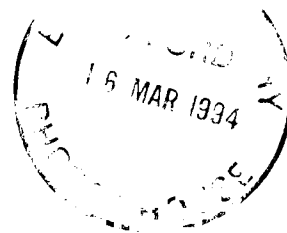
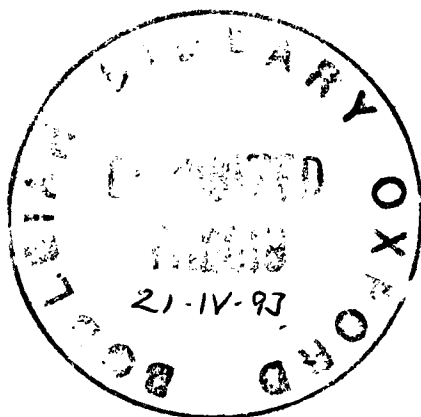


HOUSEHOLD RESPONSES TO FOOD INSECURITY IN NORTHEASTERN GHANA

**A Thesis Submitted in Partial Fulfilment
of the Requirements for the Doctorate in Economics
at the University of Oxford**



STEPHEN DEVEREUX

Balliol College

Trinity Term 1992

ABSTRACT

Stephen Devereux
Balliol College

D.Phil. in Economics
Trinity Term 1992

Household Responses to Food Insecurity **in Northeastern Ghana**

When grain production falls short of consumption expectations in self-provisioning households, a range of responses is possible. How each household selects from and manages these responses provides the theoretical and empirical focus of this thesis. Several problematic issues in the 'coping strategies' literature are addressed, including questions of response sequencing and 'discrete stages', the timing of asset sales for food, and the relationship between consumption protecting and consumption modifying strategies. Among other theoretical advances, criteria for response sequencing are identified which explain decisions about which assets to sell for food, and when, in terms of each asset's expected return rather than its immediate 'entitlement' value.

This thesis is grounded in fieldwork conducted in the West African semi-arid tropics, a region characterised by seasonality, agricultural risk and market imperfections. Drought and armyworms undermined crop production in the fieldwork village in 1987/8. The community is highly stratified economically, and striking cross-sectional contrasts in household behaviour and nutritional outcomes were observed. Food secure households practice demographic, agronomic and economic diversification, which provide access to sources of food and income that are not correlated to local economic fluctuations. Consumption insecure households have narrower options and respond to production deficits by wealth depletion (asset monetisation, debt acquisition) and severe food rationing.

Responses to production deficits are not confined to strategies for acquiring food. Multiple objectives - economic, nutritional and social - are retained. Nutritional adjustments are motivated by intertemporal economic priorities. The poorest households protected their assets and rationed consumption most severely: the cost of consuming resources rises as the number and value of assets owned falls. Within households, nutritional surveillance revealed that adults rationed their food consumption earlier and more severely than their children. Adult anthropometric status may therefore be a more robust predictor of food insecurity and economic stress than child anthropometry.

Acknowledgements

A number of people have contributed, in either a professional or private capacity, to the production of this thesis, both in Oxford and during the fieldwork in Ghana.

Dr Judith Heyer, of Somerville College, Oxford, has been an ideal thesis supervisor, providing direction at each stage, as well as reading countless (often dire) chapter drafts at great speed and offering detailed comments, always constructive and stimulating.

Gillian Devereux was my companion in Ghana, where apart from enduring malaria and food poisoning, she carried out a five-round nutrition survey and conducted dozens of interviews for this research. Her less glamorous but no less valuable contributions to this thesis included typing volumes of fieldnotes, counting countless numbers from 700+ questionnaires, and checking references just hours before submission.

Seidu Mumuni, my principal interpreter for ten months, was highly professional and had an ability to relate to respondents which smoothed our entry into the village and greatly facilitated the research. Valuable research assistance was also provided by Nachinaba Bugri, from the Institute of African Studies at Legon, and by Dorcas Panada. Also in northern Ghana, Carla Roncoli, a fellow PhD fieldworker, generously shared contacts, data, even research assistants.

Among many others who assisted us in Pusiga and Bawku town, the following deserve special mention: Karim Braimah, S.K. Salifu, John Abugrey, Henry Oduroh and Philip Ayamba. The people of Tesnatinga and Terago accepted our year-long intrusion into their lives with good grace, warmth and generosity. We will remember them always with affection.

In Accra, Professor Kwame Arhin, Director, and the members of the Institute of African Studies at the University of Ghana, Legon, arranged institutional affiliation, provided an academic base, and wrote letters essential for dealing with Ghanaian bureaucracy.

The staff at the National Archives of Ghana, Accra, were also most helpful. In all dealings with government employees and academics in Ghana I received a high degree of co-operation and support.

The fieldwork would not have been possible without a generous research grant from ESCOR-ODA. This thesis is one result of ESCOR's support. (Preliminary results were reported in Devereux (1989).) I also acknowledge with thanks financial support from Balliol College, Oxford, the Newby Trust and Draper's Consolidated Charity. Julia Knight and Rosemary Francis, at Queen Elizabeth House, Oxford, managed the financial and administrative aspects of the ESCOR grant.

Before leaving for Ghana, I contacted several West Africanists, including David Cleveland, Phyllis Ferguson, Keith Hart, Polly Hill, Michael Watts and Ann Whitehead. All responded generously, either in person or by correspondence. While writing up, I have benefited from comments made at graduate seminars at Oxford University and Oxford Polytechnic, Swansea University's Centre for Development Studies, and the London School of Hygiene and Tropical Medicine.

My thanks also to Roger Hay and other members of the Food Studies Group, Oxford, where I have been a research associate since 1986, for logistical, intellectual and physiological sustenance (computers, consultants and coffee respectively). Also to Chris and Fran Burge, for their support before, during and after fieldwork.

John Hoddinott, Robert Greener and Bruce Cogill supplied invaluable technical advice about computing, software and statistics. The advisory staff at Oxford University's Computing Services (OUCS) helped with data entry and use of SAS. Alayne Adams, Bill Bender, Jindra Cekan, Jane Corbett, Lucia da Corta, Robert Greener, Barbara Harriss, John Hoddinott and Simon Hunt also read chapter drafts and/or shared in discussions which contributed to developing the ideas presented in this thesis.

I dedicate this thesis to Gillian, who lived it with me; and to my parents, who each, in their own way, made it possible.

CONTENTS

Acknowledgements	i
Chapter 1. Introduction	1
Chapter 2. Historical Origins of Inequality and Subsistence Crises in Northeastern Ghana	9
Chapter 3. Agriculture and Seasonality in Northeastern Ghana	84
Chapter 4. Responses to Food Deficit: A Critique of the Literature and a Conceptual Approach	134
Chapter 5. Responses to Food Deficit in Pusiga, 1988/9	201
Chapter 6. Nutritional Consequences of Food Insecurity in Northeastern Ghana	266
Chapter 7. Conclusion	323
Bibliography	330
 <u>Appendices</u>	
Appendix 1. Fieldwork Methodology	359
Appendix 2. Fieldwork Questionnaires	379

DETAILED CONTENTS

Chapter 1. Introduction

1. Theoretical Concerns	1
2. The Empirical Context	3
3. Outline of Thesis	6

Chapter 2. Historical Origins of Inequality and Subsistence Crises in Northeastern Ghana

0. Introduction	9
1. Interregional Inequality and Regional Underdevelopment in Northeastern Ghana	10
1.1. The Colonial Period	11
1.2. The Post-Colonial State	14
2. The History of Pusiga	22
2.1. Inequality and Differentiation in Colonial Northeastern Ghana	26
2.1.1. Cash Cropping	28
2.1.2. Conscript Labour	29
2.1.3. Road-Building	31
2.1.4. Taxation	32
2.1.5. Mixed Farming	33
2.2. Ethnicity and Land Settlement in Pusiga	35
3. Food Crises and Differentiation in Northeastern Ghana	38
3.1. Pre-Colonial Food Crises	40
3.2. Food Crises in Colonial Pusiga	42
3.2.1. Colonial Responses to Food Deficits	43
3.2.2. <i>Poyanglal</i> : The Official Version	46
3.2.3. <i>Poyanglal</i> : The People's Version	47
3.2.4. From Surplus to Deficit: Northeastern Ghana in the 1940s and 1950s	51
3.3. Post-Independence Food Crises: 1957-1985	55
3.4. Summary	58
4. Differentiation and Inequality in Contemporary Pusiga	59
4.1. Demographic Factors	62
4.2. Commoditisation	65
4.3. Trade	68
5. Quantifying Inequality in Contemporary Pusiga	71
5.1. Household Wealth	72
5.2. Household Incomes	75
5.3. Household Entitlements	81
6. Conclusion	82

Chapter 3. Agriculture and Seasonality in Northeastern Ghana

0. Introduction	84
1. Agriculture	85
1.1. Crops	85
1.1.1. Cereals	87
1.1.2. Pulses	88
1.1.3. Vegetables and Tree Crops	89
1.1.4. Inedible Cash Crops	91
1.2. The Farming System	92
1.3. Labour	98
1.4. Land	100
1.5. Institutional Support for Agriculture	101
1.5.1. Ministry of Agriculture	102
1.5.2. Farmers Service Company	102
1.5.3. Crops Research Institute	104
2. Seasonality	105
2.1. Agricultural Seasonality	105
2.2. Climatic Seasonality and Drought	108
2.3. Employment and Income Seasonality	115
2.4. Grain Price Seasonality	119
2.5. Institutional Responses to Seasonality	126
2.5.1. Ghana Food Distribution Corporation	127
2.5.2. 'Global 2000'	129
3. Conclusion	131

Chapter 4. Responses to Food Deficit: A Critique of the Literature and a Conceptual Approach

0. Introduction	134
1. Definitions and Terminology	135
2. The Literature on Household 'Coping Strategies'	139
2.1. A Summary of Approaches	140
2.1.1. Responses Enumerated	140
2.1.2. Responses Categorised	141
2.1.3. Responses Sequenced	143
2.1.4. Discrete Stages	147
2.2. Rational Rationing and Nutritional Reductionism	152
2.3. A Critique of Sequencing and Discrete Stages	156
3. Conceptualising Household Responses to Food Deficit	161
3.1. Production Strategies	162
3.2. Income Diversification Strategies	165

3.3. Asset Strategies	168
3.3.1. Determinants of Asset Accumulation	169
3.3.2. Sequencing of Asset Disposal	172
3.3.3. Timing of Asset Disposal	176
3.4. Credit and Transfers	182
3.5. Nutritional Strategies	185
4. Intra-Household Considerations	189
4.1. Intra-Household Conflicts	190
4.2. Differential Vulnerability	191
4.3. Household Dissolution	193
5. Conclusion	194
Appendix 4.1. The Specification of Household Entitlements to Food	196

Chapter 5. Responses to Food Deficit in Pusiga, 1988/9

0. Introduction	201
1. Direct Entitlement Declines in Pusiga, 1987-1988	201
1.1. Causes of Crop Failure in 1987	202
1.2. Causes of Crop Failure in 1988	205
1.3. The Government Response: Food Aid Comes to Pusiga	207
2. Classifying Households in Pusiga by Food Security Criteria	209
3. Enumerating Responses to Food Deficit in Pusiga	214
4. Cross-Sectional Differences in Household Behaviour	219
5. Consumption Protecting Strategies	225
5.1. Spending on Grain	225
5.2. Primary Sources of Income for Grain Purchases	227
5.3. Secondary Sources of Income for Grain Purchases	235
5.3.1. Borrowing	235
5.3.2. Remittances	241
6. Impact of Food Deficit on Household Expenditures	245
6.1. Food v. Non-Food Spending	245
6.2. Non-Food Expenditures	246
7. Responses to Food Deficit and Social Standing	249
7.1. Funerals in Pusiga, 1989	251
7.2. Other 'Status Costs'	255
8. Sequential Adoption of Responses to Food Deficit in Pusiga	257
9. Seasonality and Economic Differentiation	260
10. Conclusion	265

Chapter 6. Nutritional Consequences of Food Insecurity in Northeastern Ghana

0. Introduction 266

1. Methodology 267

 1.1. Data Collection 267

 1.2. Child Anthropometric Indicators 269

 1.3. Adult Anthropometric Indicators 271

2. Child Nutrition in Northeastern Ghana 272

 2.1. Basic Statistics 273

 2.2. Child Malnutrition by Gender 277

 2.3. Child Malnutrition by Season 278

3. Adult Nutrition in Pusiga 282

 3.1. Adult Nutrition by Season and Gender 282

 3.2. Adult Nutrition by Age Cohort 286

4. Intra-Household Differences in Nutrition Status: Adults and Children 289

5. Inter-Household Factors: The Economics of Nutrition 295

 5.1. Inequality, Seasonality, and Malnutrition 296

 5.2. Inequality and Malnutrition in Pusiga 298

 5.2.1. Food Security Status, Wealth Quartiles and Household Entitlements 298

 5.2.2. Mother’s Income and Expenditure 302

6. Conclusion 311

Chapter 7. Conclusion

1. Theoretical Observations 323

2. Empirical Findings 325

3. Implications for Further Research 326

4. Implications for Policy 327

Bibliography 330

Fieldwork Appendices:

Appendix 1. Fieldwork Methodology

0. Summary of Fieldwork	359
1. Sample Enumeration	360
1.1. Site Selection	360
1.2. Sample Selection	361
1.3. Units of Analysis	363
1.4. Pre-Survey Enumeration Errors	365
1.5. Changes During the Year: Household Mobility, Mortality, Assimilation and Fission	366
2. Data Collection	368
2.1. Research Assistants	368
2.2. Quantitative Data	368
2.3. Qualitative Data	370
2.4. A Note on Respondents	371
3. Limitations of the Fieldwork	372
4. Post-Fieldwork Analysis	374
4.1. Household Classification	374
4.2. Software Used in Data Analysis	376
Appendix A1.1. Specialist Interviews	377

Fieldwork Questionnaires

List of Tables

Table 2.1.	Plough Owners in Bawku District, 1938-1960	34
Table 2.2.	Balance of Trade of Main Crops, 1943-1956	53
Table 2.3.	Gini Coefficients (Wealth) for the Pusiga Sample, 1988 and 1989 .	74
Table 2.4.	Gini Coefficients (Incomes) for the Pusiga Sample, 1988-89	76
Table 2.5.	Income Distribution in Pusiga, 1989	79
Table 2.6.	Agricultural v. Non-Agricultural Incomes by Quintile, 1989	80
Table 2.7.	Per Capita Income in Pusiga, 1989	80
Table 2.8.	Gini Coefficients (Entitlements) for the Pusiga Sample, 1988/9 . . .	81
Table 3.1.	Crop Projections for the 1986 Agricultural Year, Bawku District . .	86
Table 3.2.	Fertiliser Prices in Upper East Region, Ghana	103
Table 3.3.	Annual Calendar, Northeastern Ghana	107
Table 3.4.	Monthly Rainfall at Manga-Bawku, Northeastern Ghana: 1930-1988	110
Table 3.5.	Rainfall Variability in Northeastern Ghana: 1970s and 1980s	113
Table 3.6.	Commodity Exports (bags), Bawku District, 1988	118
Table 3.7.	Monthly Maize Price Indices, Bawku District and Ghana	121
Table 3.8.	Retail Maize Prices, Bawku District Markets, 1982-1989	125
Table 3.9.	Rainfall, Grain Price and Nutritional Seasonality, 1983	133
Table 4.1.	Terminological Proliferation	136
Table 4.2.	Levels of Food Deficit and Behavioural Responses	137
Table 4.3.	Categorising Responses to Food Deficit	144
Table 4.4.	'Discrete Stages' of Adoption of Responses to Food Deficit	149
Table 4.5.	Objectives and Costs of Various Responses to Food Deficit	155
Table 4.6.	Sequencing and Continua Within and Between Responses to Food Deficit	160
Table 4.7.	Characteristics of Assets as Consumption Buffers	170
Table 4.8.	Sequencing Asset Sales by Present Value and Selling Price	176
Table 5.1.	Household Demographic and Economic Characteristics	211
Table 5.2.	Food Secure and Severely Food Insecure Households Compared . .	213
Table 5.3.	Responses to Food Deficit Adopted in Pusiga, 1988/9	216
Table 5.4.	Responses to Food Deficit in Pusiga Aggregated and Ranked	221
Table 5.5.	Responses to Food Deficit in Pusiga: Adoption v. Availability	224
Table 5.6.	Spending on Grain by Season and Household Category	228
Table 5.7.	Seasonal Sources of Income for Grain Purchases	231
Table 5.8.	Spending on Grain By Household Category, Source of Cash, and Round	232
Table 5.9.	Asset Ownership per Household by Food Security Category	234
Table 5.10.	Cash and Groundnut Borrowing by Household Category, 1988 and 1989	236
Table 5.11.	Cash and Food Borrowing by Purpose of Loan, 1988 and 1989 . .	237
Table 5.12.	Characteristics of Lenders by Category of Borrowers	240
Table 5.13.	Migrant Earnings and Expenditures, 1989	244
Table 5.14.	Non-Food Spending per Household by Category, Pusiga 1988/9 . .	247
Table 5.15.	Seasonal Non-Grain Spending per Household, Pusiga 1988/9	249
Table 5.16.	Four Funerals in Pusiga, 1989	253

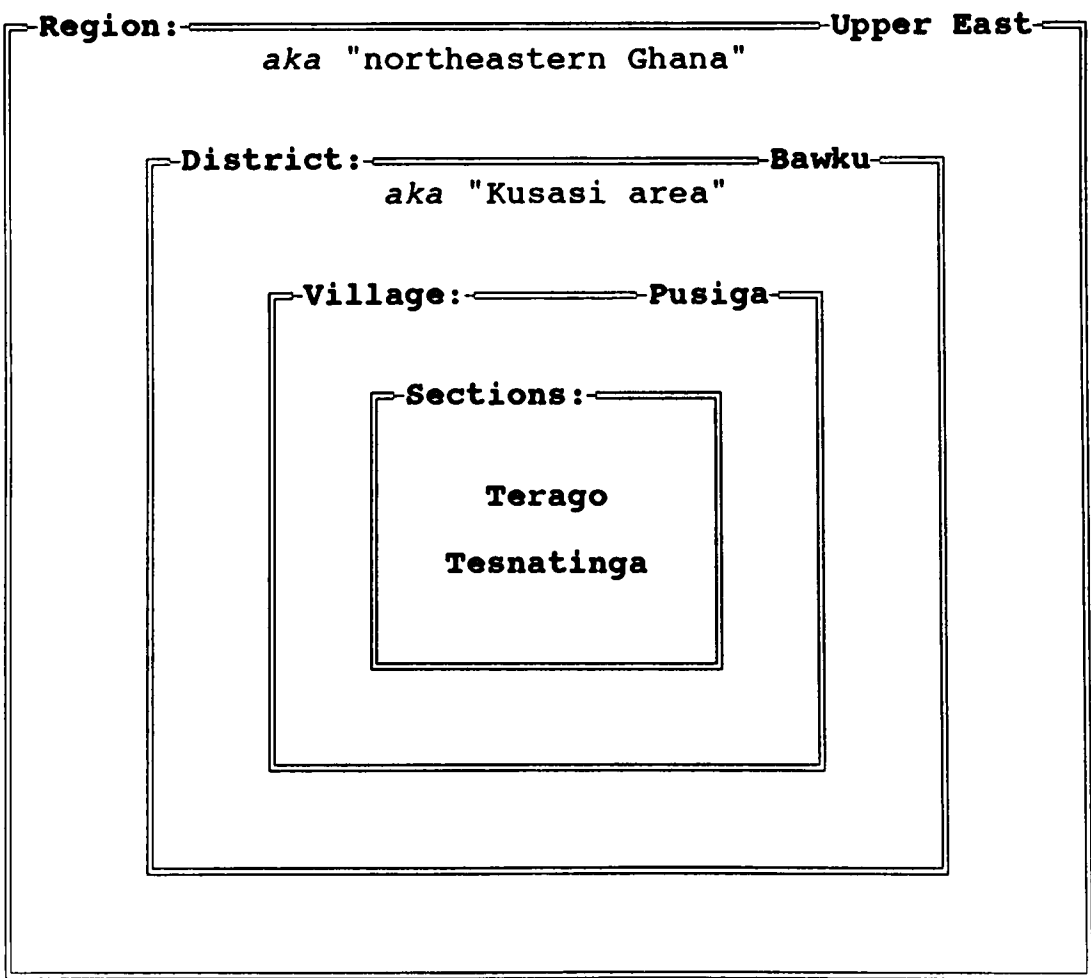
Table 5.17. Response Sequencing: A Case Study Household in Pusiga, 1988/9	260
Table 5.18. Accumulation Strategies in Pusiga, 1988/9	264
Table 6.1. Malnourished Children in Pusiga, Ghana and Africa (%)	276
Table 6.2. Mean Z-scores, Under-Fives, by Interview Round	281
Table 6.3. Summary Demographic and Nutritional Characteristics of Adults in the Pusiga Nutrition Sample, by Gender	285
Table 6.4. Adult Body Mass Index by Gender and Interview Round	286
Table 6.5. Body Mass Index: Adults and Children, by Gender and Interview Round	294
Table 6.6. Child Anthropometry: Households Ranked by Food Security Category	299
Table 6.7. Women and Food Expenditures in Pusiga, 1989	310
Table 6A.1. Children Falling below Standard Anthropometric Cut-off Points, by Age Cohort (%)	313
Table 6A.2a. Children Falling below Standard Anthropometric Cut-off Points, by Gender (%)	314
Table 6A.2b. Mean Z-scores, Under-Fives, by Gender	315
Table 6A.3. Malnourished Children by Interview Round (%)	315
Table 6A.4. Adult Body Mass Index by Gender, Age Cohort and Interview Round	316
Table 6A.5. Adults with Chronic Energy Deficiency, by Interview Round (%)	316
Table 6A.6. Adults with Chronic Energy Deficiency, by Gender, Age Cohort and Interview Round (%)	317
Table 6A.7. Reported Rationing and Meals per Day, by Interview Round	317
Table 6A.8. Malnourished Children by Wealth Quartile	318
Table 6A.9. Adult Nutrition Data by Wealth Quartile	318
Table 6A.10. Reported Rationing and Meals per Day, by Wealth Quartile	319
Table 6A.11. Child Anthropometry: Households Ranked by Value of Entitlements	319
Table 6B.1. Malnutrition among under-5s in Ghana, 1980-84 (%)	320
Table 6B.2. Male/Female Ratios, Upper East Region, Ghana, 1984	320
Table 6B.3. Selected Summary Anthropometric Results of Ghana's National	
Table 6B.4. Calorie Intake by Children in 4 Compounds in Bawku District, 1972	322
Table A1.1. Sample Sizes, Tesnatinga and Terago	363
Table A1.2. Corrections and Changes to Sampling Frame, 1988-89	366
Table A1.3. Timetable of Regular Interviews Conducted in 1988-1989	369

List of Figures

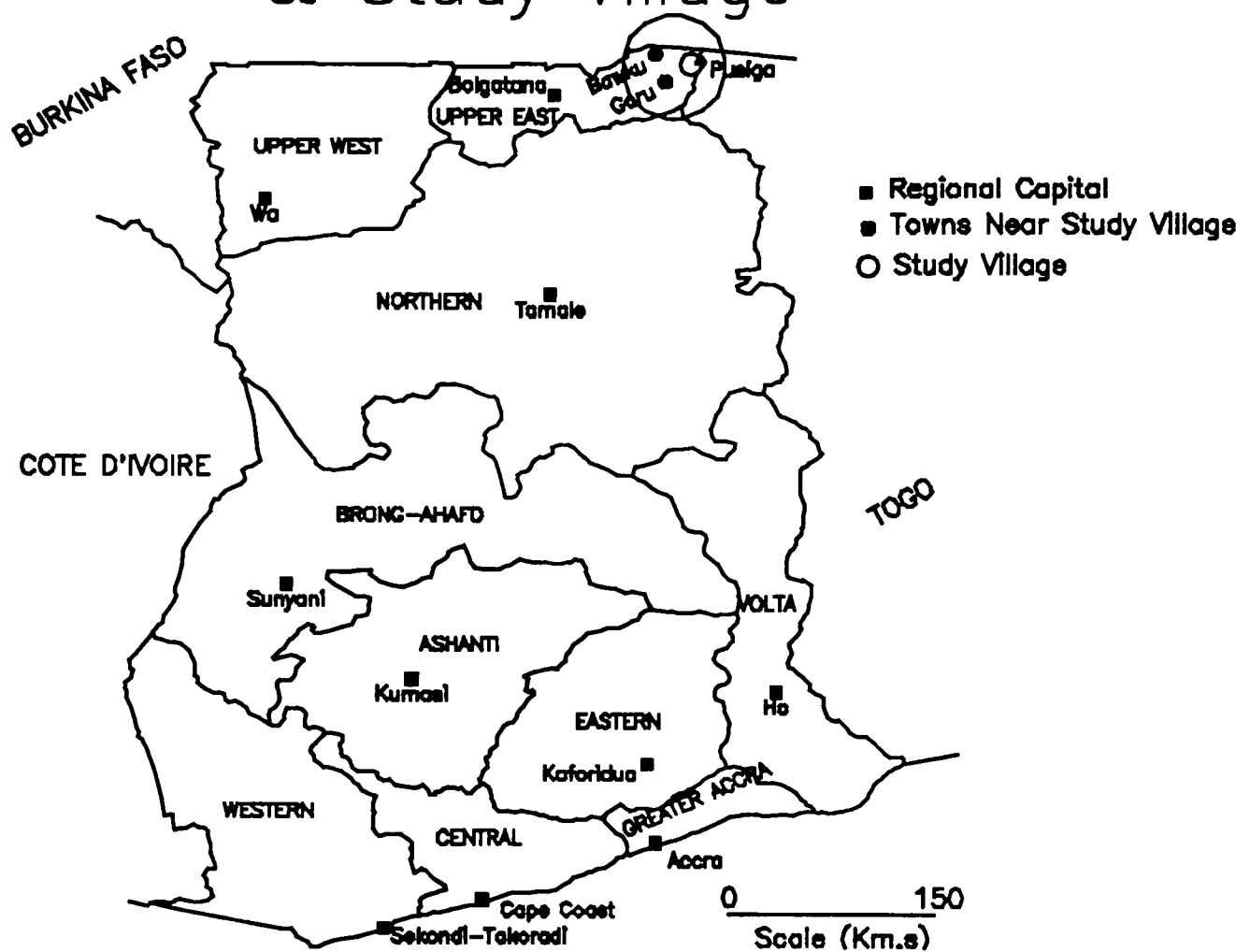
Figure 2.1. Food and Cash Crop Exports and Imports, Northern Ghana, 1943-1956	53
Figure 2.2. Lorenz Curve, Household Incomes, 1989	79
Figure 3.1. Rainfall Variability in Northeastern Ghana, 1971-1988	113
Figure 3.2. Monthly Rainfall in NE Ghana, 1970-87, 1983, 1988	114
Figure 3.3. Rainfall by Decads, 1970-86, 1987	114
Figure 3.4. Rainfall by Decads, 1970-86, 1988	114
Figure 3.5. Dry Season Exports, Bawku 1988	118
Figure 3.6. Seasonal Coefficients, Maize Prices, Bawku	121
Figure 3.7. Retail Grain Prices, Bawku	125
Figure 3.8. Moving Average, Retail Maize Price, Bawku, 1982-1988	125
Figure 3.9. Seasonality in NE Ghana, 1983	133
Figure 4.1. Temporal Sequence and Organization of Responses to Food Shortage	146
Figure 5.1. Food Production and Consumption (In)security in Pusiga	210
Figure 5.2. Spending on Grain/HH, 1988/9	228
Figure 5.3. Grain Purchases per AE, 1988/9	228
Figure 5.4. Sources of Cash for Grain	231
Figure 5.5. Use of Remittances by Migrants	243
Figure 5.6. Seasonal Expenditure Patterns by Household Category	248
Figure 6.1. Malnourished Children in Pusiga, Ghana and Africa	276
Figure 6.2. Z-Scores, Under-5s, by Round	281
Figure 6.3. Adult BMI by Gender, Age Cohort and Round	288
Figure 6.4. Adults with Chronic Energy Deficiency, by Gender and Age Cohort	288
Figure 6.5. Seasonal Food Consumption	
(a) Rationing (%): Adults and Children	292
(b) Meals per Day: Adults and Children	292
Figure 6.6. BMI: Adults and Children % Change by Round	294
Figure 6.7. Malnourished Children by Wealth Quartile	301
Figure 6.8. Mean Adult Bodyweight Loss, Rounds 1 to 5, by Wealth Quartile .	301
Figure 6.9. Consumption by Wealth Quartile	
(a) Rationing (%): Adults and Children	303
(b) Meals per Day: Adults and Children	303

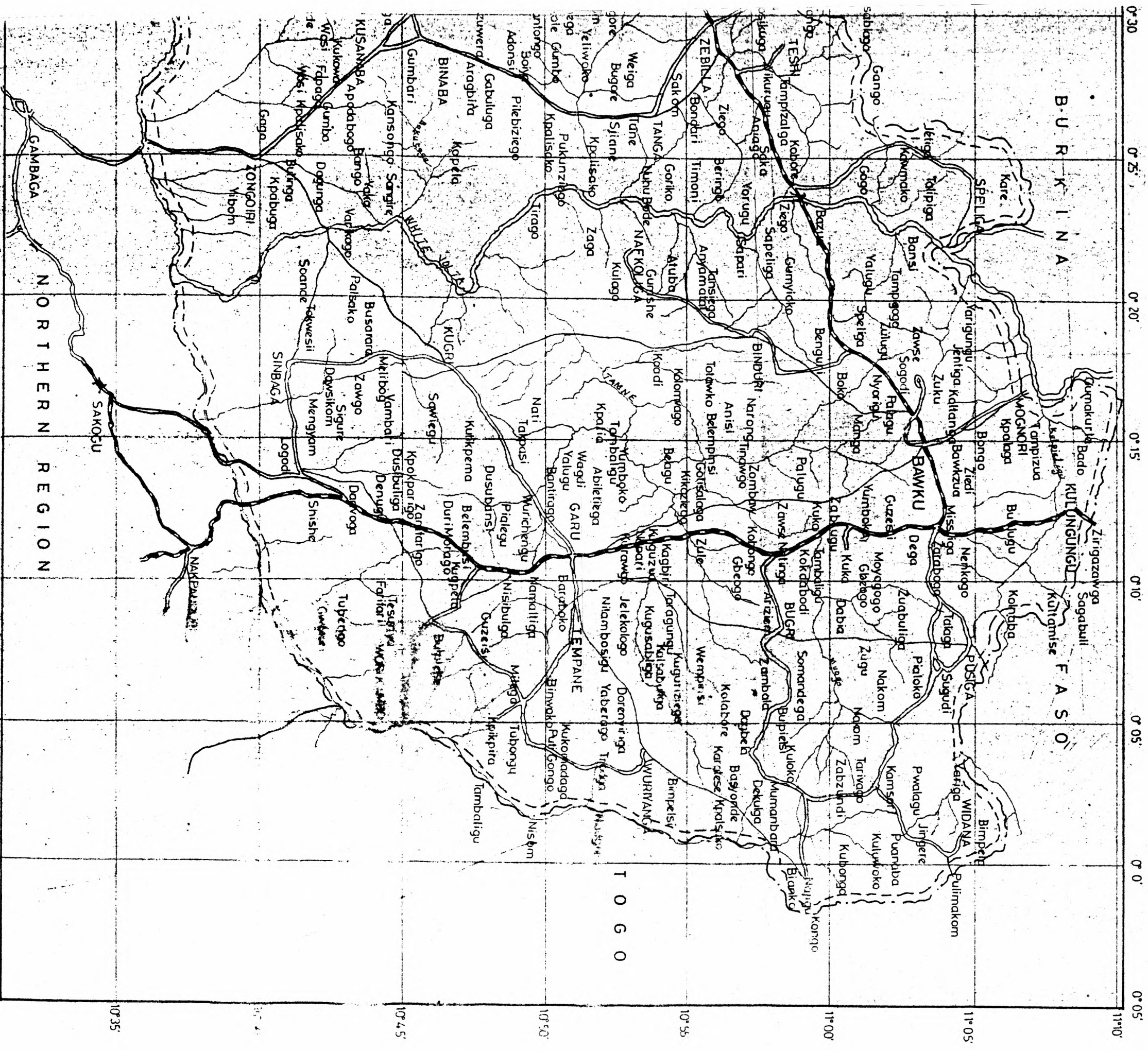
Notes

- 1. The names of all respondents in the fieldwork community have been disguised throughout this thesis. The names of the villages themselves, the research assistants and officials interviewed in Bawku town and elsewhere have not been changed.
- 2. During the period of fieldwork Ghana's currency, the Cedi, was devalued several times, halving in value relative to sterling (C330 = £1 in July 1988; C650 = £1 in August 1989). As a rule of thumb, the December 1988 exchange rate serves as the mean rate in this thesis: C500 = £1.
- 3. An abbreviated form of cross-referencing is adopted within this thesis: "see Chapter 6.3.2" means "see Chapter 6, section 3, sub-section 2".
- 4. A number of terms are used to describe the fieldwork area in this thesis. The following schematic representation aims to reduce any unintended geographical confusion (see also maps overleaf).



Ghana: Administrative Regions & Study Village





1A) Town & Country Planning Dept-Bawku (1988)

Chapter 1. Introduction

Seasonal and critical food insecurity trigger a diversity of behavioural responses by self-provisioning households. Despite a rapidly growing literature on household 'coping strategies', they remain poorly conceptualised. One theoretical contribution of this thesis is to reformulate conceptualisations of coping strategies in a more rigorous and consistent fashion. A number of problematic issues raised by the literature are identified, and improvements are suggested to redress gaps or modify generalisations. A framework for analysing household responses to food deficit is developed which addresses some key issues in the literature. This development of theory is supported and informed by primary data collected during community-level fieldwork in the West African semi-arid tropics. This empirical evidence, which is presented both inter-seasonally and cross-sectionally, validates the theoretical framework and provides several new insights into the behaviour of households under economic stress.

1. Theoretical Concerns

The ideas informing this thesis were stimulated by a reading of the literatures on famine and famine 'coping strategies' during the mid-1980s. At that time the dominant debate in famine theory centred on the relationship between supply-side (eg. Malthusian) and demand-side (eg. 'entitlements') explanations for subsistence crises. Sen's Poverty and Famines, published in 1981, had decisively shifted the balance of the argument from 'food availability decline' to 'entitlement decline' - 'entitlement' being a broader concept in which access to food is determined by wealth and income as much as by production and market availability of food.¹

¹. Although Sen's work is frequently caricatured as neglecting food production and supply, his specification of 'entitlement to food' at the individual or household level does incorporate domestic food production as well as demand-related determinants. For agriculturalists, food sources include 'direct entitlement' (self-provisioning) and various 'indirect' entitlements - crop sales, off-farm incomes, asset sales, credit, transfers (Appendix 4.1).

A reconciliation of these positions accepts the influence of both sets of factors as determinants of access to food. For self-provisioning farmers, agriculture is the most significant source of food; and household food insecurity does rise in years of underproduction. But the ability to respond to a failure of self-provisioning varies radically across households, and this is where a more discriminating focus on household wealth and incomes is required. Seasonality or drought may be an indiscriminate event, but vulnerability to these events is dictated by the unique circumstances facing each member of every household in an affected community.

Also during the 1980s, the role of rationing was beginning to receive belated attention. The conventional wisdom, that households draw on all available sources of cash and food to protect consumption levels (Watts 1983; Cutler 1986) recognises that welfare costs are associated with consumption fluctuations (Deaton and Muellbauer 1980), but privileges food acquisition above other economic or social objectives. Opposing this nutritional reductionism was the view that consumption rationing is a 'voluntary' response to food deficit, motivated by a concern to retain productive assets (Jodha 1975; de Waal and el Amin 1986; Corbett 1988).

This fieldwork tests and supports the emerging consensus that poor households sacrifice short term nutritional objectives in favour of longer term economic objectives (protecting viability). Food purchasing decisions are determined not only by the immediate value of household entitlements. These choices are also about the intertemporal management of scarce productive resources, which in turn influences the distribution of present and expected future consumption (Deaton 1990, Dercon 1992).

Underlying this disagreement are opposing views not only about household objectives, but about the extent to which household behaviour is involuntary or chosen. The latter view sees households as responding with some flexibility to subsistence threats; the former sees households responding passively and mechanistically. Both views can be criticised for treating households in an undifferentiated way, as if the observation of a 'hungry season' or 'famine' applies equally to all households in the relevant geographical area. Again, the resolution of this disagreement lies in recognising that

the poor face greater constraints than the wealthy. These cross-sectional distinctions in household responses are emphasised throughout this thesis, particularly since the fieldwork context is one of high inter-household inequality.

A number of additional questions are raised by the unsatisfactory state of the current literature on responses to food deficit. Many questions relate to the sequencing and timing of response adoption, especially asset sales for food. In this thesis some progress is made towards identifying the criteria that inform decisions about asset disposal and response adoption more generally. Such characteristics of various assets as their liquidity, risk and expected returns enter into the decision-making process.

A sharp distinction is drawn in this thesis between responses to food deficit that aim at maintaining and those that imply modifying consumption. Disaggregating Sen's entitlement approach provides a useful organising framework for analysing responses in the former category. Interpreting responses in the latter category, especially rationing, is possible but requires an intertemporal entitlement analysis. The observation of severe hunger among households holding non-zero entitlements to food rarely reflects a total inability to find food in the market. Rationing must therefore be incorporated into the analysis of household responses to food deficit: it is not simply an outcome of food scarcity, but part of the food deficit household's strategic management of its limited resources.

2. The Empirical Context

Primary data for this thesis were collected in a 13-month period of fieldwork in Pusiga, an agrarian community in Bawku District, in Ghana's Upper East Region. The purpose was to monitor post-harvest adjustments to grain production deficits. The community was chosen because farmers had suffered severe losses of cereals to drought and attack by armyworm (*Spodoptera exempta*) in both 1987 and 1988. Though not famine-prone, this fieldwork site was chosen partly to allow exploration of the relationship between responses adopted during the annual 'hungry season' and those recorded during major

subsistence crises. It was expected that response adoption would reflect each household's economic and social positioning within the community, and that the poorest might behave in ways barely distinguishable from the behaviour of communities afflicted by major famines. This is indeed demonstrated in Chapter 5.

The fieldwork methodology is described in detail in Appendix 1. An unusual feature was the repeated collection at regular intervals of both economic and anthropometric data from the same sampling frame. This produced two directly comparable data sets on the economic and nutritional consequences of an episode of severe food insecurity, and provided evidence for the simultaneous adoption of consumption protecting and consumption modifying strategies.

Quantitative data collection was dominated by a five-round repeat survey of 110 randomly sampled households, over a nine-month inter-harvest period. Apart from grain purchasing and asset disposal behaviour, each round of interviews included an income and expenditure survey. Nutrition surveillance of a 66-household sub-sample was carried out concurrently. In contrast to many other nutrition studies, anthropometric data were collected from all household members, not just under-fives. This allowed analysis of intra-household (inter-generational) distinctions in anthropometry. These primary data were supplemented by interviews about local history and life histories, income-earning activities, and related topics. Interviews were also conducted with local agricultural workers and other government officials. Secondary data were gathered from university libraries and the National Archives of Ghana, Accra.

Contemporary Pusiga is a farming community - a market surrounded by 22 'sections' (smallholder farming settlements) - located at latitude 11°04' north and longitude 00°08' west, at an altitude of 250m. Pusiga market is located just 2 miles from Ghana's border with Burkina Faso to the north, and 12 miles from the Togo frontier to the east. The

two sections in which fieldwork was conducted, Terago and Tesnatinga, lie 1-3 miles south of Pusiga market, and straddle the gravel road linking Bawku town with Togo.²

Pusiga shares many characteristics with other communities in the West African semi-arid tropics (WASAT).³ Agriculture in this "dry grain farming system" (Hill 1982) is dominated by hardy cereals (millets and sorghums), while pulses (groundnuts, cowpeas) and leafy vegetables are cultivated for both consumption and sale (Kowal and Kassam 1978). The region is characterised agro-ecologically by climatic seasonality (unimodal rainfall), poor soil quality and consequent low productivity (Bennett and Schork 1979). In the absence of irrigation, crop yields are highly covariant within micro-climates, and agricultural risk is high (Binswanger *et al* 1989:125).

One notable contrast between Pusiga and many other 'WASAT' communities is that Pusiga is densely settled, for reasons explained in Chapter 2. Land pressure has induced intensification, but low incomes constrain investment, and agriculture remains undercapitalised. Bawku District was described in the 1970s as "a near-subsistence economy in which the dominant economic motivation is to minimize risk and thereby ensure survival" (Anthony *et al.* 1979). The District is subject to periodic 'agricultural droughts' (most recently in 1977, 1983 and 1987/8), which undermine local farmers' expressed commitment to self-sufficiency (Whitehead 1984b). Although farming provides little prospect for wealth accumulation, market dependence for grain in communities like Pusiga is associated with heavy economic and hence nutritional costs (Harriss 1982b, 1983), as was certainly the case during this fieldwork.

². Pusiga is named after a tamarind tree (*tamarindus indica*, local (Kusaal) name *pusig*) around which the first settlers in the area began farming. Terago and Tesnatinga are both named after the baobab tree (*adansonia digitata* - *te-eg* (male) and *te-es* (female) in Kusaal). Tesnatinga, or 'Teshie-natenga', picturesquely, means "domain of the Chief of the female baobab tree".

³. This agro-climatic region encompasses the northern portions of Ghana, Côte d'Ivoire, Togo, Benin and Nigeria, all of Burkina Faso, Senegal, the Gambia and Cape Verde, and southern Mali, Mauritania and Niger (Matlon 1987:59). Northeastern Ghana shares economic and cultural similarities with northern Togo and northern Côte d'Ivoire (Bourgoin and Guilhaume 1979; Weekes-Vagliani 1985); Hausaland in northern Nigeria (Hill 1982; Shenton 1986; Mortimore 1989); southern Burkina Faso (McMillan 1986; Savonnet-Guyot 1986; Christensen 1989); and central Mali (Toulmin 1986; Krings 1991; Adams 1992); among other countries in the region.

In Pusiga in 1988/9, 96% of sampled households were market dependent for grain. The fieldwork concentrated on household responses to this failure to achieve self-sufficiency. Differentiated access to lucrative and non-correlated off-farm income sources has produced a high degree of intra-village inequality and mediated the ability of households to redress production shortfalls. Possibilities for wealth accumulation lie in trading, not farming.

Testing these propositions required paying close attention to cross-sectional considerations. Food secure and food insecure households display very different characteristics, and behave very differently. Sampled households differed markedly in their resource bases (or 'entitlements'), their relationship to markets and their incorporation into, or marginalisation from, social and economic networks both within and beyond the village. Explanations for this are not exclusively 'economic'. Other dimensions - historical, environmental, demographic - provide distinct insights into the nature of food insecurity, and these are also discussed extensively in this thesis.

3. Outline of Thesis

The complexity of West African systems of production and exchange (specifically, of agriculture and agricultural marketing) is well documented (Hill 1975; Norman, Ouedrago and Newman 1979; Harriss 1982a; Hart 1982; Pottier 1985). This thesis adopts a range of approaches to the study of food insecurity in contemporary northeastern Ghana. While grounded in economic theory, historical, agricultural and nutritional issues are also examined in separate chapters, and the relevant literatures are reviewed in each case.

Broadly speaking, Chapters 2 and 3 address supply-side determinants of food insecurity in contemporary northeastern Ghana. Historical processes and agricultural seasonality affect different households in distinct ways, and these different impacts are noted. Chapter 5 disaggregates demand-side determinants of food insecurity by household

category, and Chapter 6 examines the nutritional impact of the 1988/9 food deficit and responses adopted. Most of the purely theoretical discussion is contained in Chapter 4.

Chapter 2 locates the fieldwork community in its historical context, regionally, nationally and in relation to neighbouring countries. The community is poor in relation to other parts of Ghana (itself a poor country), but is sharply stratified internally. Statistical indicators of high economic inequality are presented which can only be explained with reference to historically uneven settlement patterns, access to new technology and alternative income sources, and the differentiated impact of partial commoditisation. Some households accumulated wealth and took advantage of emerging opportunities while others were marginalised. Entitlements to food are similarly maldistributed. This has significant implications for the ability to respond to food deficit, and sets the strategies actually adopted in response to the food problem of 1988/9 in a longer term perspective.

The evolution of subsistence crises from the colonial period to the 1980s is seen to mirror the evolution of famine theory: 'food availability decline' scenarios in the past have been superseded by household-specific food insecurity problems. Contemporary subsistence crises are attributable more to poverty than to food unavailability. While grain shortages do occasionally occur, in 1983 for example, high prices reduce entitlements and exclude the poor from the market. Supply variability is evident in price seasonality, but the balance of explanation has shifted from supply-side to demand-side determinants of food insecurity, an insecurity which affects households and individuals more than the community at large.

Climatic and agricultural seasonality has long been recognised as imposing severe economic constraints (eg. labour and cash flow bottlenecks) on poor rural households in tropical countries, and as being associated with enhanced morbidity and nutritional stress (Chambers, Longhurst and Pacey 1981; Lipton 1986; Longhurst 1986; Sahn 1989; Gill 1991). Supply and price seasonality in rural African grain markets is also well documented (Seaman and Holt 1980; Ibrahim 1991). Chapter 3 explores these components of seasonality in northeastern Ghana, and argues from survey data on food

purchases, asset sales and other variables that the economic implications are not uniformly distributed across households. The 'hungry season' in the semi-arid tropics is an economic as much as a climatic problem.

Chapter 4 critically reviews the literature on 'coping strategies' and identifies areas of confusion or inadequate theoretical rigour. This chapter begins with a clarification of definitions and nomenclature. Specific questions explored include: What criteria guide decisions to adopt particular responses at particular times? In what sequence will they be adopted? How do strategies to (partially or fully) protect consumption levels interact with decisions to ration consumption? Can rationing be formally integrated into the analysis of 'coping strategies'? How do immediate imperatives interact with longer term (intertemporal) objectives in the context of household behaviour under food stress?

Detailed results of the fieldwork are presented in Chapters 5 and 6. Chapter 5 focuses on strategies to protect consumption through grain purchases, and considers the impact of production deficits on household expenditure patterns and social obligations. Data are reported both cross-sectionally (inter-household) and longitudinally (inter-seasonal). In Chapter 6, the results of the nutrition survey are presented. This chapter emphasises the intra-household dimension of 'household food insecurity'. Disaggregation again addresses the question of how much undernutrition was 'involuntary' and how much a 'choice' variable.

Chapter 7 concludes the thesis and suggests directions for future research and for policy. Appendix 1 describes the research methodology. Appendix 2 reproduces the questionnaires used in the fieldwork.

Chapter 2. Historical Origins of Inequality and Subsistence Crises in Northeastern Ghana

0. Introduction

Inequality in rural Africa is greater than is often believed. The popular notion of a homogeneous peasantry living in a 'moral economy' of redistributive equality and social harmony is confounded by evidence of deep economic divisions between households, even within poor villages. Nonetheless, categorisation of African peasantries is far from simple. A variety of forces, including ethnicity, patronage and demography (household composition and life cycle stage), complicates both theoretical analyses of social differentiation and empirical attempts to quantify economic inequalities within rural communities. Some of these forces accompanied or pre-dated colonialism, while others are by-products of continually evolving relationships between peasants, markets and the post-colonial state.

This chapter has three purposes. First, it describes the history of the fieldwork site in northeastern Ghana. Poverty in Pusiga is situated both in its national context and in relation to theoretical debates about inter-regional inequality (sections 1 and 2). This historical and regional contextualisation is essential if contemporary inter-household inequality and responses to food insecurity in this community are to be understood.

Second, the discussion draws on life history interviews and previously uncollated archival materials, to examine specific episodes of food insecurity in northeastern Ghana. The role of the British colonial administration in ameliorating local crises of underproduction is assessed, and post-colonial food crises are contrasted with earlier famines. Improved transport and communications infrastructure emerges as crucial to the transformation of northeastern Ghana from a famine-prone economy, earlier this century, to one characterised instead as food insecure today (section 3).

Third, the magnitude of inter-household inequality in contemporary Pusiga is quantified, using statistical indicators such as Gini coefficients. Explanations for persistent and deepening inequality are sought in the preceding discussions of historical processes of demographic and economic differentiation (sections 4 and 5).

1. Interregional Inequality and Regional Underdevelopment in Northeastern Ghana

Ghana is ecologically, ethnically and economically diverse. Climatically, the dry northern savannah presents a stark contrast to the tropical forests and coastal fishing villages of the south. Culturally and politically, northerners are regarded by southern Ghanaians almost as foreigners. (Bawku District, with its high proportion of settlers from Burkina Faso, is often nicknamed "little Burkina" in Accra.)

Living standards, literacy levels, transport and communications infrastructure, sanitation, health and education services are all lowest in the northern regions (Senah 1989).⁴ Various studies have reached the same conclusion: "the Northern Savannah region has the highest incidence of poverty" (Okyere *et al.* 1992:5). Per capita income and consumption levels are 2.5 to 3 times lower than in Accra (Glewwe and Twum-Baah 1991; see also Brown 1986). The Physical Quality of Life Index, calculated at 13.4 for the Northern and Upper Regions' rural population in 1984, was by far the worst in the country - next lowest being rural Brong-Ahafo, with a PQLI of 35.2 (UNICEF-Accra 1986:19). This inequality is reflected not only in economic and social indicators, but also in health and nutrition outcomes (Seidman 1978). A 1980s national nutrition survey concluded that: "The northern savannah zone is in general the worst area nutritionally by all measurement criteria" (UNICEF-Accra 1988:25). Episodes of acute hunger and famine in Ghana during the twentieth century have been largely confined to the Northern and Upper Regions.

⁴. In 1980, the northern regions had 21 rural health posts - just 13% of the national total of 158 (Ewusi 1983:64) for 21% of Ghana's rural population. School attendance by 6-10 year olds in 1988 was 44% in the Northern and Upper Regions, compared with a national average of 68% (Glewwe and Twum-Baah 1991:36). In Pusiga in 1989, attendance was closer to 20% than 44%.

The problem of unequal inter-regional development within countries (the 'north-south problem'), occurs throughout the world. Several explanations have been advanced. The relevance of each argument to Ghana's semi-arid northern savannah can be assessed only with reference to its unique historical experience.

1.1. The Colonial Period

In 1902, most of what is today northern Ghana was formally annexed by the British and administered as the Protectorate of the Northern Territories of the Gold Coast (Buah 1980). It remained under British administration until Ghana's independence in 1957. The colonisation of the Northern Territories was motivated firstly by political and strategic considerations, and secondly by economic opportunism. The arrival in 1896 of British forces at Gambaga (an escarpment which serves as a boundary between the present-day Northern and Upper East Regions) pre-empted German and French interests in imposing control over this area, which had previously been ignored by the European powers. The principal commercial objective was to protect trade routes between the coast and the interior - the cattle caravans coming south and returning north with salt, kola nuts and tradeable goods. Politically, the Northern Territories were to serve as a buffer zone between the Gold Coast and its French- and German-controlled neighbours.

The evolution of the Ghanaian economy during the twentieth century has been described as an archetypal example of "structural dualism" (Ewusi 1983:87). The Gold Coast was rich in minerals and was suitable for cash crop cultivation. Colonial resources were channelled into the development of a modern sector enclave, based on the export of cocoa and the extraction of gold and other minerals. Transport and other infrastructure reflected these priorities. Cocoa soon became the Gold Coast's major foreign exchange earner. By 1911 the colony was already the world's leading cocoa producer, a position retained by Ghana until 1977.

In the structuralist logic of 'dual economy' models (Lewis 1954; Fei and Ranis 1964), the economic backwardness of northern Ghana today might be explained with reference

to its historical role as a supplier of low productivity 'surplus labour' (especially seasonally underemployed adult males) to the modern sector (export agriculture, mining and industry) in the south. During the colonial period, population pressure on poor quality land in the Northern Territories increased, and the administration encouraged young men to travel south to find work as migrant labourers on cocoa farms and gold mines. But while remittances from migrants may have sustained households in the north during the annual 'hungry season' and in years of food crisis, little was invested in agriculture or local industry. Poverty and scarcity of productivity-enhancing inputs meant that cash was used mainly for buying food, paying brideprice and taxes (which were introduced in 1936 partly to accelerate 'monetisation' (see 2.1.4 below)), or to purchase basic consumer goods. Even worse, migration selectively removed adult men from male-dominated agriculture, not only seasonally but often for years on end.⁵

In terms of Kuznets' 'inverted U-curve' (Kuznets 1955; 1963), inequality is deepest, or rises fastest, during the early stages of accumulation, as a pre-colonial economy is transformed from being more or less 'poor but equal' to one where surpluses are generated and differentially accumulated. Later, inequality begins to fall as the economy becomes integrated and the benefits of growth are more widely distributed in the form of, *inter alia*, rising wages. A conventional 'Lewis model' analysis would predict a similar 'trickle down' effect as the resources released by the low productivity 'traditional' sector (labour-intensive self-provisioning agriculture) are absorbed into the more profitable 'modern' sector, raising the productivity of both and leading ultimately to income equalisation. In Ghana's case, this clearly has not occurred - structural dualism has persisted, and the south itself has failed to prosper to an extent which would allow substantial redistribution towards the north.

According to 'dependency theory' (*contra* Lewis and Kuznets), the exploitation by the 'metropole' (or 'core') of the 'periphery' can become permanent, so that there is no reason for inequality ever to narrow. De Janvry's (1981) useful distinction between

⁵. This demographic distortion continues to the present. According to the 1984 population census, the male/female ratio in the Upper East Region for the 20-35 age category was 0.65 (calculated from Republic of Ghana 1987c, Tables 1a and 1c).

'articulated' and 'disarticulated' patterns of capitalist accumulation helps resolve the contradiction. Articulated accumulation requires the 'periphery' sector to benefit (for instance, through the creation of an internal market for consumer goods) in order to continue fuelling the growth of the 'metropole'; but disarticulated accumulation requires no such linkages, and occurs through maximum exploitation of the periphery, with little reinvestment, leaving it with no more than the ability to reproduce itself in perpetuity (by paying subsistence wages). This pattern is typical of export-oriented economies (such as African cash-crop economies during colonialism), and results in no appreciable improvement in living standards in the periphery.

Similar patterns of inter-regional inequality have persisted elsewhere in West Africa, including Nigeria, Côte d'Ivoire and Sierra Leone. One reason for the dominance of southern regions in these states is their proximity to ports for exporting cash crops and minerals. It is no coincidence that the colonial ports of Lagos, Abidjan, Freetown and Accra all became capital cities. These urban centres "became 'islands' of development while the remaining parts of each country remained isolated and experienced the 'backwash effects' of development, including a loss of their productive human resources through migration to the growing towns" (Onyemelukwe and Filani 1983:22).

Engmann (1975) perceived this process as reflecting the inexorable logic of market forces - north-south migration being prompted by economic constraints ('push' factors) in the north and economic opportunities ('pull' factors) in the south. In this view, the state's role is neutral - regional differences developed because of state policies of 'neglect' or 'indifference' towards the north, rather than malevolent interventionism. Opposing this benign interpretation is the argument that socioeconomic polarisation between northern and southern Ghana was perpetuated by deliberate policy of successive colonial and post-colonial governments, with the overt intention of holding the north in permanent dependency and underdevelopment, to the benefit of the south (Shepherd 1981; Ardayio-Schandorf 1982; Plange 1984).

Plange (1979:6) distinguishes between 'natural resources' (the physical endowment of a geographical environment) and 'colonial resources' (those natural resources which a

colonial power chooses to exploit). The claim that the north lacked natural resources Plange dismisses as a "naturalistic fallacy". Rather, the only commodity of interest to the colonial administration was the labour power of the colonised population - "the generation of a reserve army of semi-proletarianised peasants for the export sector developed in the South" (Songsore 1982:2). A second dimension of this strategy was "to prevent the emergence of social forces that could challenge Northern Ghana's 'peripheral' function as supplier of labour" (Konings 1986:11). The British deliberately blocked the penetration of capitalist production relations in the Northern Territories, by withholding development funds and preventing the emergence of a land market,⁶ and forestalled the threat of an emergent political consciousness by discouraging missionary initiatives in bringing education to the Protectorate. By these and other mechanisms, the economic interests of the south were promoted at the expense of the north.

1.2. The Post-Colonial State

The achievement of "territorial integration" or political homogeneity by the post-colonial state in Ghana has been consistently hindered by "horizontal discontinuities" such as ethnic plurality and the dominance of lineage-based loyalties over nationalist affiliations (Ladouceur 1979:5). Although regional diversities have not produced separatist political movements,⁷ they continue to be associated with deep social and economic disparities.

In the 1960s, when the 'stages of growth' view had some influence in development circles (Rostow 1960), underdevelopment in Northern Ghana was commonly ascribed

⁶. The Land and Native Rights (Northern Territories) Ordinance of 1927 vested official control of land in the colonial governor, but endorsed rights to allocate land in "customary law". This application of 'indirect rule' served to preserve social stability and to delay the formation of a dispossessed rural landless class dependent on the state (Ninsin 1986:154).

⁷. Before independence in 1957, though, Mamprusi chiefs campaigned actively for regional autonomy for the Northern Territories, fearing that their interests would not be represented by Nkrumah's southern-based Convention People's Party. In 1954 the Northern People's Party was formed, but it won only 15 of 26 Northern Territories seats in the 1956 election, losing even Bawku to the CPP candidate (Austin 1964:349). Tensions between north and south persisted after independence. In 1962, an attempt was made to assassinate Nkrumah when he visited Bawku District.

to its being at a "different stage of development": "Social and economic conditions persist in the North which have largely passed further south" (Caldwell 1969:169). Several explanations for the persistence of Ghana's structural dualism have been advanced.

The first extends the colonial 'benign neglect' view into the post-colonial period - that the north was simply ignored because it has remained peripheral to the development of metropolitan capital in the south. Environmental determinists of the 1960s noted that ecological similarities in West Africa are latitudinal rather than longitudinal, "so that contrasts occur in a south-north direction" (Ladouceur 1979:xiii), and they attributed the underdevelopment of Ghana's northern savannah to its climatic and agro-ecological limitations (Szereszewski 1965; Boateng 1966; Dickson 1969). The north suffers from a harsh climate marked by pronounced seasonality and regular drought, declining soil fertility, and high incidences of debilitating or even fatal diseases such as guinea worm, malaria and cerebro-spinal meningitis.⁸ In Bequale's (1983:240) pithy phrase, "the region is ecologically disadvantaged".

After independence in 1957, government policies tended to reinforce rather than erode urban-rural dualism and inter-regional inequalities. Bureaucrats and politicians inherited an institutional framework which concentrated power in Accra, power which they had little incentive to relinquish or decentralise to the Regions. Successive governments implemented Five or Seven Year Development Plans or Integrated Rural Development Programmes. All included regional development objectives, few of which were achieved (Adarkwa 1983). The division of the Northern Territories after independence, first into the Northern Region and the Upper Region, in 1960, with a further subdivision of the latter into the Upper West and Upper East Regions in 1983, aimed to create 'growth poles' in the regional capitals (Tamale, Wa and Bolgatanga), but with little

⁸. In the past, onchocerciasis (river blindness) and yaws were also endemic in some districts, but these have now been virtually eliminated. In 1940, 96% of adult males in Bawku District were rejected as unfit for military conscription by the British, the main health problems being guinea worm, malnutrition, and bilharzia (Smith 1945:2).

success.⁹ Rhetoric has rarely been backed by adequate resources. "Subsequently, the north-south disparity is widening while within the regions, the rural-urban dichotomy assumes newer dimensions" (Aryeetey 1985:11).

A familiar variant on these arguments sees the state as well-intentioned but unable to promote development in poorer regions because of their 'natural' and even 'social' constraints. "National social and economic policies... recognize the need to bring equitable development to all regions and communities, although inadequate social, economic, and geographic resources impede progress" (Zachariah and Conde 1980:14). The area covered by Ghana's northern savannah is estimated at 152,000 km², or about 57% of the country (Ewusi 1983:11), but it contains only around 30% of the population. Nonetheless, parts of the north are extremely densely populated (for reasons discussed below), to the point where Bawku District, in particular, is often described as having exceeded its 'carrying capacity'. Thousands of men migrate annually, cyclically or permanently to the south and to neighbouring countries in search of work.¹⁰ The resulting perception of northern Ghana as a low productivity region unable to support its population has produced a number of Malthusian interpretations (Caldwell 1969; Engmann 1975; UNICEF-Accra 1989). Typical is Konings' (1986:98-99) comment, that on cocoa farms in Brong-Ahafo Region, "about one-third of the annual labourers are Kusase, whose home territory is one of the most densely populated and poverty-stricken areas of Northern Ghana".

Opposing 'benign neglect' or 'resource constraint' arguments is the view that excessive state interventionism is responsible for Ghana's problems in agriculture and the national economy. Often cited is Nkrumah's ideological commitment to export-led growth, which was to be achieved primarily by industrialisation: "Nkrumah and his colleagues

⁹. Bawku has always been the most populous town in the Upper Region. As a centre of colonial administration, Bawku had 5,850 inhabitants by 1915 (Benneh 1974:171)). But Bolgatanga was preferred as the regional capital because of its central (longitudinal) location. In 1960, the population of Bawku town was 13,729; that of Bolgatanga, just 5,535 (McKim 1972:338). By the time of the 1984 Census, the two were of comparable size, each housing around 33,000 residents.

¹⁰. The Upper Region lost an estimated 148,700 people (net) to outmigration between 1960 and 1970 (Ewusi 1983, Table 2.7), equivalent to 19.7% of the region's total population in 1960 of 755,000.

made no intellectual distinction between industrialization and development" (Killick 1978:185). But this naturally encouraged urbanisation; with few backward linkages to agriculture, rural development was not promoted.

The decline of the Ghanaian economy during the 1970s, when it slumped from one of Africa's richest countries to one of the poorest, is well documented (Bequele 1983; Ewusi 1983; World Bank 1984b). In all productive sectors - cocoa, foodcrops, mining, manufacturing - output fell. Between 1970 and 1983, real GDP growth rates were negative, real export earnings halved, inflation averaged over 50% per annum, real wages fell by 80%, and the index of per capita food production fell from 100 in 1975 to 65 in 1982.¹¹ Falling exports and deteriorating terms of trade reduced government revenues along with private earnings. Import capacity was reduced, infrastructure crumbled, acute shortages of consumer goods and spare parts developed. High inflation rates contributed to reductions in real incomes, and an overvalued exchange rate fuelled illegal cross-border trade (UNICEF-Accra 1988). Ghana's experience coincided with economic crises throughout sub-Saharan Africa. Adverse external factors, such as the 1970s oil price shocks and falling cocoa prices, affected all oil importers and monocrop exporters comparably. But political instability and economic mismanagement compounded Ghana's precipitate collapse (Abaka-Quansah 1987).

Post-colonial state intervention in peasant agriculture occurred mainly in the sphere of exchange, rather than production. From the early 1960s to the 1980s, the Cocoa Marketing Board (CMB) extracted a heavy surplus from cocoa farmers, one ostensible aim being to invest in the development of the northern regions. But little of the proceeds ever reached the north. With 10% of Ghana's population, the Upper Region was allocated just 3% of the Ministry of Agriculture budget between 1971 and 1974 (Bequele 1983:240). This comparative neglect was compounded by a fall in public expenditure on agriculture as a whole, from 10.8% of the national budget in 1965 to 6.3% in 1971/2 (Hansen 1989:202).

¹¹. FAO, Production Yearbooks, 1980 to 1985; ILO, Yearbook of Labour Statistics, 1977 to 1986; World Bank, World Development Reports, 1978 to 1986.

The policy of underpaying cocoa producers reached a point where, by 1977, the price offered to farmers was just 13% of the export price earned by the CMB (World Bank 1984b). Producer resistance was individualist rather than collective - farmers switched out of cocoa and into food crops (a partial 'retreat into subsistence'), or evaded government marketing agencies by smuggling cocoa to neighbouring countries, mainly Côte d'Ivoire (Bates 1981). By 1978, Ghana's francophone neighbour, aided by more favourable price incentives to its farmers, had supplanted Ghana as the world's leading cocoa producer (FAO 1980; Beckman 1981). It was also the most popular destination for north Ghanaian migrants seeking seasonal or longer term employment. Officially, cocoa production in Ghana contracted from 422,000 metric tons in 1972/3 to 250,000 tons in 1978/9, a decline matched by a fall in Ghana's share of world production from 29.3% to 16.5% (Gyimah-Boadi 1989:233).

The collapse of cocoa during the 1960s and 1970s was accompanied by a crisis in food production. A primary objective of 'Operation Feed Yourself', introduced by Ghana's new military government in 1972, was to achieve national self-sufficiency in foodcrop production, so as to reduce the country's dependence on food imports and curtail its rising foreign debt (Ewusi 1985).¹² These concerns led to renewed interest in the northern savannah as primarily a food producing zone. From being designated as little more than a labour reserve for the export economy of the south by the British, the region was now regarded as a potential producer of staple food for the nation's rapidly growing towns and cities. The state's attempt to convert the north from a supplier of labour to a supplier of foodcrops motivated its investment during the 1970s in agricultural mechanisation and subsidised inputs. It particularly supported capitalist rice farming (Goody 1980; Shepherd 1981) and large-scale irrigation projects (Konings 1981, 1986) in the Northern and Upper Regions. In Bawku District itself, though, government involvement in agriculture was minimal. One factor was population variations across the region. Little spare land was available for large farms in Bawku, and the construction of dams and canals was mainly confined to the three Upper East

¹². In 1971, food imports amounted to 16% of Ghana's total import bill (Ninsin 1989:172). The failure of 'Operation Feed Yourself' to redress this is discussed in Girdner *et al.* (1980).

districts adjacent to Bawku (Builsa, Frafra, and Kasena-Nankani), where land was relatively abundant.

The failure of Operation Feed Yourself and related interventions is evident in the fact that the 1970s saw a 30% decline in per capita food production (Hansen 1989:193; Quansah 1987:24). "By 1982 total food availability was only 68 per cent of minimum basic calorie requirements (with Chad, the lowest in Africa)" (Cornia and Stewart 1987:112). In the nadir year of 1983, the combined effects of prolonged recession and severe drought created famine conditions in the north, with farmers becoming market dependent at a time when transport and communications infrastructure were near collapse, and government capacity to import and distribute food was negligible.

As for social infrastructure, government spending on health and education fell steadily in the 1970s and 1980s. Half of Ghana's doctors emigrated between 1981 and 1984 alone. Ghanaians suffered declining health and nutrition status, evident in rising malnutrition and infant mortality rates, a fall in life expectancy, and the recurrence of diseases like yaws and yellow fever, thought to have been eradicated, in 1977, 1981 and 1983.¹³ Health clinic attendance in the the Upper East and Upper West Regions fell from 31,000 in 1979 to 9,800 in 1984 (UNICEF-Accra 1988:109).

In April 1983, Ghana's PNDC government adopted an IMF- and World Bank-funded stabilisation and structural adjustment package of loans tied to policy reforms, designed primarily to improve the macroeconomic performance of the economy (Republic of Ghana 1983, 1987a). A general principle was to realign relative prices so as to provide incentives to producers, investors and exporters. Among several policies introduced were a hundredfold devaluation of the cedi between 1983 and 1989 (Clark and Manuh 1991:219), the removal of many consumer subsidies, and a 17-fold increase in producer prices paid to cocoa farmers between 1983 and 1987 (Dowden 1987).

¹³. Levels of infant mortality and child malnutrition, which fell steadily until the late 1970s, started rising again in the early 1980s. The proportion of children estimated as malnourished nationwide exceeded 50% in 1983 (UNICEF 1985).

The effects of this Economic Recovery Programme (ERP) were immediately felt in reversals of several trends noted above. Per capita incomes started to rise, the budget deficit was cut, positive GDP growth rates were recorded (averaging 5% per annum between 1985 and 1989), and inflation was brought under partial control. Against this, external debt and debt servicing liabilities rose sharply (Ewusi 1987) - donor support came mainly in the form of loans, not grants. The emphasis of most reforms was on macroeconomic indicators and on the export sector (cocoa, timber, mining). Foodcrop farmers were virtually ignored, and they derived few 'trickle-down' benefits.

Moreover, these aggregate economic successes were offset by further cutbacks in the provision of social services, followed by the introduction of user charges under the terms of fiscal austerity and cost recovery associated with the ERP. The introduction of fees for schools and health facilities is a regressive measure which disproportionately affects the poor (Okyere *et al.* 1992:10). Pusiga, for example, has 16 primary schools, 5 junior secondary schools and a Teacher Training College, but in 1987 the annual fee per child was increased from C20 to C200, which immediately resulted in children being withdrawn from education.¹⁴ Consultation fees at Pusiga clinic were raised from C50 to C100 in 1989, against the better judgement of the Community Nurse, who argued that clinic attendances fell sharply when charges were introduced in 1986, and fell again in 1989, and that the poorest always dropped out first.¹⁵

To summarise, the positive elements of the Economic Recovery Programme have had little impact on the people of northern Ghana, while the implications of structural adjustment on social services have been regressive. Recognising this, in 1987 the government introduced 'PAMSCAD' (Programme of Actions to Mitigate the Social Costs of Adjustment), which targeted specific 'vulnerable groups' such as the rural poor in the northern regions. Interventions are project-based and include: employment generation (food-for-work and public works), credit provision for artisans and small enterprises, and basic needs improvements (sanitation, water supplies). Simultaneously,

¹⁴. Interview with Mr Mumuni Abubakari, primary school teacher in Ninkongo, Pusiga; July 1989.

¹⁵. Interview with Mr S.K. Salifu, Pusiga Nurse; 30 July 1989.

under the second phase of the national Economic Recovery Programme (ERP II), a number of policy changes were announced, including the installation of grain silos to reduce post-harvest losses, the rehabilitation of neglected irrigation schemes (silted dams), and the targeting of small farmers with access to productive inputs (Republic of Ghana 1987b:11).

PAMSCAD was slow to get started and had had minimal impact in Bawku District by the time the present fieldwork was completed in July 1989. An early critique concluded that PAMSCAD was attempting too many projects of too diverse a range, and that it was failing to target effectively "the poorest of the poor" (Clark and Manuh 1991:221).

In conclusion, the underdevelopment of northeastern Ghana occurred over an extended period, for reasons related as much to national and international events as to internal factors. The region has always been on the margin of events, from pre-colonial times when it was trapped between the Mossi kingdom to the north and the Mamprusi kingdom to the south, to the colonial period, when it was regarded as having little economic potential, to the post-colonial present, when it continues to be marginalised or ignored by politicians and businessmen in Accra. Nonetheless, the north is changing, in many ways dramatically. The Upper East Region has derived Boserupian benefits from its high concentration of population, such as the installation by CIDA (the Canadian International Development Agency) of handpumps throughout the Region in the mid-1970s. In 1975, 2 handpumps were sunk in Terago and 2 in Tesnatinga, with the result that virtually every household lives within one mile of pipe-borne drinking water.¹⁶ This has proved immensely beneficial, not least in eradicating debilitating guinea worm from the District - an achievement yet to be realised in the sparsely populated Northern Region. Transport and communications links between the regions continue to improve, electricity reached Bawku town in 1991, and investment by donor agencies and the state in development projects is rising.

¹⁶. From the records of the Ghana Water and Sewage Corporation, District Head Office, Bawku.

Finally, as a border community, the destiny of Bawku District is not unrelated to developments in neighbouring countries. As will be seen, political and economic pressures in German and francophone West Africa encouraged settlement in northern Ghana (then Gold Coast) earlier this century, and these households retain close links with relatives across the frontier. Cross-border trading (both legal and illegal) between northern Ghana, Burkina Faso and Togo was significant in 1988/9 (though predictably difficult to quantify). As noted above, favourable economic incentives in Côte d'Ivoire continue to attract seasonal and longer term migrants from Bawku District, and many local families also have relatives living and working in Nigeria and further afield.

The next section narrows the focus to Pusiga (the fieldwork village in Bawku District) itself, arguing that differentiation and food insecurity in contemporary Pusiga are strongly conditioned by historical settlement patterns, colonial policies and other events dating back a century or more.

2. The History of Pusiga

Prior to the late nineteenth century, the Kusasi people of northeastern Ghana were poor, acephalous, and surrounded by ethnically related but warring kingdoms. A British representative who visited the area in 1894 described it as follows: "This region, between Mamprusi and Mosi, is occupied by Grunshi, Kusasi, and Busansi, wild pastoral tribes without government living in family communities in compounds scattered over an extensive area" (Ferguson 1894, quoted in Roncoli 1991:2). Opinions vary as to whether the Kusasis were constantly engaged in factional conflicts among themselves or were a peaceful, egalitarian society. Support for each view is provided by Syme (1932:iii): "In the old days every village was at war with its neighbours"; and by Whitehead (1984a:12): "These were a highly egalitarian people, a stateless society with no elite and no chiefs."

Either way, the Kusasis were invaded and subjugated by the Mamprusis, a politically and militarily well organised group from south of Kusasi, probably in the 15th century,

and Mamprusi chiefs were installed, principally to protect Mamprusi trade routes with Upper Volta and the Sahel (Syme 1932; Mbillah 1982). The Kusasi area straddled an important north-south caravan trail: animals from the north; salt, cowries and kola nuts (*cola nitida* - a tree crop chewed as a stimulant) from the south (Benneh 1974).

As for Pusiga itself, the evidence suggests that it has experienced cycles of settlement and depopulation over its complicated history. Pusiga has been for centuries the site of a fetish shrine to *Na Gbewa*, or *Na Bungwa*, a mythological or historical warrior Chief who settled in Pusiga around the year 1400 (Barker 1986:120) and was allegedly responsible for the subjugation of the Kusasis. According to Cardinall (1931:245), *Na Gbewa* "emigrated with a tremendous number of followers into the Kusanga and Busanga countries, and made Pusiga his capital town, whence he used to fight the Kussasi and the Busansi, trying to subdue them." Following *Na Gbewa*'s death, his sons moved away from Pusiga to establish several dynasties: the Mamprusi, based at Mampurugu (in present-day Togo), the Mossi at Ouagadougou (in Burkina Faso), and the Dagomba at Yendi (now in Ghana's Northern Region) (Staniland 1977:4).

Despite an ongoing antagonistic relationship between the Kusasis and the Mamprusis, the *Gbewa* shrine has always been under official custodianship of the *pusigdim*, or 'Pusiga people', the Kusasi clan after whom Pusiga is named. In the early 1930s, however, District Commissioner Syme (1932:5) wrote that: "the whole of the Mandated Area was a wilderness within living memory... Even the placaters of the great fetish Bungwa at Pusiga, nine miles east of Bawku in the Mandated Area, and burial place of the first known Na of Mamprusi and Dagomba, lived in Sarabogo close to Bawku". Syme (1932:37) suggests that Pusiga was one of several local villages that had been repopulated only slowly, after raids decades earlier by horse-riding slave traders and roving bandit groups, raids which occurred periodically until late in the 19th century.

Another reason for Pusiga's underpopulation before World War I had to do with its colonial history. Much of present-day east Bawku District, including Pusiga, was incorporated into German Togoland in November 1899. The British annexation of the Northern Territories of the Gold Coast in 1902 did not extend to Pusiga, which

remained under German administration until World War I. Conditions in German Togoland were extremely harsh. Young men were forcibly conscripted as soldiers and porters, or chain-ganged into constructing roads, bridges and military camps, for no pay or food (Crowder 1968:241).

Togoland was surrendered by the Germans in August 1914 and formally partitioned between the British and French, under a League of Nations mandate, in July 1919 (ADM 56/1/497, 1925). The western section, Pusiga included, became known as the 'British Sphere of Togoland', or 'British Mandated Togoland', and its incorporation into the Gold Coast was legally effected on 1 January 1920 (Bening 1973:33). Thereafter, Pusiga fell under the jurisdiction of the District Commissioner at Bawku town. Bawku itself was the capital of 'Kusasi District, North Mamprusi', in the Northern Territories Protectorate of the Gold Coast Colony.

The introduction of a more benevolent system of law and order certainly encouraged resettlement of previously abandoned villages in British Mandated Togoland. Kusasis from the increasingly densely populated land around Bawku town streamed into Pusiga as if moving into a vacuum. First arrivals settled near the *Gbewa* shrine, in Tesnatinga. They naturally chose the best farming and grazing land, and cleared as much bush as their families could farm. Some of these early settlers accumulated herds of cattle, which enabled the men to marry several wives (brideprice being set at four cows among the Kusasis) and produce large families, thereby expanding their domestic labour supply and solidifying their claim to large tracts of land.

Land in northeastern Ghana has always been communally owned, and customary law decrees that 'strangers' cannot be denied rights to farm uncultivated bush (Naden 1984; Abudulai 1986). As population pressure increased during the 1920s, with a second wave of settlers from the Gold Coast's francophone neighbours, early arrivals were threatened with losing land to newcomers. Two strategic responses were to maintain large family sizes, and to reduce fallowing periods, since land under cultivation need not be surrendered. Continuous cultivation and the persistence of polygamy and high

fertility, which have both accelerated land degradation in contemporary Pusiga, can be regarded partly as household attempts to maintain control over scarce land resources.

Even today, most wealthy local families trace their origins back to the first settlers who arrived in Pusiga during the 1910s and early 1920s.¹⁷ The exceptions are those later arrivals who went directly into trading - or continued trading. As Meillassoux (1967) has argued, long distance commerce in West Africa pre-dated colonialism by centuries, because different production systems created complementarity in demands between the interior and the coast. But Kusasis did not engage in trading until comparatively recently, as noted in one of the first colonial Quarterly Reports for Northeastern Province in 1911. "There is little trade. Cattle and food stuff are being bartered in local markets. There is also a little cloth, both native and imported, being sold in the villages" (ADM 56/1/461, 31/12/1911).

While the Kusasis were essentially farmers, Mossi, Fulani and other settler groups from the north had a tradition of involvement in long distance commerce. Since they were allocated smaller fields in less desirable areas, most found it difficult to accumulate wealth through farming. Without agricultural surpluses to provide a springboard into trading, these settlers used capital raised elsewhere - often from relatives already engaged in commerce - and became farmer-traders. Much of the inequality in Pusiga today reflects the continuing dominance in trading activities of settlers from the north, supplemented by local Kusasi recruits, who often adopted Islam explicitly to gain access to Moslem-dominated commercial opportunities. The need for working capital and contacts continues to deter new entrants from this lucrative profession. As McKim (1972:341) noted of north Ghanaian markets: "Trade in certain items tends to be monopolized by one ethnic group." Ethnic exclusivity is waning, however.

¹⁷. Seven of the ten wealthiest households in the Terago and Tesnatinga samples of 1988 were headed by sons of three farmers who came to Pusiga from Bawku before 1925.

The first market in Pusiga was small, no more than a few traders sitting under a tree, with farmers bartering and later selling (for cowries, then cash)¹⁸ surplus crops and animals to buy salt and kola nuts, but not much else. A major impetus to trade was provided by the building during the 1920s by the British of a Cattle Quarantine Station at Pusiga, where cattle dealers from further north (Upper Volta, Mali, Niger) were required to leave imported animals for nine days, to curtail the introduction of cattle diseases. In 1934 Pusiga market was moved from the village of Terago into the town centre, near the Quarantine Station, and from then it grew rapidly, in response both to population growth and cattle dealers' demands for food and other products. The Kusasi District Commissioner, visiting Pusiga in 1936, noted that: "The market has grown tremendously since it was moved into the town a few years ago and is now second in size only to Bawku" (ADM 57/5/2, 6/7/1936).

The Quarantine Station was one of several accompaniments of British rule which radically transformed the lives of the people of Pusiga. Further aspects of Pusiga's experience of colonialism between the 1920s and the 1950s are discussed below.

2.1. Inequality and Differentiation in Colonial Northeastern Ghana

Colonialism contributed to processes of differentiation in rural Africa in many ways. In northern Ghana, as in most of Africa, colonialism was characterised by a limited transformation of the agrarian economy. Rural self-provisioning producers became smallholders who produced partly for home consumption and partly for sale. They retained control over the means of production (especially land, which was never alienated), but engaged increasingly in wage labour and non-agricultural income-earning activities (Allen and Williams 1982:67). The incidence of prosperity and poverty in rural communities was dictated increasingly by differential access to new sources of

¹⁸. Cowries and cash (sterling) were used interchangeably as currency in Ghana until at least the 1920s. According to some respondents in Pusiga, cowries were circulating in Bawku District markets as late as the 1950s. (The Ghanaian currency since independence, the Cedi, is an Akan word (from southern Ghana) meaning 'cowrie'.)

income (both within and beyond the village) and to technological innovations, which were small in scale but had significant ramifications at the level of individual communities. Capitalist transformation of agriculture and proletarianisation of rural labour were 'blocked'. This despite the fact that various mechanisms were employed by the state to encourage monetisation of village economies, including the imposition of taxes (collected in cash, not produce), the conscription of forced labour (*corvée*) for public works, and the promotion of export crops.¹⁹ All these policies were employed by the colonial administration in the Northern Territories of the Gold Coast, as they were throughout both British and French West Africa (Crowder 1968:206-9).

The British intended to run the Northern Territories as cheaply as possible. One device was to install chiefs in communities where none had existed before (Arhin 1985:93), or to entrench the tenuous authority of Mamprusi chiefs over the Kusasis, to the deep resentment of the latter - which continues to the present - and the political and economic advantage of the former. Mbillah (1982:6) has criticised this practice as a "historical 'fraud' of putting power where power should not belong". The chiefs and headmen who had been created or recruited in this cause, anticipating the introduction of 'indirect rule' by some thirty years, enjoyed preferential access to natural and human resources (land and labour), yield-enhancing innovations (new technology) and emergent income-earning opportunities (cash cropping, salaried employment), because of their favoured relationship with local representatives of the colonial state (Roncoli 1986a:4).

In this sub-section, five important policy developments during the colonial period are considered in terms of their impact on inequality, differentiation and food insecurity: cash cropping, conscript labour, road-building, taxation, and mixed farming.

¹⁹. In French West Africa, the cultivation of certain export crops was obligatory, and this factor alone led to the emigration to the Gold Coast of an estimated 100,000 Mossi people from Upper Volta (Crowder 1968:338).

2.1.1. Cash Cropping

In most years during the colonial period, Bawku District was a surplus producer of foodgrains. Farmers sold not only to itinerant cattle dealers and traders but also to peasants from Upper Volta who were regularly afflicted by drought-induced food shortages. Only occasionally, as in the famine of 1946 in northeastern Ghana (see section 3.2 below), were the roles reversed. But the commercialisation of agriculture in Bawku really began with the promotion by the British of cotton (unsuccessfully) and groundnut (successfully) as cash crops for export to the south (Der *n.d.*).

The British Cotton Growing Association attempted to encourage cotton production in northern Ghana (as elsewhere in West Africa) as early as 1902, but withdrew in 1916 (Koli 1973). This failure can be attributed to inadequate price incentives and an inappropriate marketing system - cotton had to be head-loaded 50 miles or more to the nearest ginneries. Then, even more than now, small farmers were concerned primarily with meeting household food needs through self-provisioning, which was difficult in an uncertain climate (Dickson 1973). The virtual inaccessibility of the northeast until the 1930s (because of poor transport links) further retarded commercialisation.

More successful than cotton was the promotion of groundnut, which was adopted almost universally within the District by the late 1930s, and has been Bawku's most important export crop ever since. Two reasons for the popularity of groundnuts are: its dual role as both cash crop and food crop (it is an important stew ingredient, snack food, and source of cooking oil), and the fact that it was introduced at a time when transport infrastructure had improved and trade with southern Ghana was booming.

In densely settled parts of the District, however, cash cropping competed directly with cattle for scarce land. As the District Commissioner remarked of Pusiga in 1936: "There is an unprecedented shortage of grazing land this year for every available inch of spare land has been put down in groundnuts" (RAT 283, 7/9/1936). More crucially, this also threatened to undermine district-level food security, as farmers switched from being (in most years) surplus producers of food to being major exporters of groundnuts.

The District Commissioner also warned of the "danger of their putting too much land under groundnuts to the neglect of foodstuffs" (RAT 283, 18/11/1936).

However, the expansion of agricultural production for the market also provided an important secondary source of 'entitlements to food', and in deficit years groundnuts and other crops were sold for grain. This diversification of food and income sources has provided a useful (though not guaranteed) insurance against grain production shortfalls for the residents of Bawku District. Cash crop production is only partially correlated with cereals harvests - subterranean legumes like groundnuts are not attacked by locusts or armyworms, for instance. On the other hand, groundnuts also react badly to adverse weather conditions, and in drought years groundnut production can fall almost as sharply as cereals production (see 3.3.4 below).

2.1.2. Conscript Labour

As previously discussed, the main 'resource' in the Northern Territories of interest to the British throughout the colonial period was labour. Men were first conscripted for portage and road-building. Later they were recruited for mining and construction projects in the south. They were also encouraged to become cocoa migrants. Finally, some were coercively conscripted into the British army during World War II. In 1940, notwithstanding the poor health status of northerners mentioned earlier, 400 men were recruited from the Northern Territories each month (RAT 339, 25/5/1940).

During the 1910s and 1920s, labour was conscripted mainly for road construction and maintenance, to improve transport, communications, and the marketing of produce and other commodities. Conscripts were cheaper than hired workers, but they were also resentful and inefficient, and the extension of road networks in the northeast was slow. Initial demands made by the British on local labour were heavy, and may even have contributed to the food shortage experienced in the northeast in 1913, as the Provincial Commissioner acknowledged: "Are we demanding too much of the people in the

matter of transport etc. and making the people neglect the most important task of producing food?" (Staniland 1977:53).

Labour was mobilised through chiefs, in the (often mistaken) belief that chiefs already extracted tribute from peasants in this form. As early as 1897, about 30 people were killed by the British in Binduri (a village 6 miles south of Bawku town) in retaliation for the chief's refusal to mobilise labour (Roncoli 1991:9). The use of chiefs to mobilise workers created new forms of exploitation within villages. Concern about this was expressed by the District Commissioner in 1928. "The more headmen there are the more the people get worried. I find here that all the chiefs and even down to the smallest headman have large farms made with what is nothing else but forced labour - and we say this is not slavery" (ADM 57/5/1, 22/7/1928).

Even such an apparently egalitarian obligation as conscript labour discriminated, in effect, against smaller, poorer households. A 1936 'Circular on Forced Labour' noted that: "Every compound is usually required to provide one worker irrespective of the size of the compound" (RAT 283, 17/5/1936). Secondly, the policy benefited urban traders more than the peasants who provided the majority of conscripts.

"It was unfair also in that the peasants living alongside the roads who performed most of the work were not the people who derived most benefit from the lorry traffic. Those who did were the inhabitants of Bawku and Pusiga, yet they were the most adept at avoiding their obligations on the roads. Many of the peasants were becoming tired of being constantly called upon for labour and were simply leaving their compounds and going elsewhere to live" (RAT 533, 1938:8).

Conscript work for infrastructural projects was phased out in the late 1930s and replaced with hired labour, paid from tax revenues. This cash payment may have provided a limited form of 'social security' during the dry season to those short of money for food or taxes.

2.1.3. Road-Building

The first lorry reached Bawku as early as 1925, and the first motor car drove through Pusiga in 1932. In 1933/4, 566 lorries were recorded as arriving in Bawku; just three years later, in 1936/7, the number of lorries had almost doubled, to 1090.²⁰ The volume of cattle trading between Upper Volta and the Gold Coast increased steadily during the 1930s, as roads improved (Dickson 1969:300). But roads, drifts and bridges were frequently washed away during the rains, cutting off villages and whole districts from trade for months at a time and contributing to severe seasonal food price rises.

By 1954, the road from Accra to Tamale, capital of the Northern Region, had been tarred, and this made a major contribution to enhanced integration of the north and south Ghanaian regional economies. Although it subsequently fell into disrepair, it remains a reliable and heavily used route, conveying substantial volumes of people, produce and other commodities between north and south, all year round.²¹ Also in the mid-1950s, the laterite roads linking Pusiga to Bawku and Bawku to Bolgatanga were upgraded to first class status. An immediate and dramatic impact on trade was evident in the rising proportion of cattle imported south through Pusiga by lorry rather than on the hoof. Traditionally, cattle had been driven on the hoof from the Sahel down to Kumasi or even Accra, losing weight (and numbers) on the way. In 1956, only 7% of cattle recorded at Pusiga Quarantine Station were transported by lorry; by 1958 this had risen to 44% (Gould 1960:137).

Pusiga's favourable location on this major Sahelian cattle route, and its proximity to roads connecting the village to Togo, Burkina Faso and southern Ghana provided lucrative opportunities for cross-border trade in livestock, grain and other produce. Set against this are various "backwash effects" (Jodha 1975:1617) of market integration,

²⁰. Figures from ADM 57/5/8, 1931:11; ADM 57/5/1, 3/12/1932; and RAT 531, 1937:4.

²¹. During fieldwork in 1988-89, I travelled on State Transport Corporation coaches between Bawku town and Accra several times. The average time for this 450 mile journey was 20 to 22 hours, and the service runs three times weekly. For this reason alone, the threat of major famine in the northeast appears effectively to have disappeared.

including rising inequality between farmers and farmer-traders, and the export of grain and other essential commodities, even in years of local shortage, in response to higher prices in towns and elsewhere. As will be seen, so powerful was this effect that steps were frequently taken by colonial (and later post-colonial) administrations to prevent grain exports in deficit years, in Bawku as elsewhere in British Colonial Africa.

2.1.4. Taxation

Personal taxation was introduced to the Northern Territories as part of the British attempt to make its West African colonies self-financing, and also to encourage monetisation and cash cropping. The 'tribute tax' was set at a flat rate of 2/- per adult male (women and children were exempt) when first levied in 1936 (RAT 40-50, 1936), rising to 3/- in 1943. The reasoning behind the flat rate was explained by the resident District Commissioner in 1932:

"Personally I am not in favour of differentiating between well-to-do farmers and small men. To allow the headman to take more from one than the other would be regarded as a tax on thrift and labour. This is not desirable when the one thing we want to encourage is initiative in making bigger farms" (RAT 10, 23/4/1932).

Although the amount of the tax was not onerous (about half the price of a goat or sheep), it had adverse implications for inequality. The rich merely diverted some of their income from cash crop sales to taxes. In 1936, a bag of groundnuts sold for 8/- (RAT 531, 1937:8), and an increase in groundnut exports from Bawku was recorded in this year. The poor were forced to sell grain to pay their taxes (or else to grow cash crops on plots previously reserved for cereals), thereby undermining their food security.²² The tax was payable after harvest, when selling prices were lowest.

²². 'Forced commerce' - in this context, the sale of staple food output to pay taxes - was a critical problem in French West Africa, where taxes were collected even in years of crop failure (Harriss 1982a).

Taxation, cash cropping and general monetisation created new forms of indebtedness, including crop mortgaging. Rural moneylenders emerged to exploit the seasonally skewed pattern of cash needs (which were concentrated in the pre-harvest months) and cash income (most of which was realised immediately post-harvest). This cash-flow imbalance, between those who usually have cash to spare and those who are usually short of cash, persists as both a symptom and a cause of inter-household inequality in Pusiga today.

2.1.5. Mixed Farming

One consequence of increasing land pressure in Bawku District during the 1930s was agricultural intensification. The British contributed to this trend by encouraging cash cropping and introducing animal traction and mixed farming to the Northern Territories. Three objectives of these innovations were: to raise land productivity (raising yields to counteract falling land availability), to promote new sources of income for poor peasants, and to accelerate the monetisation of rural economies. But the colonial administrators initially selected 'progressive farmers' as opinion leaders, which meant that already wealthy farmers (including village chiefs) were the first to benefit.

After a slow start, animal traction was enthusiastically taken up by those considered capable of paying for ploughs (which were given to farmers on credit) throughout the Northern Territories, but particularly in Kusasi District. The Kusasi Agricultural Development Committee was responsible for distributing bullocks and ploughs and recovering costs. It achieved this by imposing crop mortgaging on farmers and exploiting seasonal price movements:

"The cost (£24 for two bullocks and £8 for a ridging plough) is recovered from the sale of the farmer's groundnuts. ... the farmers included in the scheme sell their nuts to the Committee when they are harvested and receive in cash approximately the current price. The Committee holds the nuts for some months and sells them when the

price is highest, crediting the profit (less expenses) against the debit balance of the farmers" (Gold Coast Government, 1951:28).

The number of plough owners in the District (including Pusiga) rose dramatically during the 1950s (see Table 2.1.). By 1960, 12% of rural households in Bawku had adopted bullock ploughing (Shepherd 1981:170).

Table 2.1. Plough Owners in Bawku District, 1938-1960²³

Year	1938	1947	1950	1951	1952	1953	1954	1955	1956	1960
Ploughs	60	88	299	437	497	653	789	971	1200	2645

The administration claimed credit for reducing famine vulnerability because of their role in introducing bullock ploughs to the Northern Territories. "After the two lean years of 1945 and 1946 when plough-farmers almost invariably had much better crops than their neighbours the benefits of mixed farming became more generally appreciated" (RAT 520:9, 1948).

Mixed farming certainly raised crop yields, but it also contributed to deepening socioeconomic inequality among the rural population. Those who gained access to a pair of bullocks and a plough became relatively prosperous and food secure, often supplementing their increased income from crop sales by hiring out their plough and bullocks to poorer neighbours. Whitehead (1984a:13) observed that households which had been among the first to adopt ploughs tended to belong to the wealthy category in her research area in the mid-1970s. This is true also of Terago and Tesnatinga. In this respect, Cleveland's (1980:147) remark that: "In some areas, at least, it was recent immigrants rather than Kusasis who first took up the plow" is significant. There is a perception in Bawku District that Kusasis are less enterprising and more conservative (or were so in the past), than settler groups like Mossi traders, Busanga blacksmiths,

²³. Figures compiled from Gold Coast Government, Annual Report of the Department of Agriculture (1946 to 1957); Anthony *et al.* (1979:190); and Cleveland (1980:145).

Yanga weavers and (sedentarised) Fulani herders. Pusiga, with a higher than average proportion of settlers, is also one of the wealthier villages in Bawku District.

2.2. Ethnicity and Land Settlement in Pusiga

Perhaps the single most significant feature of Pusiga's early decades this century was increasing pressure on land, caused by heavy in-migration during the 1920s and 1930s, mainly from neighbouring Upper Volta (Rouch 1954). According to the first two censuses conducted in the area, the population of Pusiga trebled from 3,592 in 1921 to 10,993 in 1931. The 1931 Census Report noted that much of the increase consisted of settlers choosing to live under a British rather than a French colonial administration. "The French tax, their forced labour, and the extortion alleged to be practised by the Chiefs and public Officers of the lower ranks are given by the people as their reasons for preferring British Territory" (ADM 57/5/8, 1931:1-2). The same Report expressed concern with rates of in-migration, though without going so far as to recommend the introduction of immigration controls:

"this stream of immigrants from French Territory may in time become a serious problem if not checked in advance. There is plenty of land for more people in the interior of the District if only they would occupy it, but far the greater majority of the immigrants prefer to cluster along the Frontier, where they are in close contact with their relatives on the other side" (ADM 57/5/8, 1931:5).

Settlement in Pusiga continued steadily through the 1930s. The British never took steps to control this process, and local ideology forbids the prohibition of settlers, so the Gold Coast-Upper Volta border rapidly became heavily populated. Pusiga, located just a few miles from two French colonies, remained one of the most popular destinations for settlers, for several reasons. First, it was sparsely populated, at least initially. Second, the first northern immigrants had settled there, and later arrivals naturally preferred to live among relatives or kin. Third, Pusiga was strategically situated on a major cattle

and kola nut trading route - Pusiga had one of only two Quarantine Stations in the District for cattle entering the Gold Coast, and many settlers were cattle dealers.

The clustering of settler groups along Ghana's northern border resulted in pronounced variations in population density over very small distances. A 1949 survey estimated that only 14% of land in Bawku District was being farmed (Raeburn 1950:35), the rest being virgin bush, communal grazing areas, or fallow. Even today, it is striking that some villages only 15-20 miles south of Pusiga are surrounded by areas of bush which have not yet been cleared for cultivation. Such communities, being further from major roads, tend to be less commercialised and more agriculturally-oriented. These farmers work larger acreages, including 'bush farms' several miles from their compounds. A survey of land use in 1976 estimated average farm size in Pusiga at 2.9 acres, as compared to 7.1 acres for Binduri and Kulugungu, two villages both within 20 miles of Pusiga (Cheshire 1977:10).

So Pusiga was rapidly and dramatically transformed - demographically, ethnically and agriculturally - from uninhabited bush to being more densely populated than almost anywhere else in Bawku District. Environmental consequences of this transformation were severe. Within 30 years, the hills near Bawku town, which had been described in the District Commissioner's diary of 1915 as "well-wooded", were "completely bare save for a thin cover of grass and a few farms" (Smith 1945:1). By 1934 the District Commissioner already saw a virtually deforested countryside when he visited Pusiga.

"All this country is inhabited by Yanga and Busanga immigrants from French Country. The scarcity of population and density of the bush on the French side of the Frontier still form the same striking contrast to our own closely populated, and, in many areas, tree-denuded country" (ADM 57/5/2, 18-19/8/1934).

Deforestation added an extra stimulus to commoditisation - in Pusiga and other border villages, firewood was one of the first natural products to become marketed. As early

as 1938, Bawku's Medical Officer commented on the "relatively high cost of firewood, owing to its shortage" in "the northern part of Kusasi" (RAT 306, 1939:33).

Migration into northern Ghana tailed off in the late 1930s. One reason was that the French colonial administration retaliated against Upper Voltans who moved only a few miles into Ghana, by confiscating their farms, as is evident in this diary entry by the Bawku District Commissioner in 1936:

"many of the Busangas who have immigrated from French Territory during the past 10 or 15 years, but continued to farm their old lands in French Territory, have had the latter seized by the French. ... Most of those in question are merely tax shirkers, but now they are moving back to their own country to claim their lands. They will be no loss for the country just this side of the Frontier has been far too congested" (ADM 57/5/2, 25/5/1936).

A second explanation was also fiscal. One side-effect of the Tribute Tax introduced by the British in 1936 was to slow down in-migration from Upper Volta, where the tax of 20 francs (about 2/6d) was only slightly higher.

"For several years the French threatened to crowd us out, then movement became more or less stationary... It is possible that no tax made British territory popular with the French natives but that a 2/ tax ceased to make it worth while" (RAT 306, 20/6/1938).

There is even evidence of a reversal in net population movements over the past half century. While population growth has continued, the ratio of Kusasis to immigrants may have altered in favour of the Kusasis. Of 201 households enumerated in Terago and Tesnatinga in mid-1988, 69% were Kusasi, 14% Mossi, 10% Yarse, 5% Busanga

and 2% Fulani.²⁴ In the 1931 Population Census, of 679 people enumerated in Terago and Tesnatinga, 53% were Kusasi, 40% Mossi, 4% Yarse, 1% Busanga and 1.5% Fulani (ADM 57/5/8, 1931:3).

Another indicator of land pressure in Pusiga is provided by population density figures. According to the 1984 Census, the population of the Pusiga-Pulimakom local authority area was 52,932, amounting to 21.2% of Bawku District residents and 6.8% of the total for the Upper East Region (Republic of Ghana 1987c). Average population density in the Region was 79/km², up from 57/km² in 1960 (Anthony *et al.* 1979:132) and 49/km² in 1931 (Netting *et al.* 1980:293). But the figure is considerably higher around Pusiga, being estimated at 390/km² in 1980 - "about three times the sustainable population" (Ardayfio-Schandorf 1982:3).

3. Food Crises and Differentiation in Northeastern Ghana

Interactions between subsistence crises and socioeconomic differentiation are complex and under-researched.²⁵ At a theoretical level, 'moral economy' and 'political economy' approaches offer two contrasting views of the capacity of pre-colonial communities to deal with food shortages and other adverse outcomes of shared risk (Cheal 1989). Scott (1976) argued that pre-colonial village societies were organised around a 'subsistence ethic' which guaranteed, as far as possible, a minimum level of social and economic security for all members. Only during crises might this ethos be supplanted by a self-interested struggle for survival.²⁶ This 'moral economy' view has also been invoked to explain the variety of inter-household transfers which persist

²⁴. All 14 Busanga and Fulani households were in Terago rather than Tesnatinga, which is typical of the 'clustering' of ethnic groups along Ghana's northern borders. There were also several Hausa, Yoruba, B'moba, Grunshi and Frafra families in Pusiga town, but they are not farmers.

²⁵. This is particularly true of sub-Saharan Africa. Van Schendel (1981) provides an excellent study of interactions between subsistence crises and household differentiation in Bangladesh.

²⁶. The same argument is applied to conceptual models of household behaviour under stress (e.g. famine), when mutual support among household members often breaks down (see Chapter 4.4.3).

in many village societies today, from gifts (patronage) to reciprocity to low-interest loans.

Opposing Scott's view, Popkin (1979) insisted that "social insurance mechanisms are conspicuously absent in many precapitalist peasant communities" (Platteau 1988:1-2). Popkin invokes the 'free rider problem' and the 'prisoners' dilemma' to argue that self-interest within villages dominates over ideals of collective security, and that this explains the high degree of inequality observed even in precapitalist societies. He also argues that self-insurance mechanisms (eg. intercropping, scattered fields) are more frequently observed than social insurance mechanisms (village seed banks and cereal reserves), even where collective behaviour - eg. consolidated rather than scattered fields - would result in higher yields and greater productive efficiency, at no increase in risk or insecurity.

One criticism of Popkin's approach is that it fails to account for 'selfish' behaviour which appears altruistic (Platteau 1988:6) - such as patron-client relationships. Similarly, Scott's approach assumes that individuals value a joint or social utility function above their individual utility functions - yet both Scott's 'moral economy' and Popkin's 'political economy' approaches may be entirely 'rational' in terms of individual utility maximisation.

These two views - summarised by the titles of Scott and Popkin's books - respectively, "The Moral Economy of the Peasant" and "The Rational Peasant" - are irreconcilable. The following sub-section suggests that a 'political economy' approach best describes pre-colonial northeastern Ghana. This contradicts Watts' (1983, 1984) application of the 'moral economy' framework to pre-colonial Hausaland. Though the evidence for Ghana is scanty - as it is also for northern Nigeria (Mortimore 1989) - it does cast doubt on Watts' attempt to generalise his case study to West Africa as a whole.

3.1. Pre-Colonial Food Crises

According to Watts (1984:126-127), pre-colonial West African societies, although subject to recurrent food crises, "were in some sense geared to environmental risk, and possessed some sort of adaptive flexibility and adjustment capability with respect to drought and oscillations in the availability of food". Watts separates "Response to environmental variability" (which he also describes as "risk aversion in agriculture") from "Response to food shortage" (or "the norm of reciprocity").²⁷ In the former category are production strategies - risk-reducing planting and cropping practices. In the latter category are "social activities and institutions which functioned as, among other things, guarantors of a minimum food supply" (Watts 1984:130) - village grain reserves, communal work parties, gifts. In Hausaland and other Muslim societies, the redistributive ethic was ideologically enforced through such practices as the *zakat* - the requirement that the rich tithe their output and income to the poor.

North Nigerian society is not directly analogous to pre-colonial northeastern Ghana. The Kusasis were an acephalous group, characterised by little social organisation beyond the level of dispersed, defensively constructed compounds, which were often in conflict with each other and with neighbouring clans or tribes: "A proportion of male labour time was spent on hunting, raiding and defence" (Whitehead 1984a:9). It follows that the social insurance mechanisms described by Watts and by van Apeldoorn (1981) for northern Nigeria were almost certainly absent.²⁸ "Occasionally the Kusasis appear to have formed themselves into a loose sort of confederation for the purpose of resisting the common foe, but beyond that interdependence did not exist" (Syme 1932:6). The imposition of hierarchical political systems (chiefs) in the Kusasi area following Mamprusi conquest, later reinforced and extended by the British colonial administration, did little to improve the situation.

²⁷. This corresponds to the distinction to be drawn in Chapter 4.3.1, in the context of responses to food deficit, between pre-harvest production and post-harvest consumption strategies.

²⁸. Even in very structured pre-colonial societies, of course, a high degree of social organisation need not imply enhanced food security for the poor. The reverse was equally possible, as de Waal (1989) argues for nineteenth century Sudan.

According to Whitehead (1984a:24), writing about Bawku District: "One major source of food security in the pre-colonial economy was to utilise a number of redistributive mechanisms through which food could pass from food surplus to food deficit households." However, since there are very few records of pre-colonial northeastern Ghana at all, any assertion about relative or absolute changes in peasant vulnerability from pre-colonial to colonial times is difficult to substantiate. No record or recollection of communal grain stores exists, nor of any centrally administered distribution of food in times of need. The Kusasis were not Islamic, so *zakat* transfers would not have occurred. This is not to say that no transfers took place, only that the evidence appears to be against institutionalised 'social security'.

The complex transformation of pre-capitalist cultures which is embedded in such phrases as "from community to commodity" apply, in the context of crises of simple reproduction, mainly to community-based insurance mechanisms. Production responses to environmental variability remain intact over time; but community responses to food shortage are undermined, it is argued, by the introduction of capitalist relations and commoditisation. This rubric is applied to the colonial experience of Hausaland by Shenton and Watts (1979), who find that increased burdens on the peasant economy, generated in particular by taxation and cash cropping, imposed intolerable strains on pre-existing systems of social redistribution. While food crises had occurred regularly in pre-colonial times, monetisation altered systems of production and distribution, refocusing peasant ambitions away from reproductive needs and towards private accumulation, at the expense of community security. The loosening or undercutting of social relations between households removed a vital safety net for the poorer strata.

Unlike the pre-colonial situation, where sharp differences are apparent, northern Ghana and northern Nigeria shared similar colonial experiences. The congruence of taxation, cash cropping, and neglect of cereals production has been blamed for contributing to famine conditions in northern Nigeria in 1913-14 and in 1927 (Shenton 1986). The same factors have been identified above as pivotal developments in northeastern Ghana, which also suffered food crises during the colonial period.

3.2. Food Crises in Colonial Pusiga

When Pusiga was first settled, there was little need for cash. If the old men in Terago and Tesnatinga can be believed, land was plentiful, yields were high, the rains were good and reliable, and households were usually self-sufficient in virtually all their needs.²⁹ Millet and sorghum were grown as staple food crops, and cattle and small ruminants were kept for festivals and funerals, and to pay brideprice. Other sources of meat were obtained by hunting and fishing. Stew ingredients were either cultivated around the compound or gathered as wild plants from the bush.

Nonetheless, hunger is a permanent fact of life in northeastern Ghana, where farmers depend on a single, short rainy season for most of their foodgrain needs. Before the development of trading activities and transport links, dependence on self-provisioning was much greater than it is today, and when harvests failed the consequences were extremely serious. Fortunately, Bawku District is not quite so marginal an agricultural region that crop failure is as frequent as, say, in parts of Burkina Faso to the north. Only three named famines were recalled by older respondents in Pusiga within their lifetime - *Abumboa* (1908/8), *Poyanglal* (1946), and *Ayayua* (1978).

Although drought has become the most frequent cause of crop failure in Bawku District, locusts and heavy rains triggered most famines in the past. Locusts were a recurrent threat to crop production in northern Ghana until the 1930s. In 1906 or 1908, the Kusasi District and southern Upper Volta suffered such a devastating plague of locusts that almost all cereal production was lost. Two explanations were given for the naming of the hunger that followed. The 'geographic' explanation is that people walked to the village of Bumboa in northern Togo to buy millet, and a common saying at the time was: "Whether you are a blind man or a leper, you have to go to Bumboa." Literally translated, though, *Abumboa* means "to pour a thing", which refers colloquially to the fact that millet was sold in the shells of river slugs, because of scarcity, in such derisory

²⁹. This nostalgic depiction is reinforced by the archival evidence already presented above, and by contrasting distributions of rainfall, population and forest coverage earlier this century with the present situation around Pusiga. (See Chapter 3.2.2 on changing rainfall patterns.)

quantities that "you couldn't use it for anything". In 1933, an invasion of locusts produced a famine called *Nasom* (Kusaal for 'locusts') by people in Zorse, near Bawku town (Cleveland 1980:36), but this is not recalled as a food crisis year by residents of Pusiga, so may have been highly localised.

3.2.1. Colonial Responses to Food Deficits

The colonial administration in northeastern Ghana, as in northern Nigeria, adopted a laissez-faire attitude of non-interference in grain pricing and distribution, even during food shortages, as seen in this diary entry by Bawku's District Commissioner in 1915. "The Market Orderly reports that the price of Millet in Bawku Market is excessive and requests that the court makes a standard price. Request refused as I think competition and demand should settle market prices" (ADM 57/5/9, 3/4/1915).

Early in the colonial period, the self-provisioning ethos was seen as responsible for vulnerability to hunger in 'Northeastern Province', and the peasants were blamed for their own hunger. "Crops have partly failed... No attempt is done (*sic*) by natives to grow more than just sufficient supply for home consumption, and this accounts for their being so hardly hit (*sic*) when the rains fail" (ADM 56/1/471, 21/4/1915).

Generally, though, Kusasi District was perceived as a food exporting area ("quite a large surplus of [guinea] corn is grown in this district for sale to other areas" (ADM 57/5/8, 1931:16)), and any local hunger was frequently blamed on excess demand from famine-stricken peoples to the north, as during the West African famine of 1913. "Competition for grain by famine affected Moshis: the price of a calabash of corn has gone up to 3/ so that there are undoubtedly difficulties" (ADM 56/1/468:4, 30/10/1914). Food shortages at that time meant literally a lack of food - in July 1914 the District Commissioner noted that: "There has been no corn in the market for some days" (ADM 57/5/9, 20/7/1914).

Another food shortage occurred in 1922. "I saw large strings of apparently starving people trailing over from Navaro and Zuarungu in search of food. ... The *Nada* [early millet] crop was practically a failure and the later crops are not thriving... The mention of work down south, as a relief from famine, is not favourably received here" (ADM 57/5/1, 25/7/1922). Again, in 1927, a minor local shortage was threatened by hunger to the north. "Met a party of Bongo people entering the District in search of food" (ADM 57/5/1, 21/12/1927). In the 1920s, British intervention during localised food shortages was minimal or non-existent. The threat of famine was even used as a propaganda tool to encourage labour migration to the south.

During the 1930s and 1940s, however, the colonial administration frequently banned exports of cereals and other foodcrops from Upper East Ghana, arguing that local farmers myopically sold too much produce after harvest and were unable to buy it back later in the dry season. This argument implies that Bawku District was 'production sufficient' after harvest but became 'consumption insecure' through sales which reduced cereals stocks below the subsistence requirements of local producers. One reason for foodcrop sales by Bawku farmers was that higher prices typically prevailed in neighbouring French colonies (Roncoli 1991:53), reflecting the fact that Bawku was generally in surplus while Upper Volta suffered frequent deficits. Early mention of trade restrictions and of peasant "improvidence" is found in the District Commissioner's diary of 1932:

"The export of corn is to be stopped.... the exportation of corn was making it too dear in Bawku. ... The people here are so improvident. Anybody who has a little surplus of corn willingly parts with it for money, yet if the locusts damage the early millet a little surplus will be badly wanted" (ADM 57/5/1, 5-8/4/1932).

In November 1934, the Chief of Bawku again requested an export ban on millet, groundnuts, rice and beans, arguing that the depletion of grain stocks through sales would induce a shortage in the coming dry season, and was already raising prices beyond the ability of the poor to buy food. He also argued that sales of groundnuts and

beans in the immediate post-harvest months left little income for food purchases later in the agricultural year (RAT 10, 23/11/1934). In effect, the *Bawkunaba* recognised that peasants had two sources of access to food - 'direct entitlements' (own production) and 'exchange entitlements' (sale of cash crops for food), and that agricultural and economic seasonality threatened both sources.

The District Commissioner granted the *Bawkunaba*'s request, noting, however, that this prohibition contradicted policies which promoted monetisation and cash cropping: "I am very loath to restrict any trade activities by which the people are able to become "money conscious" and they are encouraged to grow more and more food crops for that purpose" (RAT 283, 15/2/1935). The District Commissioner added an instruction - "that every compound is to put by a store of seed grain for next season's crop". This is indicative both of a lamentable ignorance of the fact that reserving seeds for planting is standard practice in farming households, and of the administration's refusal to accept any responsibility for the provision of food or seeds to its subjects.

Export bans on cereals and other foodcrops were officially imposed again in 1936, and again after the poor harvests of 1946 (see below), when the rationale for trade bans was spelt out by the District Commissioner.

"A subsistence economy, such as that ruling in Kusasi, should in my opinion, be self-supporting and remain a closed economy. Only when production exceeds the subsistence level is it safe to indulge in external trade. The people have short memories and unless a prohibition order is made, I fear they will sell their crops at harvest time, as they did last year" (RAT 339, 5/9/1946).

Finally, in 1949, a belated attempt was made by the British to build seasonal grain reserves in northeastern Ghana, based on the post-harvest purchase and dry season resale of locally produced cereals. The Bulk Purchase and Storage Organisation had two explicit food security objectives: "(a) to show farmers that they need not be exploited by middlemen; (b) to store grain locally, instead of having to buy it back later

in the season at inflated prices" (RAT 509, 1950:19).³⁰ The project made a positive contribution to food price stabilisation in the 1950 dry season (Gold Coast Government 1951:5), but proved difficult to manage and was abandoned in the mid-1950s.

3.2.2. Poyanglal: The Official Version

A famine occurred in northeastern Ghana in 1946. The proximate cause was unusually heavy rains shortly after planting, which devastated cereals production by washing away seeds. The hunger which followed became known locally as *Poyanglal*, and is remembered by the old people of Pusiga as the most severe famine of their lifetimes. There are only scanty references to a famine in Bawku District (then called 'North Mamprusi') in contemporaneous colonial records. The Department of Agriculture awarded it a single paragraph in the Northern Territories section of its Annual Report:

"Rains were very deficient during the first half of the year and excessive in August and September. Cereals had to be replanted in most areas.... A bad harvest in 1945, followed by the delayed harvest this year, produced famine conditions in the densely populated North Mamprusi and Navrongo areas, and acute shortage in the grain exporting areas of Mamprusi and Dagomba. Prices reached unprecedented levels.... Live-stock prices slumped following a glut on the market"
(ADM 5/1/123, 1947:9).

Colonial reports of 1947/8 assert that private traders imported "adequate supplies" of maize and other cereals into the Northern Territories from Ashanti and elsewhere. This does not correspond to the recollections of the elderly people of Pusiga, who insist that virtually no grain was on sale in local markets. If supplies had been adequate, hundreds of people would not have walked to Upper Volta to purchase grain (see 3.2.3 below).

³⁰. This idea was attempted again in Bawku District in the early 1970s, but collapsed because of leakages. The same objective of counter-seasonal price stabilisation provides the rationale for contemporary grain marketing parastatal operations, as discussed in Chapter 3.2.5.

This migration in search of food also undermines the administration's confident claims about the success of its trade ban.

"There is no doubt that the ban on exports of grain from the Northern Territories was of assistance to the natives of North Mamprusi in keeping prices down; the control acted in the same way as a famine reserve scheme, but without the risks entailed in centralised storage" (RAT 520, 1948:8).

The export ban must be criticised as inadequate at best. Grain prices did rise, and this was attributed to hoarding by traders, lack of transport and inflationary pressures - "increased money in circulation" (Gold Coast Government 1946:8) - resulting from the food shortage. The official reports certainly understated the reality of famine on the ground. A more revealing insight into the unusually severe conditions prevailing in Bawku District during 1946 is provided by these isolated comments from the District Commissioner's Informal Diary of 1946:

"Saw Zongoiri market on arrival. No grain and some people are migrating to the Ghambaga area." "Starvation in this district is now pitiful." "...many people have been too weak to hoe..." "It is clear that famine conditions will again prevail next dry season" (RAT 339, 15/5, 18/5, 22/7 and 5/9/1946).

3.2.3. Poyanglal: The People's Version

The name *Poyanglal* is a contraction of a colloquial Kusaal phrase, "Apoyanga Alale", meaning "old woman Alale". The name has two components, as does its explanation. First, old women are stereotypically perceived as demanding and complaining by their families, who resent having to feed and care for them when they grow infirm. Second, there is a bush rat ('*lal*') in northern Ghana which has a sickly appearance. The Kusasis believe that a pregnant woman who sees this rat must name her child *Alale* ("of

the bush rat") or the child will die. Hence the composite name *Poyanglal*, which might perhaps be best translated into colloquial English as "double trouble".

Personal accounts collected in 1989 from people in Pusiga who experienced this famine tell a consistent story. Little grain was on sale in local markets: this was a genuine 'food shortage' famine. With transport infrastructure still poorly developed at the time, this left no option except to walk to markets where food was being sold. Unusually, this meant going north. Droughts normally affect Burkina Faso more severely than northern Ghana, but heavy rains in Bawku meant good harvests further north. Also, the Gambaga scarp separating the Upper East Region from the Northern Region was almost impassable in those days, and few households had migrants working 'down south' who could remit grain or money.

People travelled in groups for safety. Each household would send 2 or 3 members at a time (men, women and older children), either rotating them with other household members on subsequent trips or sending the same individuals several times. The average round trip would take 7-10 days, including time spent scouting around for millet, supplies of which were patchy. "When we reached Bengo and Ouagadougou we couldn't buy large quantities of millet and come right back, we had to waste a few days going round buying small amounts here and there; because there were so many people going to look for millet that there were only small stocks in the market." One woman who was only 10 years old at the time walked to Upper Volta with her mother and stepmothers several times.

"We walked there and back, it took seven days. After I came back I rested for only two days before having to go back again for more millet. I went back and forth many times - I can't count them - it seemed I was always walking and walking. My mothers were taking the millet and trading it and giving the money to me to go back and buy more. I stopped going when the *nara* was about to be harvested."

Millet and sorghum were sold in various measures. A calabash of grain cost 3p, while a donkey-load cost one or two hoe-blades, or £1 (a cow could be sold in Bawku for £6-£9). Frequently, grain was purchased for goods or labour rather than money. Items commonly exchanged were hoe blades and labour services (men), jewellery and clay bowls (women). Women bought bowls in Pusiga, which they headloaded to Upper Volta, where they went from compound to compound, not to markets, exchanging bowls for grain. "They would fill it and give you the millet and keep the bowl." In some villages, such as Shaka, Gold Coast men "couldn't get work in exchange for millet; you had to take cash and buy it. So people said: "Shaka has taken my money"."

Money was raised by selling animals - cows, sheep and goats. Later in the year limited quantities of groundnuts, rice and beans were harvested and sold for grain. During *Poyanglal* "everybody was suffering", even the rich, so those coping strategies which depend on inter-household transfers, such as betrothing a daughter to a rich neighbour and collecting the brideprice, were unavailable. "You couldn't give your daughter to another man for cows because that man had to sell his cows for millet himself." Securing loans was equally difficult, for this reason.

A common practice among those who made the journey was to divide grain bought in Upper Volta in two, half going into the household granary ("for the house") and half sold ("for the market"), usually for the price at which the whole load had been bought in Upper Volta. This 100% profit would be recycled into further purchases of grain. Wealthier men went with their donkeys, which they would ride there, load up with sacks of grain, and walk back. Some poor farmers borrowed donkeys from the rich and divided the load in two - one carrier for the donkey's owner, one for the borrower. The borrower's payment was to bring back the lender's millet: "to do the walking for him".

Millet and sorghum prices in Pusiga and Bawku markets were much higher than in Upper Volta, because "the man who had walked to Burkina and carried the millet back wanted some profit for his struggling". This was justified by most people in terms of the imperative to raise money for feeding the family; not as a means of accumulation.

"My intention was not to profit from selling millet but to get enough food to survive for the whole year. You had to keep going and coming to get enough food to feed your family, and any profit was only used to buy more food for feeding. Making money out of it was never even considered; survival was the only priority."

Most of the grain on sale locally had been brought back by local residents, though a few astute Mossi traders brought grain into Bawku District themselves and took advantage of the high prices prevailing. Some wealthy local farmers also seized the opportunity to profit from the crisis. "It was just like today - some people trade and make a lot of money, others make enough to live on."

"Some people became rich from trading millet. There was one man called Apuaduk. He used to stay here in Tesnatinga, but later moved to Zongo. He traded heavily in millet that year. He took 4 or 5 donkeys to Burkina, loaded them up with millet, came back and sold most of it in the markets here, after feeding his house. He made a lot of profit. He started the business by selling his cows to start buying millet, and he also bought some more donkeys to carry more millet back."

Most of the demand for grain in local markets came from vulnerable households - the aged and infirm, pregnant women. Old people living alone were particularly at risk: "People who didn't have sons and couldn't walk to Burkina". Vulnerability to hunger, then as now, often reflected a failure to achieve integration into a sizeable household or the wider community. These intra- and extra-household links aside, redistribution of either a 'moral economy' or charitable nature appears to have been minimal.

A number of substitutes for millet porridge were consumed during *Poyanglal*. Stew ingredients (vegetables and spinach plants) became meals in themselves, and traditional 'famine foods' - wild fruits, berries and roots - were gathered and sometimes traded for grain. Isolated deaths resulted mainly from incorrect preparation of 'famine foods' such as the 'bush yam' (*kolbat*), a toxic tuber which requires repeated boiling. Starvation

was cited as a cause of death by only a few respondents in Pusiga. The next farming season was favourable, and early millet was eaten before it was ripe.

The *Poyanglal* may have modified patterns of agricultural production in Bawku District. Old farmers claim that several varieties of sorghum became extinct in that year, because everything harvested was eaten, and nothing was saved for planting. According to agricultural experts, however, it is highly improbable that any varieties became extinct 'overnight' in this way. A more plausible explanation is that these varieties died out over a period of time as farmers switched to faster-maturing varieties because of what they perceived as increasingly erratic rainfall - a perception to which the famine of 1946 undoubtedly contributed.

3.2.4. From Surplus to Deficit: Northeastern Ghana in the 1940s and 1950s

During the 1920s and 1930s, as already noted, northeastern Ghana was regarded by the colonial administration as a food surplus region, exporting grain in good years to the south or to drought-afflicted Upper Volta. This perception had reversed by the late 1940s - "in the Mamprusi District there is seldom a surplus and sometimes a real shortage" (ADM 5/4/77, 1950:39). Northern Ghana recorded massive grain shortfalls in most years between the mid-1940s and the mid-1950s, alleviated only by bumper harvests in 1950 and 1951.

Some indication of this shift is provided by figures on net commodity movements over the Pwalagu ferry (which crosses the White Volta and lay on the primary north-south trade route during the 1940s). Although the volumes of grain and tuber imports are not directly comparable with those of pulses exports, the Department of Agriculture's Annual Reports describe the net trade balance as an "index of food shortage in the 'hungry area' north of Pwalagu". Note also that these figures apply to all of the Northern Territories, and might not accurately reflect the position in Bawku District itself in any given year.

In Table 2.2, 'grains and tubers' effectively means staple foodcrops (guinea-corn (sorghum), millet, maize and maize flour, rice, yam, and cassava), while 'pulses' (groundnuts and cowpeas) are the main cash crop exports from northern Ghana. The colonial argument that cash cropping (especially groundnuts) would provide alternative sources of income in years of foodcrop failure is challenged by a Spearman's Rank test for association on the data in Table 2.2, which finds a strong positive correlation between foodcrop exports or imports and cash crop exports ($R_s = 0.41$, significant at 10% confidence). Figure 2.1 overleaf plots the year-to-year trend in foodcrop and cash crop flows and shows graphically that the two invariably move in the same direction - the bigger the foodcrop deficit, the smaller the cash crop surplus.³¹ This is not to suggest that cash crop income played no role in redressing grain production shortfalls, but it provides broad support for the view that African agrarian economies typically experience 'boom-bust' cycles because of the correlated nature of all income derived from rainfed agriculture.

Department of Agriculture Reports for the 1940s and 1950s give some indication of both the frequency and localised nature of foodcrop failure in the Northern Territories. In 1939, "very heavy rains in June" reduced sorghum harvests in some districts (ADM 5/1/116, 1940:4). In 1940, the early millet crop failed in North Mamprussi (ADM 5/1/117, 1941:4). No food problems were recorded in 'North Mamprussi' from 1941 to 1944.³² In 1945, total rainfall at Manga-Bawku was 7 inches above average, but was poorly distributed through the growing season.

³¹. A related exercise on 1980s price data found a countercyclical relationship between retail prices recorded for staple cereals and for groundnuts in Bawku District markets, suggesting that, in grain deficit years, farmers received lower prices for crops sold to raise cash for grain purchases.

³². "In the Northern Territories, the position in the densely populated northern strip - always a source of anxiety regarding food shortage - was satisfactory this year but in the southern half the rainfall in June and July was inadequate and the maize and yam crops suffered severely in several districts" (ADM 5/1/119, 1943:4).

Fig 2.1. Food and Cash Crop Exports and Imports, Northern Ghana, 1943-1956

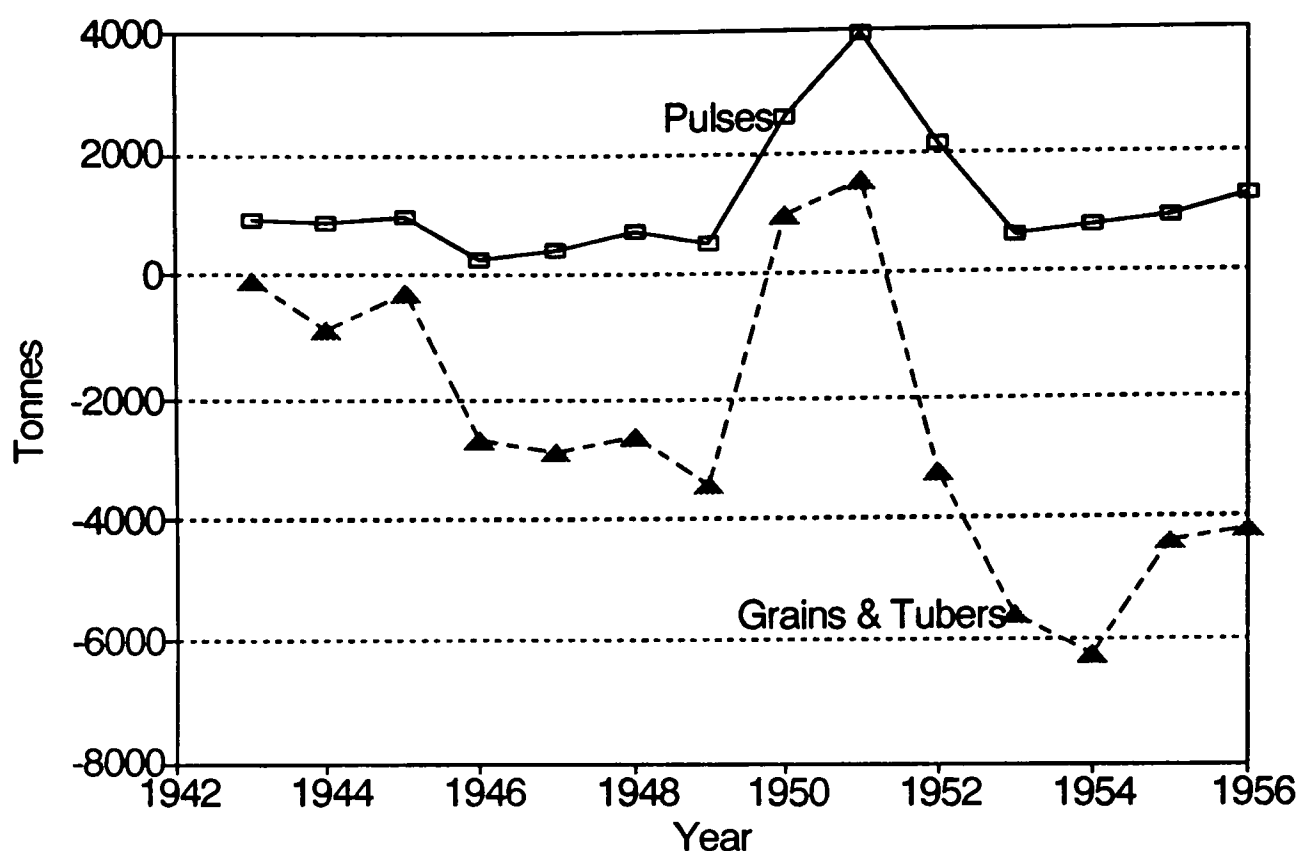


Table 2.2. Balance of Trade of Main Crops, 1943-1956

Year	Grains & tubers	Pulses	Net Trade (tonnes)
1943	-62	+926	+864
1944	-884	+888	+4
1945	-270	+964	+694
1946	-2660	+278	-2382
1947	-2883	+425	-2458
1948	-2624	+748	-1876
1949	-3422	+517	-2905
1950	+962	+2602	+3564
1951	+1551	+3910	+5461
1952	-3240	+2121	-1119
1953	-5578	+604	-4974
1954	-6227	+762	-5465
1955	-4359	+946	-3413
1956	-4188	+1292	-2896

+ = excess of south-bound over north-bound trade

- = excess of north-bound over south-bound trade

Figures calculated from ADM 5/1/127, 1951, Appendix III.B,
and from ADM 5/1/133, 1957, Appendix III.B.

"the rains started late and finished early in most districts. The distribution also was abnormal and affected adversely the staple crops, especially in the Kusasi area which usually produces a surplus of grain but which this year grew barely enough to support itself" (ADM 5/1/122, 1946:8).³³

In 1946, as reported above, famine (*Poyanglal*) struck northeastern Ghana. The fact that this was the second successive year of erratic rainfall contributed to the severity of the crisis. In fact, circumstantial evidence from volumes of grain imports (Table 2.2) suggest that northern Ghana as a whole suffered four successive poor harvests between 1945 and 1948. In Bawku District itself, though, "rainfall was adequate and well distributed" (ADM 5/1/124, 1948:11) in 1947, and harvests were satisfactory in both 1947 and 1948. In 1949, Bawku District again suffered heavy rainfall soon after planting, followed by a premature end to the rains, with the result that a "substantial shortage" (Raeburn 1950:3) of cereals was registered. This hunger became known as *Poyanglal-bil*, where *bil* means 'small' or 'junior'.

This time, the old people of Pusiga agree with the government's assertion that it "quickly forestalled any threat of famine" (ADM 5/4/77, 1950:65), by importing maize and cassava flour from southern Gold Coast, which were sold at subsidised prices. The Department of Agriculture's 1948-49 Report makes no mention of a food aid policy in the Northern Territories, but does refer to its usual policy of banning cereals exports from Bawku District (ADM 5/1/125, 1949:6).

In 1950, "excellent yields of millet and sorghum were harvested and, stimulated by high prices, record exports of cereals, cowpeas and groundnuts to southern markets were recorded" (ADM 5/1/127, 1951:2). The following year, heavy rains in the north, persisting into November, adversely affected grain production (ADM 5/1/128, 1952:2), causing another serious food deficit in 1952. However, output of groundnuts and cowpeas was only moderately reduced and, this year at least, cash crop income appears

³³. This section of the Report opens with the observation that: "In many districts of the Northern Territories the margin between subsistence and starvation is still dangerously narrow."

to have compensated adequately for foodcrop deficits. In the subsequent four years, rains were persistently light and poorly distributed (ADM 5/1/129-133, 1953-1956), and the grains and tubers deficit (proxied by tonnage imported into the Northern Territories from the south) exceeded any recorded during the 1940s. Shepherd (1981:182) claims that a named famine occurred in Bawku District in 1954 - an assertion supported by the combination of record grain imports and small cash crop exports registered for 1953 - but a famine was neither mentioned in colonial reports nor recollected by respondents in Pusiga.

Of course, a rising level of grain imports during the early 1950s also suggests a rising effective demand by northern consumers. Probably this reflects the rapidly improving integration of the Northern Territories with southern Gold Coast. As noted above, transport and communications infrastructure had improved to the point where, by 1954, a tarred road linked Tamale (then capital of the Northern Territories) to Accra. Inter-regional trade in agricultural produce, cattle and consumer goods had reached record levels. Seasonal migration was now a feature of the northern economy, and remittance flows were rising. In short, incomes were higher and more diversified than ever, and these alternative sources of entitlements provided cushions against poor harvests which had not existed in earlier years.

3.3. Post-Independence Food Crises: 1957-1985

Data on agricultural production and trade flows in northern Ghana have been scanty and inconsistent since the late 1950s. However, there were few reports of serious food shortages in Bawku District until the mid-1970s. During the 1960s, rains were generally adequate and reliable, the threat of locusts had receded, and improving transport links, markets and government capacity meant that vulnerability to famine in northeastern Ghana, as throughout West Africa, had fallen dramatically in the space of two decades. But this did not mean that crises of underproduction had passed into history. Whitehead (1988) describes the 1970s as "the decade in which famines on an unprecedented scale began" in Bawku District, and Shepherd (1981:182) specifies 1974

and 1977 as famine years, the latter being perhaps the worst agricultural year in Bawku District since the *Poyanglal* and *Poyanglal-bil* of the 1940s.

The drought of 1977 in Ghana's northern savannah regions resulted in poor harvests and serious hunger during the 1978 dry season. Food aid was provided by the EC and distributed locally by the government, in bright yellow trucks which became known in Bawku District as "*Ayayua* lorries". The word *Ayayua* is not easily translated, but means "to lift up the bowl before it is full". The famine was named for the fact that, because of shortage, grain was sold in the market in level bowls, rather than heaped to overflowing as is normal practice. The hunger of that year is considered serious by the people of Pusiga because "there was no food in the market to buy, even if you had the money". As during colonial crises, local shortages were exacerbated by exports - "in June 1977, at the height of the hungry season, about 1000 bags of produce were apparently being transported by traders from Bawku District to Bolgatanga each day" (Shepherd 1981:185). The Bawku District Administration resorted to the colonial response of banning this trade, though this was quickly dropped in favour of an export tax of C1/bag, which proved equally ineffective.

The famine ended with good rains and adequate harvests in 1978, which were repeated in 1979. A cyclical decline in rainfall began around 1980, however, culminating in a disastrous year throughout Ghana in 1983, which coincided with the severe drought that afflicted most of sub-Saharan Africa in 1982-84. This nation-wide food crisis was also associated with extensive bush and forest fires in many regions (Korem 1985) and with the expulsion of one million Ghanaians from Nigeria. Ghana's post-independence fortunes were at their lowest ebb, and the general economic collapse was yet another exacerbating factor. This famine became known in the south as *Bore Wok*, meaning "the tall people" (emaciation giving the illusion of tallness).³⁴

³⁴. It also acquired a politically charged nickname - "Rawlings' Necklace", a reference to the prominent collarbones of those suffering a hunger for which the PNDC government of Flight-Lieutenant Jerry Rawlings was blamed.

In northeastern Ghana, cereals crops failed completely, and virtually no millet or sorghum was available in local markets during 1983. Retail prices of (mostly imported) maize increased tenfold between February 1982 and July 1983 (see Table 3.8). A sizeable relief programme was set up, administered in Bawku by a 'District Emergency Food Relief Committee'. Large quantities of food aid were provided by the West German Red Cross Society. By the end of August 5,936 mini-bags (at 50 kg each) of yellow maize and 850 cartons of edible vegetable oil had arrived in Bawku. During 1983 the Relief Committee also received and distributed a total of 8,000 mini-bags of white sorghum and 109 sachets of salted fish from the German Red Cross. The bulk of this food aid was distributed to urban institutions and to individuals who submitted written personal requests - ex-servicemen, teachers, bank employees, educated traders. Illiterate small farmers got nothing.

In June 1984 an allocation of 140,000 bags of wheat was received by both Upper Regions under the Canadian Food Aid Programme, donated by CIDA but distributed under the supervision of the World Food Programme. Among the conditions laid down were: "The Canadian wheat is intended for drought-affected farmers and their families only; it was not intended for institutions, special projects, nor should an allocation be made for government workers."³⁵ No food aid was received by farmers in Pusiga.

The 1983 hunger became known in Bawku District as 'second *Ayayua*', to distinguish it from the hunger of 1978. By 1989, *Ayayua* had become a term applied generally to any hunger since the mid-1970s. A commonly heard phrase from farmers who have to buy grain during the hungry season is: "*Ayayua* has collected all my money." During the hunger of 1988/9, though, the refrain was altered to "Gushiago has taken all my money" - Gushiago being a town in the Northern Region of Ghana to which the people of Bawku District went (in lorries this time, not on foot) to buy bags of grain.

³⁵. "Allocation/Distribution of Canadian Food Aid to the Upper East and Upper West Regions", from File BG/1/SF17/18, Bawku, 5 June 1984.

3.4. Summary

Before 1950, Bawku District was prone to occasional food crises, triggered by crop failure, which resulted in distress migration, consumption of (sometimes toxic) 'famine foods' and some excess mortality, caused either by nutrition deprivation or poisoning. Markets were poorly developed, so that food supplies were extremely variable, and household food security was further constrained by the non-availability of remitted income, food aid and other sources of entitlements which are complementary to food production. These factors affected all households more or less equally, though some have always been better placed to cope than others.

Vulnerability to food crises on the *Poyanglal* scale has declined since 1950, for a variety of reasons, and Bawku District as a whole can be described as having shifted from being 'famine prone' in the past to being 'food insecure' today. By the late 1980s, several factors had improved - fertilisers and remittances were available, new sources of income had emerged, food aid was provided in bad years, markets were better integrated so that price and supply fluctuations were reduced.

Underlying these developments is a common factor: steadily improving links with the wider world. Evolving transport and communications infrastructure helps open up a local economy, reducing its isolation so that the traditional famine scenario of localised food production collapse leading directly to localised starvation can be averted (cf. Drèze (1988) on colonial India). Gains from inter-regional trade rise as transport costs fall, and trade improves the distribution of grain between surplus and deficit regions, and reduces price differentials. Market integration also implies a widening of the geographical area over which agricultural risk is spread.

In northern Nigeria, the significance of localised production shortfalls as the overriding determinant of hunger has steadily declined this century, as village communities became better integrated into the national, regional and global economy. "The 1930 famine was the last one in which local shortages of food were determinant" (Hansen 1986:234). While intermittent crop failures have continued to occur, trade and aid flows substitute

for local supply slumps, so that starvation only occurs in the event of trade and aid transfers failing as well as production.

The same observation can be made in northeastern Ghana, with the date shifted forward by 16 years. The 1946 *Poyanglal* famine was not adequately redressed by trade, but how much this reflected a 'trade entitlement failure' (low incomes and inadequate effective demand) and how much was due to market failure (poor transport, high transactions costs to traders) is unclear. Since 1946, physical food scarcity in local markets has become a rare event (except for a few months in 1983), and is due to either lack of effective demand or a national food shortage, rather than transport and distribution bottlenecks. In 1988/9, people in Pusiga often made remarks similar to these comments by two farmers from Niger, in 1974: "people no longer die from famines since there are motor cars now"; "there was no food in these previous years... Today people die of hunger only if they do not have the means" (Laya 1975:60,64).

Offsetting this, other factors have deteriorated. Land has become scarce, wild foods have all but disappeared, rainfall appears to be more erratic. Moreover, the effects of these shifts are concentrated on poorer households (see Chapter 3). Food security has been undermined in poor households by the very processes of change which appear to be making the community as a whole better off and less vulnerable.

4. Differentiation and Inequality in Contemporary Pusiga

The preceding discussion of colonial and post-colonial policies, and their contribution to (or amelioration of) subsistence crises in northeastern Ghana, failed to disaggregate the impact of these events by household types. The twentieth century has seen, if not a clear division of rural communities into social classes, at least a gradation of households by wealth, access to income sources, and vulnerability to food insecurity. Income and wealth differentials between rich and poor within Pusiga are profound (and are quantified in section 5 below). Despite this, processes of social stratification and class formation (defined as differential access and relationships to productive resources)

have barely advanced since the colonial period. In two locations in rural northeastern Ghana, Shepherd (1981) and Whitehead (1984b) observed an "incipient class structure", comprising three groups, which Roncoli (1986a:7) demarcates as follows:

"a minority of wealthy households, characterised by a large family labor force and food sufficiency, who are endowed with strategic political and social ties that give them access to more and better land, modern inputs, and capital for investments from a variety of sources;

" a large majority of small landholders who rely on the market for consumption items for at least part of the year, and who sell part of their farm produce or exchange their labour power for wages either locally or through migration;

" a minority of impoverished households whose land and labor resources are chronically insufficient to meet their reproduction, for which they rely primarily on labor exchange and debt relations".

The majority of households in the Pusiga sample in 1988/9 fell into the middle category of smallholders. The three household categories used for cross-sectional analysis of 'coping strategies' (see Chapter 5 and Appendix 1) were the 'food secure' (23 of 110 households = 21%); 'mildly food insecure' (56 households = 51%); and 'severely food insecure' (31 households = 28%). These correspond to Roncoli's incipient classes. A comparable indivisibility of the middle peasantry is found in Burkina Faso (Roche 1985) and northern Nigeria (Clough 1977; Hill 1982; Watts 1983).³⁶

In "The Development of Capitalism in Russia" (1899), Lenin described a process in which a largely undifferentiated Russian peasantry, who had previously been producing mainly for their own subsistence, became increasingly polarised as capitalism in the form of commodity production penetrated the countryside. This created two new

³⁶. As one example, Watts' (1983:412) classification of 375 'farming units' sampled in Hausaland was: rich 56 (15%); middle 226 (60%); poor 93 (25%).

groups of rural inhabitants: a rural petty bourgeoisie and a rural proletariat, both of whom now functioned within a commoditised cash economy - but on very different terms. Petty bourgeois farmers prosper by investing in superior means of production, renting out land (often "grabbed", to quote Lenin, from the newly created proletarians), usury, hoarding and speculating in grain, and hiring agricultural labour, from whom a surplus is extracted. It is important to stress, especially for the West African context, that the rural proletariat need not be entirely landless. This class includes poor peasants who continue to farm but are characterised by an "inability to exist without the sale of labour-power" (Lenin 1956:180).

While the petty bourgeois class prospers through its exploitation of others through the market mechanism, the mass of 'poor peasants'³⁷ becomes subordinated to the market. "The rural proletarian, by comparison with the middle peasantry, *consumes less*, and, moreover, consumes food of worse quality ... *but buys more*" (Lenin 1956:184). In the contemporary jargon of 'household food security', the growing category of rural proletarians is characterised by market dependence for their food requirements, but they are constrained by poverty from achieving consumption security.

Lenin also noted several factors which retard differentiation, notably those economic transactions which are conducted between individuals with personal knowledge of each other, rather than through the impersonal logic of the market. Such transactions include non-economic aspects, which capitalism must oust if it is to proceed to its logical conclusion - "the more completely bondage, usury, labour-service, etc. are forced out, the more profoundly will the differentiation of the peasantry proceed" (Lenin 1956:190).

In Pusiga's case, several explanations for partial differentiation can be suggested. First, the basis for commoditisation and deepening inequality developed barely half a century ago, with the introduction by the British of bullock ploughs, cash cropping, and head

³⁷. Alternatively, 'incipient', 'semi-' or 'disguised' rural proletarians. 'Poor peasants' (meaning 'simple commodity producers'), more accurately describes the situation in northeastern Ghana. As Bernstein (1977:165) notes, "the simple commodity producer is not a proletarian as he/she retains some control over the organization of production".

taxes. However, the forces of production remain poorly developed. Second, resistance to commoditisation is evident in a reluctance to alienate land and common property resources (trees, water, wild foods), and in the persistence of various non-economic relationships between households (patronage, communal labour parties). Third, 'rich peasants' have accumulated wealth mainly through exploiting lucrative economic opportunities beyond the local community, not (only) through extracting surplus from within the community. Fourth, no 'poor peasants' have yet been dispossessed of their land: there are no 'rural proletarians'.

Smallholder households in Pusiga continue to function both within and outside the market. Production is characterised by self-exploitation; farmers produce both for home consumption and sale (locally and on international markets); many simultaneously hire and sell labour; most retain some non-economic links with richer households, which simultaneously preserve their viability and debilitate them economically. Being partly incorporated into imperfect markets, yet marginalised in terms of access to capital and technology, differentiation in rural northern Ghana reflects the differential terms of integration facing specific households.

The remainder of this section argues that inequality in contemporary Pusiga is attributable to a range of demographic variables (Chayanovian effects, population pressure) and economic factors (commoditisation, involvement in commerce), at both household and community levels.

4.1. Demographic Factors

In 1925, Chayanov argued that statistical observations of inter-household inequality in rural communities largely reflect cyclical mobility of households at different life-cycle stages - formation, evolution and dissolution (fission or extinction) - each stage being associated with a different level of economic activity and material well-being. Provided land is not scarce, the scale of farming expands and contracts along with family size; the critical variable being the household's dependency ratio (consumers/workers) - when

this is highest, consumption demands are greatest and the potential for net accumulation is lowest (Bernstein 1977). One implication of Chayanovian theory is that tendencies toward economic polarisation will be offset by demographic fluctuations which "contain differentiation within limits" (Harriss 1982:210).

In West Africa, demographic constraints on household mobility and inter-household inequality include inheritance rules, the association between wealth and polygamy, and the persistence of "village responsibilities for providing social security" (Hill 1972:76). As Williams (1982:80) observes, wealthy farmers tend to have several wives and many sons, so the division of land and assets among heirs diffuses wealth and counteracts polarisation. In northeastern Ghana, too, patterns of inter-household inequality are not mechanistically reproduced in perpetuity. Rather, inequality is partly reproduced and partly ameliorated over the generations, with upward and downward mobility both limited. Centripetal (levelling) and cyclical (Chayanovian) processes offset centrifugal (polarising) forces; with 'multi-directional mobility' (Shanin 1972) dominating at the community level.

Chayanovian processes of 'demographic differentiation' are apparent in Pusiga, in particular through the vulnerability of young, recently 'separated', nuclear households and (more acutely) of old couples and individuals living alone. Conversely, the most successful households are made up of large, complex families who have escaped Chayanovian determinism by staying together instead of splitting up. These households are usually dominated by a father and some married sons, or by several adult brothers. With land not subdivided among heirs, economies of scale are enjoyed in production and economic specialisation occurs - some members concentrate on farming while others engage in commerce.

Roncoli argues that the relationship between a Bawku household's wealth and its demographic composition is "one of reciprocal influence rather than unilineal causation" (Roncoli 1986b:2), "with wealth increasing and maintaining large size and large household membership contributing to augmenting wealth" (Roncoli 1986a:7). This relationship holds both per household and per capita. In the Pusiga sample (n=109),

household 'entitlements' (here defined as value of assets plus incomes earned in 1988/9) are positively correlated with household size ($R^2 = 0.30$, t -statistic = 6.7), and this association remains significant, though weaker, when entitlements per capita is used ($R^2 = 0.05$, $t = 2.4$). Because the relationship between household size and incomes is non-linear, stronger correlations are obtained when the logs of these terms are used.³⁸

For peasants in West Africa, where land is not yet alienated and the self-sufficiency ethos remains strong, rural landlessness is not an option. Farmers who cannot survive as farmers do not sell up and become landless labourers, as in South Asia; they abandon their land, leave the community and look for alternative livelihoods elsewhere. This 'filtering out' of vulnerable households is matched by a 'creaming off' of wealthy farmer-traders who leave the village for the town, having freed themselves of the need to farm for self-sufficiency. In Pusiga as elsewhere, the extent of economic polarisation (accumulation by some, dispossession of others) is underestimated because of this rural out-migration of the most and least 'successful' households, who are respectively 'pulled' and 'pushed' towards urban areas (Lipton 1980).

The experience of the wealthiest family in Terago and Tesnatinga in 1988/9 illustrates many arguments made in this chapter. Five of the ten wealthiest households in the sampling frame were headed by sons of one man. Azure Asufu was among the first wave of Kusasi farmers to move to Pusiga from Bawku town, around 1920, where he settled on the best available land. He was a hard worker and a successful farmer, accumulating large surpluses of grain most years, which he sold to invest in cattle.

"In those days there was no major trading as there is now. Azure Asufu built up his wealth by exchanging his produce for sheep and goats, then exchanging these for cows and bullocks. Farmers held their wealth in

³⁸. When LN[ENTITLEMENT] is regressed against HHSIZE, the value of R^2 rises to 0.46 ($t = 9.6$); while for LN[(ENTITLEMENT)/HHSIZE] against HHSIZE, $R^2 = 0.08$ ($t = 3.0$).

the form of animal stocks more in those days than they do now. There was plenty of grazing land then."³⁹

Azure Asufu had 4 wives and was survived by 8 sons, all of whom inherited his ambition and work ethic, and became wealthy in their own right, mostly through diversifying into commerce as land pressure intensified. Only 2 stayed in farming; both had large families of their own and prospered (unusually) through crop sales. Another became a watchman for Ghana Highways Authority, and used his wages to finance his sons' entry into cattle dealing. Another son of Azure used his trading profits to move to Bawku town and open a store in 1982. He has since made a pilgrimage to Mecca and helped his relatives gain entrée to long distance cattle dealing and kola nut trading.

4.2. Commoditisation

Another explanation for rising inequality in agrarian communities is commercialisation or commoditisation. Apart from agricultural intensification (as discussed in section 2 above), a second effect of increasing pressure on land in Pusiga was to make many previously abundant and costless wild products scarce, to the point where they were either commoditised or became extinct. Hunting and fishing no longer occur, because there are no wild animals and few streams supporting fish.⁴⁰ Dried fish, an important stew ingredient, is sold in the market by traders who bring it to northern Ghana from the south. Another essential stew ingredient, a local spice called *dawadawa* after the tree from which it is gathered (locust bean, or *Parkia oliverifilicoidea*), is rarely obtainable these days, even in the market, because the tree is virtually extinct around Pusiga. Women have switched from *dawadawa* to soybean, a recently introduced crop with a similar taste which is difficult to cultivate and expensive to buy. Other wild

³⁹. Interview with Issaka Mahamadu, grandson of Azure Asufu, Terago 31/5/89.

⁴⁰. Visitors to Bawku today would be astonished to learn that lions, elephants and crocodiles roamed the District's bush areas and rivers as recently as the 1940s. Lions killed villagers in 1942, 1944 and 1946, elephants "visited some farms" in 1944, and a dam culvert was "completely smashed by crocodiles" in 1942 (RAT 339: 3/9/1942, 13/10/1942, 9/10/1944, 17/10/1944, 5/9/1946).

plants whose leaves were gathered for stews and medicinal purposes have also become scarce or died out, though some have been domesticated, and are grown by women in small plots around the compound, or by men in market gardens.

The disappearance of trees, outside Forestry Department reserves and plantations and alongside roads, all of which are protected by law, has created a fuelwood crisis in Pusiga. Millet stalks are sold in bundles by farmers with large landholdings, and poor men and women travel to bush areas 20 or 30 miles away to cut firewood for sale in Pusiga market. A recent phenomenon is the commoditisation of bullock dung. One of the last 'free goods' in Pusiga, old women and young children collected dung in basins during the 1989 dry season and sold it as fuel to relatives or neighbours, for petty cash.

Agricultural intensification has contributed to monetisation in subtler ways too. Farmers can no longer afford to leave land fallow as they did in the past - there is simply no spare land in Pusiga - with the inevitable consequence that soil fertility is declining rapidly. Chemical fertilisers have been available since the 1970s, and are very popular - among those farmers who can afford them. By contrast, poor farmers facing falling yields have no animals to provide manure for their fields, and certainly cannot afford chemical fertilisers. These households are becoming more and more dependent on the market for their foodgrain needs, a market where prices typically double each year, peaking when the hungry season is at its most severe (see Chapter 3.3).

A lack of land for farming also implies a shortage of grazing land, and this fact is evident in the much reduced animal stocks held by Pusiga farmers nowadays as compared to past years. During the dry season, cattle and small ruminants are allowed to roam in search of food and water, and crop residues such as groundnut leaves are stored as fodder. Nonetheless, bullocks and cows, sheep and goats all grow pathetically lean, and several head of cattle died in Pusiga of hunger and thirst during the 1989 dry season. Even rich farmers have found no solution to this deteriorating situation. Some have resorted to selling their bullocks after ploughing each year and buying fresh bullocks to train before the start of the next farming season.

The reduced capacity for households to keep cattle in Pusiga has also resulted in an 'indirect commoditisation' of brideprice. For decades, four cows have been given by a Kusasi groom (or his father) to the bride's father - irrespective of either family's wealth - but the essential difference is that whereas these animals used to be transferred from one family herd to another, most men nowadays have to buy the cows when they marry. Raising money for brideprice represents a major economic problem for the poor, and inhibits their ability to expand household size and family labour supply. Moreover, a fixed brideprice constitutes a form of rural inflation - the nominal and opportunity cost of four cows today is higher than in the past, when local herds were much larger. This brideprice was considered onerous as long ago as the 1930s, when an ineffectual campaign was launched by the District Commissioner "to reduce these enormous cattle dowries to a maximum of two cows" (RAT 10, 26/10/1932).⁴¹

Commoditisation in Pusiga has raised overall living standards, but its impact has been regressive: wealth differentials and the marginalisation of certain households have increased as the local economy became more monetised. The same cash needs (for food, brideprice, health care - costing the same for everybody) impact very differently on wealthier and poorer households. Cash needs are not proportional to income or ability to meet them (although some are proportional to household size), and they tend to increase inequality, since cash gives access to means of increasing wealth (buying ploughs, expanding household size) from which poor households are excluded.

It is always difficult to separate out increasing relative inequality due to differential rates of accumulation between classes, and increasing absolute impoverishment due to 'vicious cycles' of indebtedness and food insecurity, or 'poverty ratchets' resulting from unequal terms of participation in markets and differentiated access to productive inputs. The poor in Pusiga seem no more or less poor than households elsewhere in Bawku District, but the rich farmer-traders seem rather wealthier than successful farmers in other villages. Pusiga's poor have been 'left out' more than 'exploited'.

⁴¹. In 1989 a law was passed by the District Administration reducing brideprice in Bawku District to two cows, but to date it too has proved unenforceable.

Food insecurity in contemporary Bawku District has been blamed both on Malthusian factors (Konings 1986; UNICEF-Accra 1989) and on commoditisation (Whitehead 1984b). While population pressure is important in explaining how poor households have been unable to maintain their food security in the face of declining yields, it fails to explain how other households continue to accumulate and prosper. It will be argued below that wealth accumulation and consumption security in Pusiga derive not primarily from agriculture, but from off-farm incomes - in particular, from trading.

4.3. Trade

In land-scarce, self-provisioning economies, smallholder farming provides only limited opportunities for accumulation, and should therefore be seen as a relatively minor contributor to economic stratification. Hill (1972) demonstrates this for Hausaland, and Tripp (1978, 1981) for a north Ghanaian community adjacent to Bawku District. In Pusiga, farming and grazing land have steadily decreased during this century, in both availability and quality. Those who are prospering today are those who have taken advantage of developing markets to diversify their income sources, notably by trading, thereby reducing their dependence on an increasingly fragile agro-ecological system.

The majority of Pusiga households include individuals who engage in trade of some kind. Every morning, dozens of local women walk several miles to markets in Pusiga, neighbouring villages or Bawku town, returning at dusk, following the three-day market cycle. Commercial activity in northeastern Ghana revolves around this pattern, whereby each town or village holds its market every third day, in a cycle established decades ago which also serves as a simple calendar (van Apeldoorn 1971). As a secondary market in the District, Pusiga market is held the day after market day in Bawku town.

In the early 1970s, 88 markets were operating in Ghana's Northern and Upper Regions (McKim 1972). A hierarchical classification according to size and function identified 1 'regional' market, at Tamale (capital of the Northern Region); 3 'central' markets, at Bolgatanga, Bawku and Yendi (also in the Northern Region); 10 'intermediate' markets,

including Gushiegu (another Northern Region town, and the main supplier of grain to Pusiga during 1988/9); 20 'standard' markets, including Pusiga; and 54 'minor' (village) markets. Pusiga's size and status had declined somewhat since its heyday as a cattle quarantine centre in the 1930s and 1940s. 'Intermediate' markets like Bawku were characterised as attracting around 12 lorries, 200 traders and 1,000 to 1,500 purchasers on market days. 'Standard' markets like Pusiga were attended by between 300 and 1,000 people (McKim 1972:339). Trade in 'standard' markets was and still is mostly retail, and is dominated by local products and some inexpensive manufactured and processed items.⁴² Wholesale trade and costly consumer durables were found (by McKim) almost exclusively in regional and central markets, but they have subsequently permeated down to the 'intermediate' market level. The numbers and relative status of north Ghanaian markets have changed little since the early 1970s, though the volume of trade and traffic has certainly increased.

Women headload quantities of stew ingredients, clay pots or petty consumer goods to and from markets for sale or resale, earning tiny profit margins, in calculating which they do not count their walking time and labour as costs. Men are involved in local retailing too, mainly of animals (typically bought in Pusiga and sold in Bawku town) and kola nuts (bought in Bawku town and resold in Pusiga). This earns rather more than the meagre margins gleaned by female retailers of stew ingredients, but not enough to launch the household into an upward spiral of accumulation.

By far the greatest potential for wealth accumulation comes from long distance trade.⁴³ The wealthiest men in Pusiga today are cattle dealers and kola nut wholesalers. Cattle dealers buy up bullocks and cows locally or from Burkina Faso and take them south, selling them in the large cattle markets of Kumasi and Accra. Kola

⁴². While local produce (grain, animals) dominates market trade, imported petty consumer goods are also sold. An enumeration of items at a petty trader's stall in Pusiga, conducted as part of fieldwork on 6 June 1989, listed 47 items for sale from 13 African, Asian and European countries. These included toiletries (soap, body creams), beverages (Nescafé, teabags, tinned milk), domestic items (matches, mosquito coils, batteries, torches), and some processed food (tinned fish, sweets).

⁴³. By 'petty trading' is meant trade within the village or District; by 'long distance trading' is meant inter-regional or cross-border trade.

wholesalers travel to the forest Regions of Ashanti and Brong-Ahafo, where they buy up sacks of kolanut which they bring back to sell in northern markets (usually through middlemen (retailers)). The large profit on these activities derives from the sizeable capital investment needed and from the fragmented nature of the national market. Despite improvements in recent decades, transport costs remain high; roads are poor and even impassable during the rainy season; there are ethnic and language "entry barriers" to (especially) cattle dealing; different climatic regimes in northern and southern Ghana means that seasonal price cycles are very different between the regions.

Significant wealth differentials exist between households involved in long-distance (national or cross-border) trading and those who retail commodities between local (District-wide) markets. In 1989, mean income earned by cattle dealers and kola nut wholesalers (@ C237,700) was approximately double that of animal retailers (C120,000) (and three times the average total salary paid to those in formal sector employment (C78,800)). Much of the observed wealth inequality within Pusiga reflects its higher than average degree of involvement in long-distance commerce. In more remote villages, production for self-provisioning remains the dominant economic activity, supplemented by petty retailing, and inequality is less pronounced (Roncoli 1991). As Cline (1975:394) has observed, "for the purely subsistence economy there is no surplus to provide the basis for inequality".⁴⁴

Hart (1973; 1974; 1975) and Tripp (1978) argue that success or failure in commerce among north Ghanaians depends on personal characteristics (financial skills, business acumen and hard work) rather than socio-economic, ethnic or educational background. Hart's study of the fortunes of Frafra⁴⁵ migrants in Accra found that most wealthy entrepreneurs were 'self-made men' who were unlikely to have mobilised financial support from successful relatives, even though some redistribution of profits, which

⁴⁴. Whether a 'pure subsistence economy' has ever existed is open to debate, but the distinction between communities whose dominant economic activity is self-provisioning farming and those where trade provides significant opportunities for wealth accumulation is central to this discussion.

⁴⁵. The Frafra are "a highly mobile ethnic group" (Hart 1974:321) from around Bolgatanga. The 1960 Census revealed that 18% of the Frafra population had moved to southern Ghana, a migration which Staniland (1977:3) attributes to "overcrowding on the land".

typically raised welfare in the entrepreneurs' home communities, was common. Nonetheless, Tripp's (1978:280) assertion that "[o]pportunities to trade are open to all" seems rather glib, except for petty trading locally, which offers only tiny margins of profit. Ethnic, religious and economic barriers to entry exist, particularly for medium- and long-distance trading, not least being the need for access to working capital on a scale which is beyond the reach of most households.

Instead of incipient Leninist differentiation of the peasantry in Pusiga, a process of 'independent accumulation' has occurred, whereby some farmer-traders have achieved incorporation into larger economic networks, where profits are earned through spatial arbitrage between sellers and buyers hundreds of miles apart. These markets have existed since the pre-colonial era, but the improvements in infrastructure and transport which accompanied colonialism increased opportunities for new entrants to these lucrative activities, without reducing their profitability. The ethnic demarcation of non-agricultural economic activities has also eased, allowing Kusasi farmers to become cattle dealers, blacksmiths, and weavers - occupations which were formerly the exclusive preserve of Fulani, Busanga and Mossi immigrants respectively.

5. Quantifying Inequality in Contemporary Pusiga

Any visitor to Pusiga today would be struck immediately by the visible indicators of inequality. There are obvious economic distinctions between traditional mud-and-thatch compounds and 'modern' brick-walled and iron-roofed houses. Outside the former dwellings a few sheep and goats might be tethered near the single granary; outside the latter a pair of bullocks is penned behind three or four granaries, and a bicycle or even a motorbike can be seen leaning against a painted wall. But quantifying the scale of inequality in Pusiga demands a more rigorous mechanism for comparison between households than visual impressions.

In preceding discussions Pusiga was seen to be characterised by limited differentiation in terms of class formation, but high inequality in terms of wealth, access to productive

inputs and to off-farm sources of income. In Chapter 5 non-agricultural incomes will emerge as crucial to the achievement of household food security in 1988/9. This section quantifies inequality in the Pusiga sample in terms of (1) household wealth (asset ownership) and (2) household incomes, and tests the hypothesis that off-farm incomes are the most significant source of inter-household inequality.

5.1. Household Wealth

The first method was to consider the distribution of wealth in the full population of Terago and Tesnatinga (201 households) at the time of the first census, where wealth was defined and calculated as the combined market value (in Cedis) of all major assets (animals, farm tools and consumer goods) owned by each household. By this criterion, wealth distribution was heavily skewed in September 1988, with the poorest 20% of households owning just 1.1% of total assets by value in the population, while the top two deciles owned 60.7%. The mean value of assets owned by the poorest two deciles (@ C10,731), was 1/56 the figure for the richest two deciles (@ C598,850).

An indication of the levelling or polarising impact of the 1988/9 food crisis in Pusiga can be gleaned from a comparison of household wealth distribution at the start and finish of the fieldwork period. The Gini coefficient was chosen as the statistic best suited to summarise inequality levels and to capture distributional shifts. This coefficient (being geometrically equivalent to 1 minus twice the area under the Lorenz curve) provides an index of concentration for a continuous variable - typically, as in this case, some measure of personal incomes or household wealth. The value of the Gini always lies between 0 (perfect equality) and 1 (perfect inequality). The coefficient has the advantages of being mean and population size independent, as well as satisfying the Pigou-Dalton condition - "any transfer from a richer to a poorer person that does not reverse their relative ranks reduces the value of the index" (Anand 1983:306).

Box 2.1. Calculating and Decomposing Gini Coefficients

Shalit (1985) has shown that the Gini coefficient can be estimated from the following equation:

$$G = \{(\eta^2 - 1) / 6\eta\} \cdot \{\beta / \mu\}$$

where η = number of households;
 μ = mean household income;
 β = the estimated slope coefficient of the regression of household incomes (ranked in ascending order) against the set of natural numbers.

Shalit has further demonstrated that the Gini coefficient can be decomposed using the following formula:

$$G = \sum_{k=1}^K S_k \cdot G_k \cdot R_k$$

where S_k = share of total income of income source k ;
 G_k = the Gini coefficient for income source k ;
 R_k = the correlation coefficient between income source k and total household income.

In Box 2.1, 'income' can also read 'wealth'; inter-household inequality in both sources of entitlements to food will be analysed and disaggregated below. Decomposing the Gini coefficient isolates three factors contributing to this figure: the relative importance of each source of income or wealth (S_k); inequality within each source (G_k); and the correlation between each source and total income or wealth (R_k). Summing the product of these three for each source of income or wealth gives the overall Gini; dividing each product by the overall Gini ($\sum S_k \cdot G_k \cdot R_k / G$) yields the percentage contribution of each source to total inequality (Francis and Hoddinott 1992:20).

For 104 households in the Pusiga sample, the Gini coefficient for wealth was estimated at 0.55 in September 1988, and 0.58 ten months later.⁴⁶ Table 2.3 disaggregates

⁴⁶. The sample size here of 104 is smaller than the total of 109 used in the calculation of Gini coefficients for household incomes (see below), because incomplete data on assets were recorded during the year on 5 households.

these coefficients into three components: animals, domestic assets and farm tools.⁴⁷ (Assets were valued at constant (July 1988) prices.) Considering the fact that every household is engaged in self-provisioning cultivation, and that there is no commercial farming, these figures are unusually high.

Table 2.3. Gini Coefficients (Wealth) for the Pusiga Sample, 1988 and 1989

Year (n=104)	Mean Wealth (cedis)	S_k	G_k	R_k	$S_k \cdot G_k \cdot R_k$	% of Total Gini
<u>1988</u>						
Farm Tools	28,490	0.138	0.694	0.755	0.072	13.1
Animals	94,258	0.458	0.618	0.831	0.235	42.5
Domestic Assets	83,128	0.404	0.658	0.925	0.246	44.4
Total	205,876	1.000	-	-	0.553	100.0
<u>1989</u>						
Farm Tools	21,321	0.113	0.762	0.788	0.068	11.7
Animals	84,646	0.448	0.627	0.853	0.240	41.2
Domestic Assets	83,030	0.439	0.662	0.942	0.274	47.1
Total	188,997	1.000	-	-	0.582	100.0

The relatively minor contribution of 'farm tools' to household wealth (13.8% in 1988 and 11.3% in 1989) is indicative of low levels of capital investment in agriculture

⁴⁷. 'Animals' included in these calculations were: bullocks, cows, horses, donkeys, goats, sheep, pigs, ducks, chickens, guinea fowls. 'Domestic assets' included: lorry (one), motorbikes, bicycles, radios, watches, torches, kerosene lamps, wooden beds, zinc rooves. 'Farm tools' comprised: ploughs, buckets, pickaxes, spades, cutlasses, sickles, hoes, grinding mill.

throughout northeastern Ghana. The high degree of inequality in this category (0.76 in 1989) largely reflects an either-or distinction between plough-owning households and non-owners. Inequality does not vary markedly between asset categories, each of which is strongly correlated to total wealth. The contribution to total inequality of each category corresponds closely to their share of total wealth: animals and domestic assets comprise each 40-47% of household wealth in both years, and their contribution to the overall Gini each falls in this range.

The marginal worsening of all Gini coefficients over the year, compounding an overall fall in mean wealth per household, is not significant, and no conclusion can be drawn on whether the food shortage was a polarising or levelling force overall. Since this was the second successive below average year for agriculture (see Chapter 5), panel data for both 1987/8 and 1988/9 would provide more conclusive evidence, but data collected retrospectively on assetholdings, income sources and grain purchases during 1987/8 were considered not robust or detailed enough to incorporate into this analysis.

5.2. Household Incomes

Gini coefficients are more usually estimated for incomes than for wealth. Table 2.4 lists Gini coefficients for incomes earned during the 1988/9 inter-harvest period (from the November 1988 annual harvest to the August 1989 early millet harvest).⁴⁸ Two sets of figures are given, one for the full sample of 109 households, and one with the two wealthiest households removed (they are so rich that they constitute 'outliers'). The overall coefficient (for total income) is disaggregated into agricultural income (crop sales) and non-agricultural income (off-farm earnings).⁴⁹

⁴⁸. Essentially, these are adult male incomes. Women's income-earning activities are not included here, for reasons elaborated in Appendix 1 - because of data limitations, because average male incomes exceed female incomes by several orders of magnitude, and because male and female incomes are kept separate, with men buying most staple food and major household assets.

⁴⁹. In a separate exercise, 31 male income-earning activities were ranked according to the mean income they provided. 'Major' income activities - long-distance cattle dealing; grinding mill profits; kola nut wholesaling - each generated over C200,000 profit per person during 1988/9.

Table 2.4. Gini Coefficients (Incomes) for the Pusiga Sample, 1988-89

Sample Size	Mean Income (cedis)	S_k	G_k	R_k	$S_k \cdot G_k \cdot R_k$	% of Total Gini
<u>(n=109)</u>						
Agricultural	24,678	0.171	0.588	0.022	0.002	0.3
Non-Agricultural	119,832	0.829	0.831	0.996	0.686	99.7
Total	144,510	1.000	-	-	0.688	100.0
<u>(n=107)</u>						
Agricultural	24,680	0.292	0.593	0.333	0.058	11.2
Non-Agricultural	59,853	0.708	0.701	0.920	0.427	88.8
Total	84,533	1.000	-	-	0.514	100.0

As a rule of thumb, a Gini value below 0.3 is generally taken as signifying relative equality, $0.3 \leq G \leq 0.5$ suggests moderate inequality, while a value above 0.5 signifies high inequality. The Gini values recorded for the full sample (n=109) are high by any standards. Ewusi (1983:58), citing Ghana's 1974/75 Household Budget Survey, quotes a Gini coefficient for rural Ghana of 0.376, which supports the conventional view of a 'homogeneous peasantry', but is considerably lower than any for Pusiga. More recently, data from the nation-wide Living Standards Measurement Survey were used to estimate a Gini coefficient for Ghana as a whole of 0.347, based on consumption expenditures, lower than that of 0.435 recorded for neighbouring Côte d'Ivoire (Glewwe

'Middle' income occupations provided between C10,000 and C150,000. Ranked from most to least remunerative, these were: animal retailing; motorcycle hire; grinding mill operator; salaried employment; lorry driver; bicycle repairer; pension; kola nut retailing; remittances from migration; sewer; poultry retailing; bullock plus plough hire; house-building; house-plastering; sold lottery tickets; *zanna*-mat maker; herbalist; soothsayer; drummer; cut grass. 'Minor' income activities offered less than C10,000 profit per person pursuing them. These were: Arabic teacher; weaving; rope-maker; ran roadside stall; sold mangoes; collected fodder; agricultural labourer; cut firewood.

and Twum-Baah 1991:57). A Gini coefficient for the Pusiga sample of 0.69 is higher than any of these, though this is predictable given the level of disaggregation involved (*ceteris paribus*, the smaller the sample, the higher inequality is likely to be). However, the figure drops quite dramatically, to 0.51, when the two wealthiest households are removed from the analysis.

A more appropriate comparison of this inequality measure is with other village-level studies. The top two deciles in a sample of 118 rural households in Western Kenya received 53.3% of total household income (Hoddinott 1989:175) - rather less than the 64.3% earned by Pusiga's top two deciles - while the bottom 40% of households earned 11.7% of total income, more than the 6.4% earned by the equivalent deciles in Pusiga. (These figures exclude Hoddinott's wealthiest household and Pusiga's two wealthiest households.) Hoddinott's Gini coefficient for household incomes was 0.50 ("a high degree of income inequality", comparable to Pusiga's 0.51), rising to 0.56 when the richest household was restored to the analysis (considerably less than Pusiga's 0.69).

Most of the contribution to inequality of the two wealthiest households in the Pusiga sample arises from their extremely high off-farm incomes during 1989. Both are cattle dealers whose farming activities are nominal compared to their involvement in long-distance trading. Between them, these two 'cedi millionaires' earned 42.6% of total income accruing to the 109 sampled households during 1989; the richest man alone earned 30.5% of total income. (At the other extreme, 21 households had no non-farm income at all during 1989, and 15 households had no income from crop sales.) When these two 'outlier' households are removed from the dataset, the Gini coefficient for non-farm earnings drops from 0.83 to 0.70, and mean non-agricultural income halves, from C119,830 to C59,850. Even so, non-agricultural income continues to contribute more than two-thirds of total income, is highly unequally distributed, and is strongly correlated with total income ($R^2 = 0.92$).

Agriculture contributes even less to inequality (11.2%) than to total income (29.2%), being less unequally distributed (Gini = 0.59) and less closely correlated to total income ($R^2 = 0.33$) than is non-agricultural income. All three features are explained by the

comparative unimportance of agriculture to high-income households. Mean agricultural income (@ C24,680) and the Gini for crop sales are unaffected by the inclusion or removal of the outliers, since they are only average farmers. The relative contribution to inequality of each income source does not change substantially in either scenario: off-farm incomes contribute an overwhelming 99.7% to the overall Gini when the two outliers are included, and a slightly more modest 88.8% when they are excluded.

The distribution of incomes in the sample, with and without these two cattle dealers, is shown in the Lorenz Curve overleaf (Figure 2.2), which draws on the final column in Table 2.5.

Table 2.6 (p80) disaggregates incomes by source (farm and non-farm) and by quintile. Perhaps the most striking fact about this Table is the changing composition of income as total income rises. Although both components rise by income quintile, off-farm incomes start lower but rise much faster than earnings from crop sales. For the poorest 60% of households, crop sales contribute over half of annual earnings (52% in 1989), but for the top 40%, non-agricultural earnings are predominant, contributing 85% of total income during 1989. For the two wealthiest cattle dealers, crop sales contributed less than 1%, but even with these extreme cases removed, off-farm earnings provided 79% of total income for the top two income deciles. This inverse proportionate relationship between crop income and total income is not atypical. Collier, Radwan and Wangwe (1986) found that the poorer 50% of 600 sampled households in rural Tanzania derived $\pm$ 70% of their income from agriculture and the richer 50% just 35%. Possibilities for accumulation in Tanzania, as in northern Ghana, lie outside agriculture.

For the Pusiga sample as a whole, the dominance of non-farm earnings over agricultural income reflects two related facts: the enormous (relative) wealth derived by a minority from lucrative non-agricultural occupations, and the limited potential for farming as a mechanism for accumulation in Pusiga today. Even the richest farmer-traders are choosing not to invest in tractors and other yield-enhancing technologies, preferring to divert their profits into working capital for trading, buying and maintaining grinding mills, and purchasing high-status consumer goods ('modern' housing, motorbikes).

Fig 2.2. Lorenz Curve, HH Incomes, 1989

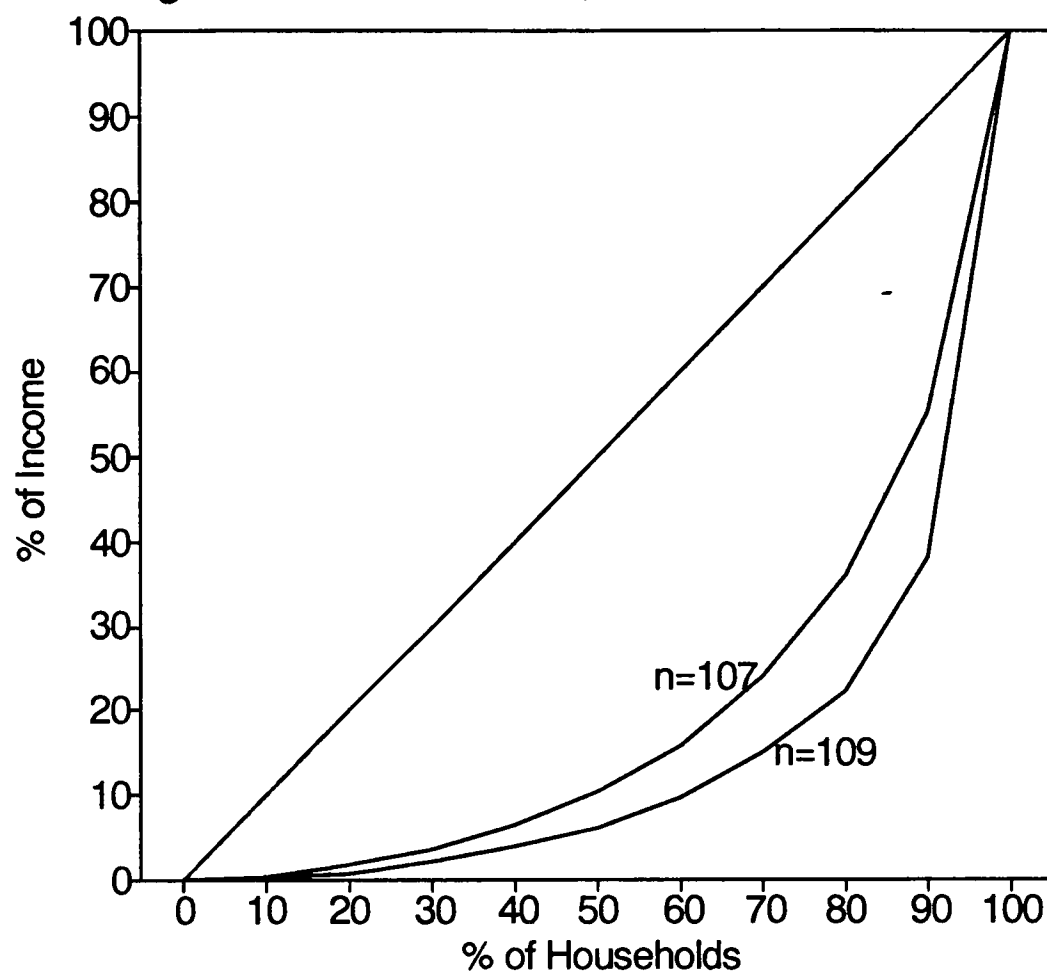


Table 2.5. Income Distribution in Pusiga, 1989

Decile	% Income (n=109)	Cum. % (n=109)	% Income (n=107)	Cum. % (n=107)
Bottom	0.23	0.23	0.40	0.40
2nd	0.78	1.01	1.35	1.75
3rd	1.17	2.18	1.82	3.57
4th	1.69	3.87	2.83	6.40
5th	2.45	6.32	4.14	10.54
6th	3.43	9.75	5.15	15.69
7th	5.20	14.95	8.44	24.13
8th	7.28	22.23	11.62	35.75
9th	15.58	37.81	19.60	55.35
Top	62.20	100.01	44.67	100.02

Table 2.6. Agricultural v. Non-Agricultural Incomes by Quintile, 1989

		Crop Sales		Off-farm Earnings		Total
Quintile	N	Mean per HH	% HH Income	Mean per HH	% HH Income	Mean per HH
Bottom	22	4600	63.5	2639	36.5	7239
2nd	22	9470	46.3	10995	53.7	20465
Middle	21	21836	52.8	19533	47.2	41369
4th	22	31093	36.3	54532	63.7	95625
Top	22	56263	10.0	506900	90.0	563163
Mean:	109	24678	17.1	119832	82.9	144510
	107	24680	29.2	59853	70.8	84533
Top-2	20	59429	20.9	224720	79.1	284149
Top 2	2	24603	0.7	3328700	99.3	3353303

On the other hand, it should be noted that crop income does rise by wealth decile, both per household and per capita (though by proportionately less than off-farm earnings), suggesting two Chayanovian relationships: between household size (which determines family labour supply and access to land) and agricultural productivity; and between household size and ability to diversify out of farming. This supports the arguments made in section 4.1 above. The relationship is stronger in respect of non-agricultural than agricultural income, suggesting diminishing marginal returns to labour in farming, but exponential returns to labour in off-farm incomes. This relationship is clear from Table 2.7, which summarises per capita incomes by these two broad income categories.

Table 2.7. Per Capita Income in Pusiga, 1989

Quintile	HH Size	Income per capita	
		Crop Sales	Off-farm Earnings
Bottom	6.7	686	393
2nd	6.0	1578	1832
Middle	8.7	2510	2245
4th	9.8	3173	5565
Top	16.4	3431	30908

5.3. Household Entitlements

In the preceding sections the value of, and inequality in, household wealth and incomes were examined individually. Here these two major components of entitlements to food are brought together. (For each household, entitlement is defined simply as the sum of the value of assets owned and incomes earned during 1989.) Table 2.8 lists Gini coefficients for the Pusiga sample, disaggregated by asset values (wealth) and incomes.

Table 2.8. Gini Coefficients (Entitlements) for the Pusiga Sample, 1988/9

Sample Size	Mean (cedis)	S_k	G_k	R_k	$S_k \cdot G_k \cdot R_k$	% of Total Gini
<u>(n=109)</u>						
Wealth 1988	205,609	0.587	0.654	0.673	0.258	51.2
Income	144,510	0.413	0.688	0.867	0.246	48.8
Total	350,119	1.000	-	-	0.504	100.0
<u>(n=107)</u>						
Wealth 1988	183,447	0.685	0.648	0.949	0.421	79.7
Income	84,533	0.315	0.514	0.662	0.107	20.3
Total	267,980	1.000	-	-	0.528	100.0

When the full sample (n=109) is considered, income in 1988/9 contributes 41% of total entitlements; realisable assets as at September 1988 only 59%. Excluding the two rich cattle dealers reduces the ratio of income/wealth from 2:3 to under 1:2. For n=109, wealth and income each contribute around half the inequality as recorded in the Gini coefficient of 0.50, but with n=107 income inequality drops, the correlation between

wealth and entitlements improves (from 0.67 to 0.95), and inequality in asset holdings now contribute a dominant 80% towards a slightly worse Gini of 0.53.

In relation to household food security, these findings suggest that assets remain vital for the 'average' household in Pusiga facing grain production deficits in any given year, even if the rich enjoy such high incomes that they have little need to hold assets as 'consumption buffers' (much of their wealth is in the form of consumer durables rather than animals held as savings). However, assets are unequally distributed too, and households of below average income also hold below average stocks of assets, despite the greater relative significance of assets in their total entitlements.

6. Conclusion

Pusiga has changed at a remarkable rate during this century, but specific developments affected different groups of households to varying extents. Notable among these were heavy in-migration during the 1920s, the introduction of taxation and mixed farming in the 1930s, steady improvements in transport and communications infrastructure, and the gradual commoditisation of what were once 'free goods' (everything from farming land to bullock dung). Generally, the wealthier and more powerful were better placed to take advantage of new opportunities, and did so, while poorer and less influential people did not (or not to the same degree) and were frequently disadvantaged by them. On the other hand, while polarisation may have increased as a consequence, these developments have also been associated with an overall reduction in the region's vulnerability to famine.

It is extremely difficult to extricate the causes of inequality between households from symptoms of that inequality. Is a household rich because it engages in trading, or can it afford to engage in trading because it is rich? Tracing back through Pusiga family histories reveals that either can be true: some men (mostly early arrivals in Pusiga) built up wealth initially through agricultural surpluses, which generated the working capital needed to diversify into trading; others (usually later arrivals) became wealthy by

concentrating on commerce from the start, rather than farming. Similarly, larger families tend to be wealthier than small families, but the direction of causality between household size and wealth can run either way.

Inequality within contemporary Pusiga is a complex function of land 'ownership', family size, income diversification, and other factors. Large households cultivate more land, engage in a wider variety of income-generating activities, and are better able to respond adequately to localised threats to food security such as drought. On the other hand, access to sources of income extending beyond the local community is the most striking indicator of inter-household inequality. Economic linkages beyond the village are crucial not just in ensuring consumption security in bad years, but in offering opportunities for accumulation which agriculture no longer does. Apart from long distance trading, the few educated local men who have managed to find salaried employment enjoy a stable source of income which reflects the comparative prosperity of the towns, and exceeds the scale of income which can be earned within the village.

More generally, differential participation in imperfectly developed markets has emerged as central to the understanding of inequality and differentiation in contemporary Pusiga. This argument applies to all factor and produce markets in Pusiga, as will be discussed in Chapter 3 - including those for foodgrains and cash crops, assets, credit, inputs (fertiliser, ploughs, seeds) and labour (both local and migratory). In most markets, the rich choose to participate in ways and at times which facilitate accumulation, while the poor are forced into market dependence on terms and at times of year which frequently impoverish them further. Wealthier households profit through their ability to buy and sell, hire, lend and borrow on favourable terms and at optimal times. Conversely, poor households are forced into market transactions on unfavourable terms and at adverse times. The market in many cases acts as an intermediary agent which transfers assets and resources from poorer to wealthier households, thus simultaneously increasing the wealth of the latter group and the vulnerability of the former.

Chapter 3. Agriculture and Seasonality in Northeastern Ghana

0. Introduction

Access to food in the West African semi-arid tropics is achieved primarily through self-provisioning. Rain-fed agriculture is subject to high risk - but so is market dependence. This chapter sets out the sources of food insecurity in northeastern Ghana that relate to food production and supplies. As seen in Chapter 2, farming practices have evolved substantially during this century, but agriculture remains undercapitalised. Land pressure has induced potentially destructive forms of intensification: chemical fertilisers, permanent cultivation.

Smallholder farmers face occasional grain production deficits, triggered usually by rainfall instability. (These in turn provoke the post-harvest responses with which the following three chapters will be primarily concerned.) Evidence is provided for an extremely variable distribution of rainfall, both inter-annually and intra-annually. The importance of distribution over volume in determining harvests is demonstrated.

Climatic seasonality affects not only agriculture, but structures the entire rural economy. Labour and cash flow bottlenecks constrain small, poor households during the farming (and 'hungry') season. Grain and asset markets are imperfect and function worst in years of production deficit, when self-provisioning producers become market dependent consumers. Price seasonality in turn contributes to seasonal fluctuations in welfare (eg. nutrition) levels, which are distributed unequally, according to household wealth. Government and donor efforts to ameliorate the 'hungry season' in northeastern Ghana (through counter-seasonal price stabilisation and the provision of agricultural credit) have had only limited success to date.

These two sets of issues - the problems facing agriculture and the multi-dimensional nature of seasonality - are analysed in this chapter, with specific reference to their differential impact on different types of rural household.

1. Agriculture

This section describes the agricultural system in northeastern Ghana. The discussion will cover crops cultivated, local farming practices, access to inputs (labour, land, animal traction, fertilisers, seed), and institutional support for agriculture.

1.1. Crops

Agro-climatically, Ghana divides into three zones - the coastal savannah, where the staple foodcrops are maize and cassava; the central forest belt, where cocoa is cultivated for export and plantain and cocoyam are consumed at home; and the semi-arid northern savannah, where farming for home consumption is dominated by millets and sorghums and groundnut and rice are grown for sale. In 1987, 91% of estimated national millet and sorghum production came from the Northern and two Upper Regions (30.4% from the Upper East). Only 21% of maize came from these regions (just 0.5% from the Upper East). Yam is also farmed extensively in the Northern and Upper West Regions, but hardly at all in the drier Upper East, where sweet potato is the only tuber. Also widely grown in the northeast are cowpea (or white beans), and small quantities of bambara bean and soybean. The only inedible cash crops grown in Pusiga are cotton (for local cloth production) and henna (for cosmetic purposes). Neither is cultivated in significant quantities. Tobacco is grown in tiny patches around some compounds, usually for home use only.

Some indication of the relative importance of various crops is provided by Ministry of Agriculture crop projections for Bawku District in 1986. Table 3.1 confirms the dominance in agriculture of millets and guinea corn (the main variety of sorghum), which between them accounted for 85% of cereals acreage and 71% of (projected) cereals production in 1986. High-yielding rice (12% of cereals acreage but 26% of output), is concentrated in irrigated valleys elsewhere in the District, and is not grown on a substantial scale in Pusiga. Among the pulses, groundnuts contributed an

overwhelming 81% of projected pulse production in 1986, and in terms of acreage was the single most planted crop in the District, ahead even of late millet, the preferred cereal.

Table 3.1. Crop Projections for the 1986 Agricultural Year, Bawku District

Crop	Acreage (%)		Yield: Kg/Acre	Production: Tons (%)	
Early Millet	19,000	(26)	318	6,042	(20)
Late Millet	23,000	(31)	318	7,314	(24)
Guinea Corn	20,000	(28)	409	8,180	(27)
Maize	1,500	(2)	436	654	(2)
Rice	9,000	(12)	873	7,857	(26)
Cereals (total):	72,500	(100)		30,047	(100)
Groundnuts	25,000	(74)	286	7,150	(81)
Cowpeas	8,000	(24)	182	1,456	(17)
Bambara Beans	600	(2)	318	191	(2)
Pulses (total):	33,600	(100)		8,797	(100)
Sweet Potato	180		1,527	275	
Mangoes	15		909	15	
Cotton	2,000		250	625	
Leafy Vegetables	750		-	-	

Source: Annual Report, General Extension Division, Ministry of Agriculture/
URADEP, Bawku District, 1986.

A 1988 survey of 325 farmers in Pialoko - a section of Pusiga adjoining Tesnatinga - found the following allocation of fields (since most fields tend to be multi-cropped rather than pure stands, farmers were asked to state the predominant crop on each field): millet 347 (31% of total), sorghum 162 (14%), groundnuts 292 (26%), cowpeas 294 (26%) and rice 37 (3%). This compared to District totals (for 6,046 farmers surveyed)

of: millet 5,957 (33% of total), sorghum 3,425 (19%), groundnuts 3,733 (20%), cowpeas 3,003 (16%) and rice 2,170 (12%).⁵⁰

Brief descriptive notes on the major crops cultivated or gathered in Pusiga follow, in four categories: cereals, pulses, vegetables and tree crops, and inedible cash crops.

1.1.1. Cereals⁵¹

Two varieties of bulrush millet are cultivated by most households in Bawku District. Early millet (*Pennisetum typhoideum*) is known by the Kusasis as *nara*. As the first foodgrain to be harvested, maturing in only 75-80 days, early millet plays a crucial role in breaking the 'hungry season' in poor households. It is very popular for *TZ* - a thick porridge which, eaten with a vegetable stew or relish, is the main daily meal.⁵² Late millet (*Pennisetum spicatum*) is called *za* in Kusaal. Despite being low-yielding and unresponsive to animal manure or chemical fertilisers, late millet is popular because it is resistant to drought and thrives even in poor soils (Koli 1975).

Three main varieties of sorghum are cultivated - guinea corn (*Sorghum guineense*), and two lines of *naga* (Kusaal) - red-grained and white-grained (*Sorghum bicolor*). Guinea corn offers higher yields than millets, but is less drought resistant (Mercer-Quarshie 1969, 1972a). The two are often intercropped, with late millet serving as an insurance crop should guinea corn fail. Red sorghum (*naga red*) was brought to northern Ghana by Mossi settlers from southern Burkina Faso, where the staple cereals are "maize, red

⁵⁰. Source: Upper East Region: Crops and Farms Survey 1988, Ministry of Agriculture/URADEP, Bolgatanga, August 1988. Data for Bawku District derived from a complete census of farmers in 30 randomly sampled 'enumeration areas' of the District's 316 enumeration areas. Of these 30, 5 fell under the Pusiga-Pulimakom Local Council, one of which was Pialoko.

⁵¹. Except where otherwise referenced, technical information on cereals was provided by Mr Hilla Gbene, District Crops Officer, Farming Systems Research Division, Manga Crops Research station, Bawku; in an interview on 26 July 1989.

⁵². *TZ* is short for *tuwon zafi*, the name by which this millet, sorghum or maize porridge is known in much of West Africa. In southern Africa, the same dish (made usually from maize) is called *putu* or *pap*, while in East Africa it is known as *ugali*.

sorghum, millet" (Conti 1979:55). Among Kusasis, *naga red* is important mainly as the basis for sorghum beer (*pito*), being disliked for TZ, except in lean years. Even less preferred is the recently introduced *naga white*, which is grown for fodder in the United States (Irvine 1969:137). Its rapid acceptance is due to its medium maturing period of 85-95 days (like *naga red*) and its exceptional yield: 500-600 kg/ha unfertilised, doubling with fertiliser to 1,100-1,200 kg/ha. In 1989, *naga white* was planted by 63% of Pusiga's 'Global 2000' farmers (see section 2.6 below), but it is typically sold after harvest for a more preferred variety.

Although previously considered inferior to millets and sorghums, maize (*Zea mays*) is gaining in popularity because of its short maturing period (90-95 days), its perception as a luxury foodcrop (being a preferred staple among urban people), and the recent proliferation of improved varieties. A common strategy throughout West Africa is to cultivate millets, sorghum and some local maize for home consumption, and to grow high-yielding maizes for sale, since these have softer kernels and are susceptible to insect and fungi attack in storage (Hindmarsh and Trotter 1989:76). High-yielding white-grained maizes such as *Abrotia*, *Safita 2* and *Okomasum* (meaning "no more hunger") offer up to 1,200 kg/ha if fertilised.

1.1.2. Pulses

Groundnut (*Arachis hypogaea*, *suma* in Kusaal) is a popular snack food, stew ingredient and source of cooking oil in northern Ghana. Groundnut is also Bawku District's biggest export crop to southern Ghana, and this dual function as both food and income explains why it was planted by 93% of Tesnatinga and Terago households in 1988. Indigenous spreading varieties are being superseded by semi-erect bunch imports which are easier to weed and amenable to closer spacing - an important consideration in Pusiga's context of severe land pressure. The average yield of shelled nuts, at 400-500 kg/ha (Komolafe *et al.* 1979:93), can double with fertilisers (Mercer-Quarshie 1972).

A good distribution of rainfall is vital for groundnut yields, though a strong correlation is also observed between output and total rainfall, with small reductions in annual precipitation being associated with dramatic falls in production (Abarigah 1985). In 1988, the early end to the rains in Bawku District (see section 2.2 below) dried out the soil so rapidly that many fields of groundnuts were abandoned as unharvestable. From October 1987 to May 1988, 2,319 bags of groundnuts (@ 100 kg) were exported through Bawku town; for the same eight-month period in 1988/9 only 281 bags were recorded - just 12% of the previous season's total.⁵³ This significantly reduced the agricultural income available to farmers to redress simultaneous shortfalls in cereals production.

Cowpeas (*Vigna unguiculata*), bambara beans (*Voandzeia subterranea*) and soybeans (*Glycine soja*) all complement groundnuts as sources of both nutrition and cash. As the number of locust bean (*dawadawa*) trees in deforested villages like Pusiga declines, soybeans are increasingly replacing *dawadawa* seeds as an indispensable stew ingredient (Ayamba 1986). In 1989, a number of farmers switched from groundnut to soybean, for two reasons. First, many had lost their entire groundnut crop of 1988 to drought, and soybeans (which grow on a bush above ground) were perceived as easier to harvest in the event of drought. Second, the poor 1988 harvest had reduced the volume of groundnut seed circulating for credit purposes and had raised the market price of groundnut seed relative to soybean. In June 1988, a bowl of groundnuts cost C260 and a bowl of soybeans cost C350; but by June 1989 groundnut prices had almost doubled, to C500, while the price of soybeans had increased only slightly, to C400.

1.1.3. Vegetables and Tree Crops

While men in Kusasi households provide the staple grain from which *TZ* is prepared (see 1.2 below), acquiring ingredients for its accompanying stew is the responsibility of women. This stew is vegetable-based, being made with garden crops, pulses and/or

⁵³. District Accounts Book, Bawku District Council, 1987-1989.

tree products, and enlivened (in wealthier homes) by dried fish or meat. Most women tend small gardens behind their compound, where they grow vegetables and leafy 'spinach plants' for stews (Hill 1975:123). Among the most popular spinach plants are (Kusaal name first, botanical species in parentheses): *alefi* (*Amaranthus incurvatus*), *beriga* (*Hibiscus lunarifolius*), *bung-tubis* (*Gossampelos*), *kaaga* (*Cleome gynandra*), *lelatu kpwera* (*Boerhavia*), *neri* (*Citrullus lanatus*). Also cultivated are such vegetables as okro (*Hibiscus esculentus*), pumpkin (*Cucurbita pepo*), sesame (*Sesamum indicum*), eggplant (*Solanum melongena*), and pepper (*Capsicum frutescens*).⁵⁴

Vegetables are also grown by men in dry season market gardens, usually irrigated by boreholes. While most market gardens include small beds of okro, pumpkin, garden eggs and peppers - all grown for both domestic consumption and sale - predominant crops are onions, beans, and sweet potatoes, these being cultivated exclusively for cash.

Other stew ingredients come from tree products, either gathered in the wild or (increasingly) bought in village markets. Two favourite stews are *nom* and *vua* (Kusaal), which are prepared by boiling baobab leaves (*Adansonia digitata*) and the leaves of the 'vuam' tree (*Bombax costatum*). Apart from stew ingredients, many trees yield fruit, berries and nuts, which are useful sources of vitamins and minerals and serve as supplementary 'famine foods' in lean years. Among these are the sheanut (*Butyrospermum parkii*), kapok (*Ceiba pentandra*), fan palm (*Borassus aethiopium*), locust bean (*Parkia oliverifilicoidea*), 'blackberry' (*Vitex doniana*) and wild fig (*Tamarindus indica*, Kusaal name *pusig*).⁵⁵ Most indigenous trees are common property, with rights to use of their products being vested *de jure* in the local chief, but *de facto* in the family on whose land they stand. The most important exotic fruit tree is the mango (*Mangifera indica*), which was introduced to Bawku District by the British

⁵⁴. These Latin and English names were provided by Mr Daniel Abbiw, Curator of the Herbarium at the University of Ghana, Legon, who kindly identified 16 vegetable plants from Bawku District for this fieldwork, from leaves and cuttings taken from Pusiga to Legon in August 1989.

⁵⁵. Latin names and uses of indigenous trees were obtained in interviews with Mr J.S.K. Ellety, Assistant Conservator of Forests, Bawku District Forestry Department, on 30 May 1989, and with Mr Paul Addai, Forestry Department Technical Officer, Pusiga, on 29 July 1989.

and is the only tree which has become commoditised - in 1989, one poor farmer, needing cash for grain, sold his mango tree to a rich neighbour.

1.1.4. Inedible Cash Crops

Cotton (*Gossypium species*) has never caught on as a major crop in northern Ghana, despite being promoted by the British early this century (as discussed in Chapter 2.2). However, smallholder cultivation has persisted, and local cotton is still sold in village markets, mainly to sewers and weavers (Mahama 1976). Also, after independence, production was encouraged by a parastatal, the Ghana Cotton Development Board. During the 1970s, the Cotton Board was hamstrung by the national economic crisis - lacking foreign exchange to import fertilisers, insecticides and tractors. Farmers withdrew from cotton production as the Board failed either to provide essential inputs, or to collect produce and pay farmers punctually. Under the Economic Recovery Programme, the Cotton Board was privatised in 1986, and became the Ghana Cotton Company. Real producer prices have risen and incentives such as subsidised tractor hire are offered.⁵⁶ Marketing problems remain, however, and several farmers in Pusiga suffered delays in 1988 of three or four months between the harvest and the Cotton Company's payment. Late payment amounts to lost entitlements for farmers who depend on income from cotton to buy grain, because grain prices start to rise almost immediately after the annual harvest, and the Company offers no compensation.

Finally, a much neglected crop is henna (*Lawsonia inermis*, *lale* in Kusaal). Henna is not supported by the Ministry of Agriculture, no company buys or sells it, and no research is conducted on it. Henna's main use is as a cosmetic - during festivals and weddings, Moslem women paint their arms and legs with a red dye extracted from the plant's leaves, which also protects the skin against cracking during the dry season. Henna is both used and traded by women, who store the crop until prices rise in the dry season. Among poor farmers, henna serves a vital food security role. Mortgaging

⁵⁶. Interview with Mr Alex Nuagah, District Officer, Ghana Cotton Company, Bawku, 2 June 1989.

henna - borrowing cash against bags of henna not yet harvested - is a common practice by the poor, who typically take loans from large farmers or henna traders, at a rate in 1989 of C1200 or C1400 per bag mortgaged. Later in 1989, prices reached C2000/bag.

1.2. The Farming System

The economy and society of northeastern Ghana are more reminiscent of those found in Sahelian countries to the north than of Ghana's coastal and tropical forest regions to the south. Agriculturally, farming techniques, cropping patterns, and the seasonal calendar are all comparable to those observed in neighbouring (mainly francophone) countries. One factor which does vary substantially across the West African semi-arid tropics, even between contiguous rural areas, is population density, for historical as much as environmental reasons (White and Gleave 1971). This has implications for farming practices. In northern Côte d'Ivoire and Togo population densities are relatively low, and shifting cultivation is practised, with fallow periods averaging 6 to 8 years (Weekes-Vagliani 1985:34), but in heavily settled areas such as Pusiga, permanent cultivation has become the norm. On the other hand, low population densities inhibit the development of physical and social infrastructure, and Bawku District has derived Boserupian advantages in this respect which most sudano-sahelian communities do not enjoy.

Despite being articulated locally as male-dominated, farming activities in Bawku District are shared between the genders. Men are responsible for the production of staple cereals, while women cultivate stew ingredients in small gardens around their homes. But women are also involved in cereals production, where a marked gender division of labour exists - men clear the land, plough (or hoe by hand) furrows and ridges, and weed; but women plant the seeds and participate in harvesting.

Food and cash crop farming divides broadly into two categories of field - 'compound' and 'bush' farms. Every household living in each compound has its 'compound farm',

which surrounds the household dwelling.⁵⁷ This is the household's primary source of staple cereals. All able-bodied household members work in this field most mornings during the rainy season. The resulting millet and sorghum harvest is stored in the household granary and reserved exclusively for domestic consumption needs through the post-harvest months. As Whitehead (1981:93) observed of south Bawku in 1974/5: "The farming system is still sufficiently based on self-provisioning for it to be considered extremely wrong to sell millet." Only in years of clear surplus production will this rule be broken. In Pusiga in 1987 and 1988 there were no such cases.

'Bush farms' are located beyond the compound farm, sometimes several miles away. In densely settled Pusiga 'bush farms' is a misnomer, since little uncleared land has been available since at least the early 1970s. As Anthony *et al.* (1979:133) observed: "Cultivable land in Bawku District is poor, scarce, and overpopulated. In some areas, such as Manga and Pusiga subdistricts, bush farms are now practically nonexistent." Dickson (1973:14) similarly noted that bush farms "used to be fairly frequent in the northeast when the agriculturist Lynn surveyed the area in the 1930s, but the rapid increase in population since then has practically eliminated them".

'Bush farms' (or 'private farms') are cultivated for personal profit rather than household subsistence. These fields are cultivated by individual men and women, using their own resources, in the afternoons or in slack labour periods (eg. between first and second weeding on the compound farm). Some ambitious and hard-working male farmers travel considerable distances in search of spare land - sometimes into Togo or Burkina Faso. This spatial diversification - across soil types, gradients (valleys and hill-sides) and micro-climates also helps to spread agricultural risk.⁵⁸ Access to these plots is largely determined by wealth. Payment for usufruct rights must be made to the local

⁵⁷. The distinction between socially constructed 'households' and 'compounds', the residential unit, is explained in Appendix 1 to this thesis: 'Fieldwork Methodology'. A single compound often includes several households, which can confuse understanding of domestic production systems.

⁵⁸. Since most droughts and armyworm attacks in northern Ghana are extremely localised, having a farm just 10 or 15 miles from the compound can dramatically improve food security and incomes.

tendana or chief, labour must be mobilised and paid for, and transport (a bicycle or motorbike) is needed to visit the plots regularly.

Crops commonly planted on 'private farms' include groundnut, cowpea, bambara bean, soybean, cotton, sweet potato and rice (in wet valley areas). Proceeds from sales of this produce accrue not to the household, but to the individual farmer. This can create tensions within the household, both between genders and among adult males. The complaint that one or more men were "saving their work" for their private farms and neglecting their responsibilities to the household granary was the reason most commonly given by Pusiga residents for household fission (brothers or sons who were farming together splitting into separate production-consumption units).

Historically, Kusasi women were not farmers in their own right. But many wealthier women now have private farms, where they grow such crops as groundnuts or rice, partly for stew and partly for sale, or millet to supplement consumption and ensure that their children do not go hungry. But land scarcity, together with the fact that rights to land are vested in men, severely inhibits women's farming in Pusiga. Women who succeed in 'begging' land from their husband or other farmers also have only secondary access to means of production. For ploughing they might borrow or hire a plough and bullocks. They sometimes do their own weeding, but more often employ labour. The cash that women earn from farming is usually put towards stew ingredients and clothes for themselves and their children, or invested in trading and other off-farm enterprises.

Some writers have argued that the burden of subsistence production in northeastern Ghana fell increasingly on women during the 1970s, a result of the changing gender division of labour (Kraus 1986:117) or of men neglecting communal foodcrop farms for private cash crop production (Whitehead 1981). Dumor (1983:78), on the other hand, argues that partial mechanisation of agriculture has resulted in a greater concentration of landholding among men than ever before, such that "women lost the opportunity to engage in lucrative cash crop production". In Pusiga, access to land seems to be dictated by economic circumstances as well as by gender. In poor households, men had as much difficulty finding extra land to farm as did women; in wealthier households,

women with disposable income from trading could buy land rights and hire labour almost as easily as their husbands.

Underlying an appearance of continuity and stability in farming systems in northeastern Ghana, then, is a reality of dynamic and ongoing change. Farming practices have evolved substantially during the past half century. The most significant modifications are related to agricultural intensification - the introduction of animal traction and mixed farming in the 1950s (as seen in Chapter 2), the decline and ultimate elimination of fallowing periods in densely populated settlements such as Pusiga, the adoption of chemical fertilisers and the introduction of new varieties of cereals and pulses, the attraction of private over communal farming. While many of these developments served to offset negative trends and have even increased agricultural production and incomes in certain households, they are also associated with deepening intra- and inter-household inequalities, and with rising food insecurity for those households who have been excluded from, or exploited by, these changes.

The single most robust indicator of socioeconomic differentiation in Pusiga is the distinction between plough-owning households and non-owners. Bullock ploughing reduces labour requirements and raises agricultural productivity, relative to hoe farming, dramatically (Ayamba 1986). As one Tesnatinga farmer remarked in 1989: "If you have two bullocks and a plough you are a rich man, because you can feed yourself."

Most farmers in Pusiga use animal traction to plough their fields, though only 27% of households in Terago and Tesnatinga actually owned a plough in 1988. A further 31% (usually junior householders living in the same compound) enjoyed free (but delayed) access to a relative's set. For the rest, 23% hired bullocks and plough for a fee of some kind; 12% who owned a bullock or plough, but not both, were involved in sharing arrangements; while 7% had no access to animal traction from any source, and hoed their farms by hand. Norman *et al.* (1982:195) identify a disturbing increase in exploitative dependency relationships between owners and hirers of ploughs and bullocks in West Africa, and in Pusiga many resources (not just cash but labour, produce and land rights), were transferred through this mechanism.

Notwithstanding the fact that bullock ploughing raises the acreage that each farmer can potentially cultivate, average farm sizes in Pusiga are small and falling. A 1988 survey of over 16,000 farmers throughout the Upper East Region found that 44% of Bawku District farmers (2,682 out of 6,046) cultivated less than 3 acres of land, 35% (2,124) cultivated between 3 and 5 acres, and only 21% (1,240) farmed more than 5 acres.⁵⁹ This process of declining farm sizes under population pressure and land partition among male heirs has been underway in Bawku probably since the 1950s - 47 years ago, Smith (1945:11) wrote: "The area farmed is large - on the average 1.79 acres per person supported". In Pusiga, farms are smaller than District averages, for reasons related to heavy in-migration historically, as elaborated in Chapter 2. In a study of land use and agricultural production in six villages in Bawku District, Cheshire (1977:9) found that Pusiga farmers cultivated less than half the acreage of farmers in the other villages. In south Bawku District, Whitehead (1981:94) found individual men farming in excess of 40 acres in 1974/5, but in Terago and Tesnatinga in 1989 no one person farmed more than 5-6 acres, including fields cultivated far from the home.

Shifting cultivation has given way to permanent cultivation, which inevitably reduces soil fertility. Soils in Bawku District are ferruginous and of poor agricultural value - being thin, low in nutrients (particularly phosphate), and highly susceptible to sheet and gully erosion (Bennett and Schork 1979:26). The 'Pusiga association' of "severely degraded arable soils" is below average quality for the District, being described by Adu (1969:31) as having "lost their organic top soil layers". Adu (1969:54) goes so far as to conclude (rather unrealistically) that these soils should not be used for farming at all: "As they are at present difficult to protect against erosion it is recommended that they are taken out of cultivation."

As far back as the 1940s, the British promoted mixed farming, but few households nowadays own enough animals to provide good quantities of dung. Instead, those with cash to spare buy chemical fertilisers, but these do not maintain soil structure in the long term. Improved agronomic practices, such as crop rotation and intercropping, are

⁵⁹. Upper East Region: Crops and Farms Survey 1988, Policy Planning, Monitoring and Evaluation Department, Ministry of Agriculture/URADEP, Regional Head Office, Bolgatanga.

recommended by the Ministry of Agriculture as a means of slowing soil depletion. If a cereal is intercropped with or followed by a pulse, for example, nitrogen is fixed in the soil and higher yields are assured (Schmidt and Frey 1988).

Farmers in Pusiga are conscious of the threat of desertification posed by the generally poor quality of the land, permanent cultivation, deforestation and an apparently shortening rainy season. As one old man said gloomily: "The Sahara is coming." They are also aware of the moisture retention and nutrient properties of different soils. Benneh (1970) lists five distinct soil types identified by farmers in Bawku District in terms of colour, indicator grasses, drainage capacity and suitability for various crops.

Despite the strong causal relationship between rainfall and crop production in Pusiga (see 2.2 below), investment in agriculture also influences yields. Agriculture is a less lucrative source of income than occupations such as long-distance trading. Nonetheless, returns to farming can be high. Poor farmers, lacking cash when the new season starts, typically plant seeds stored from the previous year, use family labour only, and buy nothing except hoe blades from the market. By contrast, wealthier farmers spend heavily during the farming season, and reap the rewards in the form of market independence (self-sufficiency) and produce which can either be sold immediately or stored for some months until prices and profit margins rise.

One self-sufficient household in 1988/9 was headed by Issaka Mahamadu, then a man of 33 with two wives and three children, all under 10. In 1988, Issaka spent C27,000 on fertiliser and hired labour for his household's compound farm. C31,200 was invested in cuttings, fertiliser and labour for a field of sweet potatoes 4 miles away, and a further C14,500 paid for land rights, seeds, fertiliser and plough hire for an acre of groundnuts some 6 miles to the south. Although the groundnuts had to be abandoned because of drought, the spatial diversification of these fields ensured the household's food self-sufficiency for 1989 and earned Issaka C132,000 on sales of sweet potatoes alone - a 420% return on expenditure on that crop.

1.3. Labour

Smallholder households in Terago and Tesnatinga mobilise agricultural labour for both compound and private farms in many ways, including family (unpaid), communal (reciprocal) and the market (hired). While family labour continues to dominate, particularly in poor households, communal labour parties are being displaced among wealthier farmers by hired labour, especially in more commercialised areas (Benneh 1988:33). Labour relations between rich and poor households are a crucial determinant of socioeconomic differentiation in Bawku District. As Whitehead (1984b:2) observes: "the direct and indirect commoditisation of rural labour time, have fuelled a growing inequality between rural households".

Most men work their private farms with the help of male relatives from the same compound, even if they farm separately. If this is insufficient, the farmer can either hire labour or "beg people to come and help" on communal labour parties. Each system has its pros and cons, which makes it difficult to judge which is the more expensive or most cost-effective. Communal labour involves a reciprocal obligation: "If you call a man to help you weed today, he may call on you to help him weed tomorrow." A major advantage of communal labour parties over hired labour is the incentive effect - the knowledge that effort put in on a neighbour's farm will produce equivalent effort by the neighbour on your own. But communal labour also has to be rewarded with food - *TZ* and stew - plus *pito* for those who drink it (non-Moslems). This can work out prohibitively expensive for low-income households, especially if millet and beer has to be bought in the market at pre-harvest prices. Whitehead (1984a:28) concludes that, since the rich are in a stronger economic and social position to call weeding parties, this form of labour pooling is not as redistributive as it may appear.

Hired labour is usually provided by poor farmers in the vicinity. The nominal rate for hired labour rises each year, usually exceeding inflation. In 1987, a man who worked from 7am to 1pm would be paid C100, plus a meal. In 1988 the rate was C150, and in 1989, C200. This rate is constant irrespective of what work is done. Most labour is called or hired for weeding and for harvesting. Hired labour, or *badi* (a corruption

of the English phrase "by-day labour" (van Hear 1984)) carries a social stigma, and the rich do not usually do it. Men who do *badi* usually need money for grain, but women go for money for stew ingredients. The historical sexual division of labour in farming is breaking down to some extent, and nowadays men work at clearing fields and weeding, while women go not just for sowing and harvesting, but for weeding too: "It is because of the stomach that women have learnt to weed." Rates paid to women and children average 75%-80% of rates offered to men. In 1989 women were paid C150 each for a morning's sowing, up from C120 in 1988 and C80 in 1987.

Most men who work as hired labourers do not complain that rates are too low, nor do they seem to perceive themselves as exploited. On the contrary, even with *badi* the ethos is one of helping each other. A poor man 'begs' a rich neighbour for work so that he can feed his family, the rich man obliges and gives him a meal when the morning's work is done plus C200, enough for a bowl of millet in Pusiga market, which might feed a family of 2 adults and 3 young children for 2-3 days.

However, the labour market works to the disadvantage of the poor in both direct and indirect ways. At the crucial planting and weeding stages, hunger can be entrenched in small, poor households by men having to work on other farms when there is no food in the granary, leading them to neglect their own farms, which are planted or weeded late. The rich man who hires the poor man helps to feed the poor household for that day, but the poor man who works on the rich man's farm is helping to feed the rich household for the next year. A vicious cycle of seasonal hunger, late planting, poor harvests and further hunger for the poor ensues. This is both a poverty ratchet, perpetuating the poor household's food insecurity, and a polarising mechanism, since the rich man who uses hired labour for farming both earns a surplus in farming and is free to pursue off-farm income-earning activities elsewhere.

In larger households these effects matter less, since some males can farm while others go for labour. Most vulnerable to this cycle of hunger are households with few economically active adults - a young couple with small children, an old couple whose sons have separated and left them alone. It is not by chance that those households

whose active members are forced through hunger into going for *badi* are also those who suffer most severely from seasonal shortages of family labour. Both these factors - labour scarcity and working as agricultural labour - reinforce poverty and food insecurity in small households.

1.4. Land

In the past, when land in northeastern Ghana was in abundant supply, no individual property rights were established over land. Kusasi ideology prohibited (and still prohibits) the sale of land: "It belongs to the land gods and is lent to us to farm." Usufruct rights are allocated by the *tendana* (earth priest) of each village, supposedly in proportion to household size. The fact that usufruct rights depend on each *yakim* (plot of land) being farmed each year - or the right lapses and other farmers can cultivate it - is intended to serve as a regulator which preserves some balance between land usage and household needs, and to provide a degree of security to poorer farmers who might otherwise be denied access to sufficient land.

Usufruct rights do not depend only on historical cropping patterns, nor on membership of specific ethnic groups or clans - 'strangers' who choose to move into the area are never denied rights to farm by the *tendana*, provided spare land is available. On the other hand, as Popkin (1979:43) notes in a general sense, 'insiders' typically enjoy preference over 'outsiders' in terms of the quality and quantity of land and other communal resources they control. Whitehead (1984b:12) found that households which farmed the most land in Tempene in the 1970s were all clan relatives of the local chief.

The concentration of land rights becomes problematic only when population pressure transforms land from effectively a 'free good' into a scarce resource. In Pusiga, as the extensive margin of cultivation was reached, farmers started 'begging' land from neighbours who had plots to spare for a season or more - a practice which dates from at least the 1970s. Initially, no charge was levied, but the man borrowing land often gave a bag of groundnuts or millet to the 'owner' after harvest. Charging cash for

usufruct rights is a recent development, but one which is increasingly adopted as a coping strategy by poor farmers. In 1989, land could be rented out for the farming season at approximately C4,000 per acre. It was difficult to document the extent of this practice because of its extreme sensitivity. As one farmer admitted: "We are not supposed to buy or sell land. So to sell your land to somebody because of hunger is a disgrace." At least 4 poor households in Pusiga 'sold' some usufruct rights for the 1989 farming season to wealthier households because they needed cash for food.

This development has obvious and disturbing implications for economic polarisation and household food insecurity. Once 'sold' for a season, this land is rarely recovered - the farmer's economic base has contracted beyond his ability to generate enough income to farm that land again. The increasing number of land transfers in recent decades may explain the observation of a skewed distribution of scarce land in Tesnatinga and Terago in 1989. Although there were no large-scale commercial farmers in these two sections, some farmers had 2-3 acres devoted exclusively to cash crops like cotton and groundnut, while other, marginal households complained that they were cultivating only a small plot around their compounds, which yielded barely enough food to feed their children, let alone grow produce for the market.

1.5. Institutional Support for Agriculture

Direct institutional support for local agriculture is provided by the Ministry of Agriculture (or more accurately, the Ministry of Agriculture/URADEP, as the Ministry was amalgamated with the Upper Region Agricultural Development Programme in July 1977), and by FASCOM, the Farmers Services Company. There is also a Crops Research Institute at Manga, four miles south of Bawku town, which develops improved varieties and experiments with different agronomic practices.

1.5.1. Ministry of Agriculture

For purposes of providing extension services to farmers, the Ministry of Agriculture has a number of Technical Assistants ('TAs'), usually literate farmers based in each village. Pusiga in 1988 had three TAs covering 18 sections (Terago and Tesnatinga being two). TAs advise farmers on farming methods - crop rotation, fertiliser application, weed control - and implement agricultural projects such as 'Global 2000'.

URADEP was established as an integrated rural development programme in the mid-1970s, with financial support from the World Bank, the UK government, the government of Ghana and various Ghanaian banks, and technical assistance from the FAO and UNDP (Abudu and Ascroft 1978). Whereas the Ministry is confined mainly to providing extension services, URADEP comprised a number of specific projects - eg. dam-building for irrigation, well-digging for market gardening, soil conservation activities - for which additional funds amounting to US \$55 million were injected in the five-year period 1977-1981. A critical review of these projects concluded that most failed to achieve their objectives, for a variety of reasons including "unfavourable general economic conditions in the country, unfavourable weather conditions and incompetence of the programme management" (Ofori 1985:45). The unavailability for extended periods of inputs, fuel and spare parts have subsequently (post-1983) improved under the Economic Recovery Programme.

1.5.2. Farmers Service Company

Another offshoot of URADEP is FASCOM, the Farmers Service Company, which was formed in 1978 as a quasi-private limited liability company and was due to be fully privatised in 1992.⁶⁰ FASCOM's most significant function is to distribute all fertiliser in the Upper East and Upper West Regions. Chemical fertilisers were

⁶⁰. Information on FASCOM was obtained in an interview with Mr E.K. Salia, Managing Director of FASCOM, Bolgatanga, on 23 June 1989; and from a speech delivered by Mr. S. Nunoofo, Commercial Manager of FASCOM, at a Farmer's Rally, Zebilla, 9 May 1989.

introduced to northern Ghana by the German-Ghanaian Agricultural Development Project in 1970. Fertilisers were purchased from EC countries and North America, and sold to farmers at prices heavily subsidised by the government, to encourage adoption. The subsidy amounted to 85% in 1975, but was reduced to 60% in 1977 and 50% in 1978 (GGADP 1980:127). Under the Economic Recovery Programme this subsidy was rapidly phased out - being cut to 15% in 1989 and removed altogether by 1991. The consequent rapid rise in prices, amounting to 80% in two years (see Table 3.2) is a serious disincentive to farmers, but demand has remained high because of the expansion of 'Global 2000', which provides fertiliser on credit to project participants.

Table 3.2. Fertiliser Prices in Upper East Region, Ghana

Type of Fertiliser	Price (Cedis/Bag)			Price Change (%)	
	1987	1988	1989	1987-88	1988-89
Sulphate of Ammonia Compound (15:15:15)	1400	1640	2350	+17	+43
	1800	2400	3350	+33	+40

Note: Sulphate of Ammonia contains 21% nitrogen. Compound (15:15:15) fertiliser contains 15% each of nitrogen, phosphorus and potassium.

Chemical fertilisers offer no solution to the secular decline in soil fertility facing farmers practising permanent cultivation in densely settled areas such as Pusiga. Excessive use of chemicals, may, if anything, accelerate the deterioration in soil quality. Specifically, Sulphate of Ammonia acidifies the soil by releasing hydrogen. But animal manure, which does not have this effect, is an option only for those who own livestock. The popularity of chemicals rises as land pressure reduces the numbers of animals owned. So both these responses to declining soil fertility are mediated by wealth (unlike agronomic practises such as crop rotation), since wealthier farmers have better access to both chemical fertilisers and animal manure.

In 1987, 42% of households in Terago and Tesnatinga purchased at least one bag of chemical fertiliser, 39% applied animal manure and 29% used nothing. In 1988, the number of fertiliser purchasers had fallen by a quarter, to 32%. However, the average number of bags bought by each household rose by 33%, from 3.3 to 4.4, suggesting that it was the poorer farmers who could afford only one or two bags who dropped out of the fertiliser market following the drought, armyworms and fertiliser price increases of 1988. As the government removed its subsidy over the following two years, this polarisation in access to chemical fertilisers certainly increased further.

1.5.3. Crops Research Institute

The Crops Research Institute at Manga-Bawku was opened by the British in 1935 to promote research into improved foodcrop varieties and local farming practices, and thereby raise agricultural incomes and productivity of local farmers.⁶¹ The CRI is now run jointly by the Ghana Government and 'GTZ', the German Agency for Technical Co-operation. Most experiments at Manga involve cross-breeding varieties of grains to develop high-yielding, early-maturing or more disease-resistant crops for adoption by local farmers. In the case of millet, the emphasis is on finding new varieties which are less susceptible to diseases like downy mildew, smut and ergot. Experiments are also carried out on intercropping, crop rotation, ridging and seed spacing, and so on.

Unfortunately, the Institute's interaction with local farmers, especially poor farmers, is limited. Technical Officers from the Ministry of Agriculture visit Manga occasionally to find out about new varieties or better farming practices, and then inform the farmers they serve, but more often it is the large farmer seeking to increase profits who comes to Manga in search of high-yielding varieties of maize or millet. The station produces

⁶¹. Information from interviews with the late Mr James Akanuwe, Principal Technical Officer and Station Manager, Crops Research Institute at Manga-Bawku; 22 July 1988; and with Mr Hilla Gbene, District Crops Officer in charge of Farming Systems Research Division, Crops Research Institute at Manga-Bawku; 26 July 1989.

only small quantities of seeds of new varieties, which they sell to farmers at prices high enough to recoup research and development costs. Furthermore, many new seeds require heavy inputs of fertiliser, which again discourages poorer farmers.

2. Seasonality

Seasonality implies predictable intra-annual variability in rainfall, temperature, vegetation and other physical indicators. In rural communities, it also has implications for food availability, morbidity, and other social welfare indicators. The effects of seasonality on the well-being of rural populations in poor countries are multiple and almost entirely negative.⁶² In poor households, the annual 'hungry season' is associated not only with heightened nutritional risk (to be discussed in Chapter 6), but with high levels of illness, labour bottlenecks and economic stress.

2.1. Agricultural Seasonality

The agricultural year in northeastern Ghana divides into two distinct seasons - wet and dry. The wet season extends roughly from May to October, and this is also the farming season, which starts with planting and ends with the main harvest in November. The climate is harsh and extreme, with temperatures ranging from 7°C - 9°C in the cold post-harvest months of December and January to 43°C - 47°C immediately before the rains, in April or May. High temperatures mean that annual potential evapotranspiration exceeds precipitation, soil water surpluses occurring only for a brief period before the rains end (Netting *et al.* 1980:213). The annual dry season is effectively a 6-7 month drought during which no farming is possible except for small-scale garden crops irrigated by wells; while the rains are often so heavy during July and August that bridges can be washed away and travel disrupted for days at a time.

⁶². Key references on these issues are Chambers, Longhurst and Pacey 1981; IDS Bulletin, July 1986 ("Seasonality and Poverty" issue); Sahn 1989; and Gill 1991.

In the absence of irrigation, rainfall seasonality translates into agricultural seasonality directly, totally dictating the pattern of the farming year. In the months preceding the rains, namely March and April, fields are prepared for cultivation. A week or two after the first rains, planting begins, and is usually spread out over a month or more, so that harvesting can be similarly staggered. Millets and sorghums are often intercropped, but early millet matures in just 80 days, while late millet and sorghum need about five months. So early millet sown in May will be harvested in late July or early August, while late millet and sorghum sown at the same time will not be harvested until October or November (see cropping calendar overleaf).

In the dry season (November to April), some farmers dig wells and grow garden crops. There is much scope for an expansion of dry season gardening, as a means of providing employment and incomes within Bawku District. The main constraint is water supplies, and Pusiga is one of several villages which would benefit from the construction of small dams for this purpose. The main climatic problem facing cereals production in Pusiga, according to farmers, is an increasingly unpredictable rainfall and a shortening rainy season (see 2.2 below). The increasing frequency of these adverse climatic events is causing farmers to switch from late- to early-maturing varieties of millet, sorghum and maize, or at least to intercrop 'improved' and established varieties, even though the preferred cereals remain the slower maturing, traditional varieties.

Farmers strive to reduce the agricultural risk induced by a unimodal and unreliable rainfall distribution. A variety of production behaviours are described in Moris (1989), including diversification (of crops and plots), staggered planting, intercropping and mixed farming (see also discussion in Chapter 4.3.1). In northern Ghana, diversification is particularly important - different crops have different levels of resistance to pests and drought, and different harvesting dates, while planting in several (scattered) fields spreads ecological risk spatially. Moris (1989:211) notes that, while these tactics are usually described by observers as "risk-minimizing devices", they also "directly influence the household's food security through diversifying the sources of food and extending the period when it is available".

Table 3.3. Annual Calendar, Northeastern Ghana

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Climate	dry season ##### rainy season ##### dry season ##### harmattan ##### hot season ##### cold season #####											
Agriculture	land clearing ##### planting ##### weeding ##### main harvest ##### {Harvests:} early millet ##### maize ##### millet, sorghum ##### groundnuts, beans #####											
Market Gardening:	planting ##### weeding ##### harvest ##### planting #####											
'Hunger Calendar'	dry season ##### "hungry season" ##### 1st harvest ##### main harvest ##### (little work, seasonal migration)											
Social and Cultural Activities	house-building ##### funerals ##### harvest festival #####											

Contrary to statements by some commentators,⁶³ the hungry season in Bawku occurs not during the dry season, but in the first few months of the rains - May to July - which is also a period of maximum agricultural labour activity and a high prevalence of debilitating diseases such as malaria, all contributing to enhanced nutritional risk. The hungry season ends with the harvesting of early millet in August, which in most years is adequate to see people through the 2-3 months until the main harvest later in the year. Between these two harvests farms must be weeded, but after November farmers have a relatively low workload for several months, unless they practise dry season activities such as market gardening or migration for agricultural labour.

2.2. Climatic Seasonality and Drought

Climatic seasonality is especially pronounced in the savannah regions of Africa and south Asia. In the West African semi-arid tropics the single rainy season of 5 months (May to September) is followed by 7 months that are so dry - especially November to March - that this period is often called the "annual drought".⁶⁴ The dry season begins with a cold dusty period caused by *harmattan* winds, and ends with two months of intense heat, in March and April. Then clouds begin to gather and the first storms occur. The rains develop slowly over several months, peaking usually in August, then falling off rapidly and ending abruptly in early October.

⁶³. As, for example, Boateng (1966:196): "During the dry season the whole land looks brown and parched. This is the 'hungry season', when hardly anything can grow and the people must depend on what they have saved from the previous harvest. Formerly, famines were common at this time but today improved communications have almost completely eliminated this threat, although there is a general shortage of food during the dry season, particularly in remote areas."

⁶⁴. A more rigorous definition of 'dry months' as months of less than 4 inches (102mm) of rain (Walsh 1981:15) would suggest that northeastern Ghana has 8 dry months and only 4 wet months (June to September) in most years.

The elderly farmers of Pusiga claim that rainfall has become less reliable over the years - not that it has decreased in volume, but that it has increased in unpredictability. The farming season is shorter than in the past: the rains start later and end earlier. They argue that this has exacerbated problems of seasonal hunger and food insecurity, since harvest failures are more frequent. Circumstantial evidence for a contracting growing season is provided by Boateng's (1966:74) description of agriculture in northern Ghana in the 1960s: "Planting of farm crops usually takes place in April, at the beginning of the rains, and harvesting is done in December". During the 1980s, planting occasionally started in April, but more often was delayed until May, and the main harvest usually occurred in late October. Local sorghum varieties like *mankariga*, which need more than 150 days to mature, have been abandoned.

To test the farmers' assertion empirically, daily rainfall data for the period 1970 to 1988 were collected from Bawku District's weather station at the Crops Research Institute, Manga. Table 3.4 allows comparison of 1987 and 1988 monthly figures with long term averages for 1930-1960 and for 1970-87. Data are also provided for the severe drought year of 1983. Several facts are striking about Table 3.4 (see also Figure 3.2). First, the unimodal concentration of precipitation in northeastern Ghana is clear. Mean annual rainfall is typically in the range 900 mm to 1100 mm (36-44 inches). In the period 1970-87, 87.8% of this total fell in the five months May through September. Second, high levels of inter-annual variability are evident in the fact that the minimum rainfall during the 1980s alone was 568 mm (1983), while the maximum, five years later, exceeded this by 240%.

Third, 1987 and 1988 were two consecutive years of above average precipitation, each exceeding 1200 mm. Total volume in 1988 was 41% above the 1930-60 annual mean, and 48% higher than that for 1970-1987. Fourth, however, this aggregate increase fell mainly in the middle months of the rainy season, when it was least needed.

Table 3.4. Monthly Rainfall at Manga-Bawku, Northeastern Ghana: 1930-1988

Month	1930- 1960	1970- 1987	1983	1987	1988
January	0.3	0.3	0.0	0.0	0.0
February	5.1	0.5	1.5	0.0	0.0
March	15.4	10.2	1.0	19.3	3.9
April	46.2	41.9	5.1	32.5	37.5
May	90.1	91.5	79.1	47.9	177.4
June	123.1	132.2	84.8	340.8	176.3
July	168.6	167.0	125.4	241.1	386.8
August	237.4	234.8	191.3	333.7	345.2
September	213.1	189.6	79.9	180.8	215.8
October	65.0	56.6	0.1	25.9	32.0
November	8.3	4.0	0.0	0.0	0.0
December	0.7	0.4	0.0	0.0	0.0
Total/Mean	973.3	928.6	568.1	1222.0	1374.9
Seasonality Ratio:	0.244	0.253	0.337	0.279	0.281
Seasonality Index:	0.877	0.922	1.140	1.128	1.060

Sources: 1930-1960 - Adu (1972:4).
1970-1988 - compiled from daily rainfall data recorded at the
Crops Research Institute station, Manga-Bawku.

Box 3.1. Calculating Seasonality Ratios and Indices
Seasonality Ratio: $S_r = (r \text{ max} - r \text{ min}) / R$ where: $r \text{ max}$ = mean rainfall of wettest month; $r \text{ min}$ = mean rainfall of driest month; R = mean annual total rainfall.
Seasonality Index: $S_i = \frac{\sum_{n=1}^{12} \left r_n - \frac{R}{12} \right }{R}$ where: r_n = mean rainfall of month n; n = month, where January = 1, February = 2, December = 12.
Source: Walsh (1981:13)

The net effect of these differences between the 1980s and earlier years was to magnify intra-annual rainfall variability in northern Ghana, as measured by seasonality ratios and (more discerning) seasonality indices (see Box 3.1). The seasonality ratio ($0 < S_r \leq 1$) expresses the difference between the wettest and driest months in relation to the annual total. For 1986-88, when heavy rains fell in each of four consecutive months, 24.6% of total volume fell in August. For the 1983-85 drought period, August was again the wettest month, and its contribution to a much reduced total was 31.1%.

The seasonality index sums absolute deviations between each month's rainfall and the monthly mean, and divides this summation by the annual total ($0 \leq S_i \leq 1.83$). This measure of rainfall variance shows a clear upward trend in the 1980s over the 1970s (see Table 3.5 and Figure 3.1, which graphs mean annual rainfall for 3-year periods (as a histogram) against the associated seasonality index (shown as a line)). The index exceeded 1.0 in every year from 1983 to 1988; in the 1970s it rarely reached 0.9. Seasonality indices for the 1980s are also higher than that for 1930-1960 (Table 3.4), though not too much should not be read into this finding, since variances are likely to be greater for shorter periods - long term averaged data disguise year-to-year variations. However, this method does allow the specific rainfall distribution problems faced by farmers in 1987 and 1988 to be identified relative to a smoothed 'normal' distribution from earlier years.

Even monthly figures may not be discriminating enough to reveal brief but crucial episodes of inadequate rainfall. A rain failure of just ten days at a vital stage can be calamitous for agricultural yields. Figures 3.3 and 3.4 provide a detailed breakdown of rainfall at Manga-Bawku by decads (10-day periods: 1st-10th, 11th-20th, 21st-31st) for 1987 and 1988, which illustrates the erratic distribution of rainfall in these years compared to 1970-86 decad-by-decad averages. By 20 April, over the period 1970-86, an average 38 mm of rain had already fallen; the corresponding figure for 1988 was only 5 mm. In 1987, a healthy 52 mm by 20 April was immediately followed by a three-week drought so severe that it constituted a 'false start', and most farmers had to

replant. In both 1987 and 1988, farmers' problems were compounded by armyworm attacks on young cereal crops (see Chapter 5.1) in the dry periods between rainfalls.

Having planted (or replanted) late in both years, the timing of the end of the rains now became crucial. After 1 October, an average of 63 mm of rain fell in the 1970-86 period; in 1987 the figure was just 26 mm; in 1988 it was 32 mm. Not a trace of rain was recorded after 20 October in either year; in 1986 a further 53 mm had ended the season. In both 1987 and 1988, cereal crops were deprived of rain to such an extent during these crucial final few weeks of growth that production failed substantially - not as dramatically as in 1983, but enough to cause both these high-rainfall seasons to be described by local farmers as 'drought years'. While 1983 was simultaneously a climatic and an agricultural drought, 1987 and 1988 were cases of agricultural but not climatic droughts. The food insecurity which resulted was overlooked by donors and the government; limited aid was mobilised only in response to the armyworms of 1988.

More generally, this detailed consideration of the data has revealed the limited use of total (annual or even monthly) rainfall, in isolation from its distribution, as an indicator of good or bad agricultural years. Finally, the seasonality statistics also provide at least limited support for the claim that rainfall in northeastern Ghana is becoming more concentrated and more variable year to year, an effect which is more determinant of crop production (and household food production in particular) than rainfall volumes. But whether the exceptionally skewed pattern of precipitation in 1987 and 1988 was a temporary aberration, or a cyclical or even secular change is too early to predict.

Fig 3.1. Rainfall Variability in
Northeastern Ghana, 1971-1988

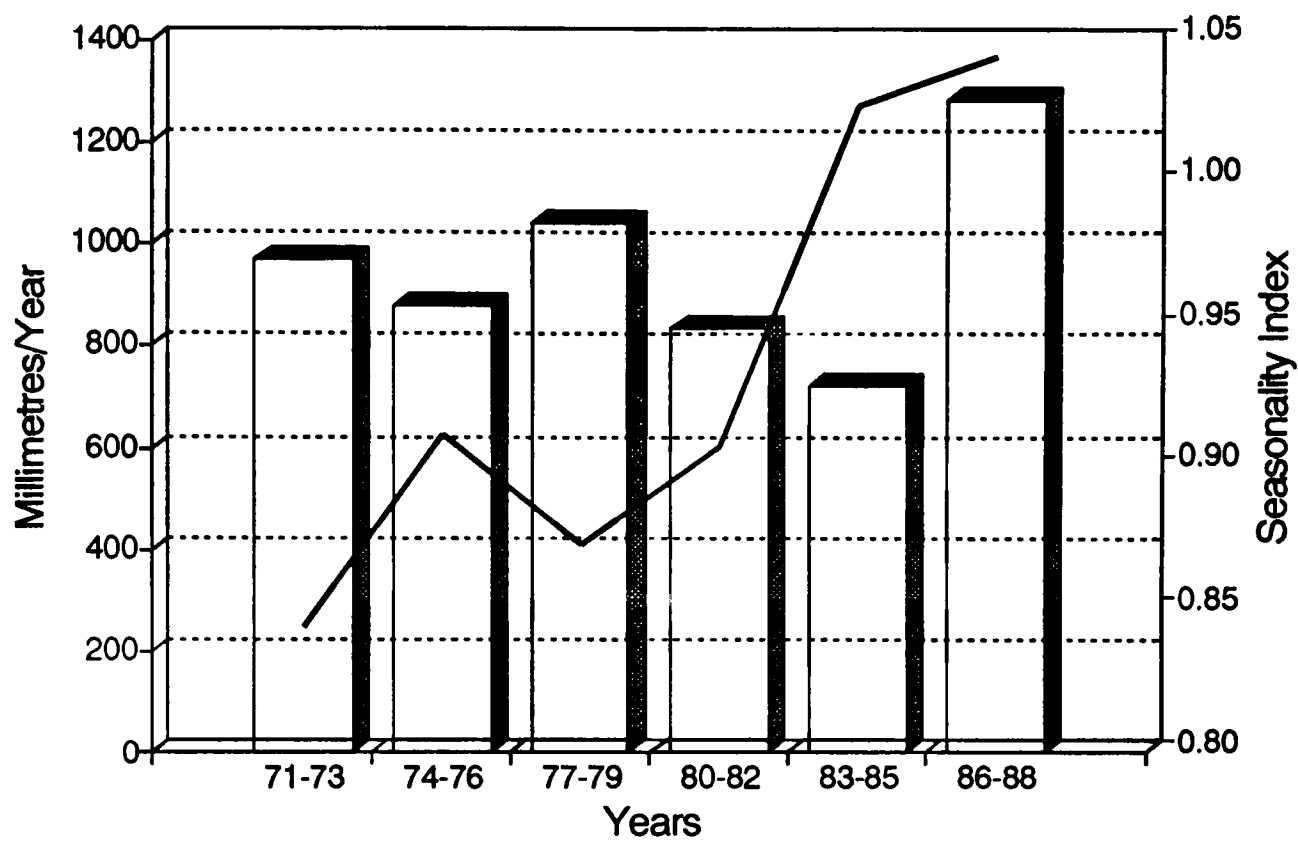


Table 3.5. Rainfall Variability in Northeastern Ghana: 1970s and 1980s

Years	1971 -1973	1974 -1976	1977 -1979	1980 -1982	1983 -1985	1986 -1988
Annual Mean	968	880	1043	837	725	1286
Seasonality Ratio	0.235	0.253	0.265	0.286	0.311	0.246
Seasonality Index	0.844	0.912	0.873	0.908	1.027	1.044

Fig 3.2. Monthly Rainfall in NE
Ghana, 1970-87, 1983, 1988

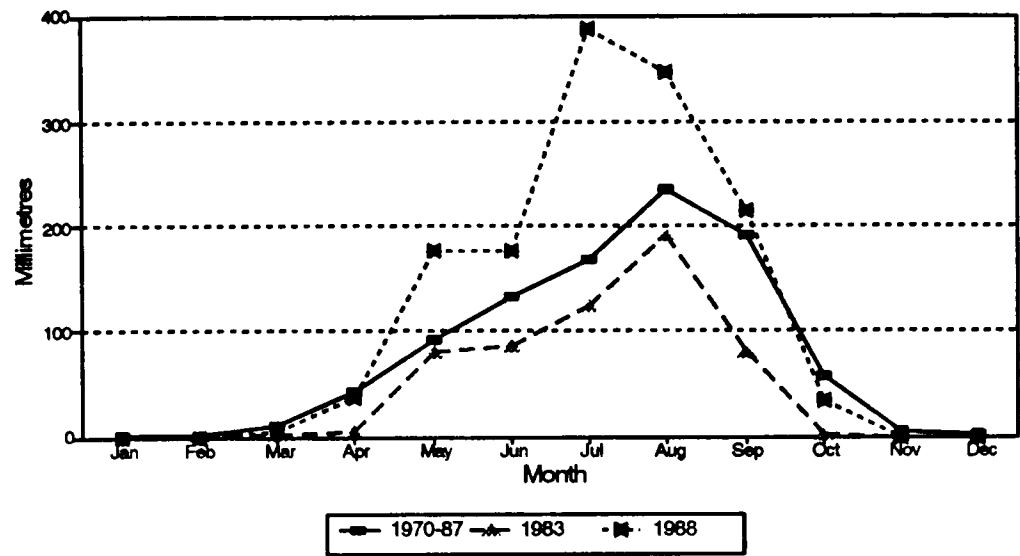


Fig 3.3. Rain by Decads, 1970-86, 1987

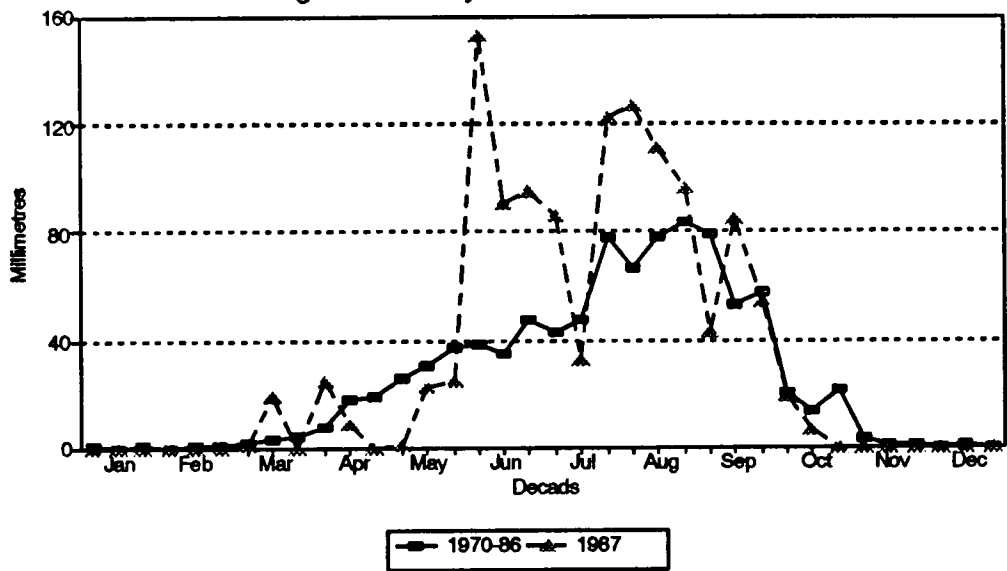
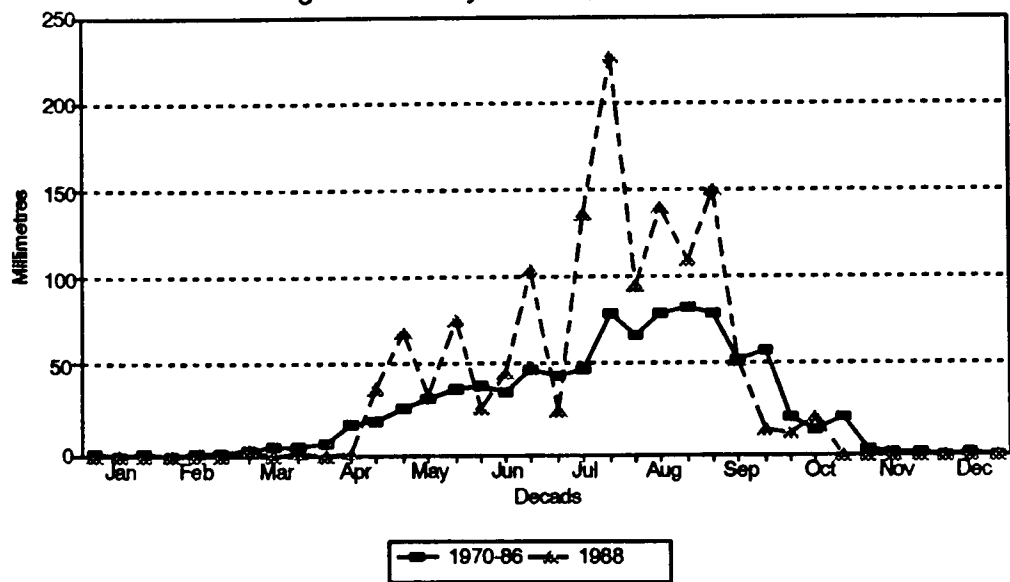


Fig 3.4. Rain by Decads, 1970-86, 1988



2.3. Employment and Income Seasonality

Production seasonality results in highly skewed work patterns, with labour demands and local employment opportunities being competitive rather than complementary. In northern Nigeria, an estimated 44% of annual farming labour is applied in three months, between June and August (Norman, Simmons and Hays, 1982:120), a pattern which is replicated in northeastern Ghana. The coincidence of the imperative to work on the 'compound' farm and the demand for casual labour from wealthier households requires the poor either to raise their levels of self-exploitation or to reduce own-farm labour (prejudicing crop yields and food entitlements for the coming year) against the possibility of earning income during the hungry season from 'by-day' labour (at a time when cash for food is often desperately needed). The second option is highlighted in a Zambian study of labour supply and productivity by Kumar (1988), which suggests that seasonal food shortages impel rural households into increasing their supply of off-farm labour relative to own-farm labour, with detrimental consequences for own-farm output.

In northeastern Ghana, the correlation between household size and vulnerability to hunger is strongly negative - not least because the agricultural labour bottlenecks produced by seasonality create incentives for households to maximise their size. The fact that the incidence of certain debilitating diseases (notably, in the rainy season, malaria) peaks during the period of peak labour requirements reduces both the supply and productivity of farm labour (Chambers 1983). In Pusiga, three small households were severely set back by illness or injury of active adults during the 1989 farming season. In one case this resulted in the afflicted household being incorporated into that of a brother of the household head, which ensured the survival of the household at the cost of its economic and social independence.

Attempts to smooth the seasonality of income (and simultaneously to reduce dependence on agriculture) depend on the complementarity (in terms of their demands on household labour and other resources) as well as the availability of off-farm dry season activities. This in turn depends not only on the nature of the local and wider economy, but on

household-level characteristics which may work against the poor and vulnerable. For instance, access to lucrative sources of income (such as trading) requires working capital; access to salaried employment requires education (or at least literacy); while seasonal migration is generally restricted to young and middle-aged men (which excludes households headed by women or old men).

In Africa, migration has either been blamed for removing productive labour from agriculture and placing additional strain on women in what become female-headed households; or it has been seen as a strategic response to seasonal underemployment and hunger in rural areas. The test again seems to be whether this 'seasonal labour circulation' (Rempel 1981:210) complements or competes with production and income generation in the migrant's home community. Writing on Ghana, Caldwell (1969:8) observed that: "the dry season in the north coincides with the maximum demand for labour for the cocoa crop in the south".

Throughout West Africa, seasonal north-south migration fulfils generally positive functions. Apart from generating income which is generally higher and more stable than that available in the home village, remittances (in cash or food) redress problems of seasonal food insecurity. The concentration of returnees around the start of the new farming (and 'hungry') season swells labour availability and injects cash or food into the household when it is most needed. (See Chapter 5.3.2 on the role of remittances in Pusiga in 1989.) Finally, the temporary absence of a consumer reduces pressures on household granary and asset reserves, and amounts to a 'demographic coping strategy'. Hill (1986:126) goes so far as to argue that, in northern Ghana, "population densities are so high that a considerable proportion of the adult male population must be absent at any one time, if standards of living are not to fall drastically", and that this is encouraged by the community as preferable to the alternative - "permanent migration, albeit involving fewer men, which would otherwise be necessary".

Against this favourable interpretation, Kraus (1986:111) asserts that the attraction of higher living standards in southern Ghana has resulted in selective permanent out-migration of adult males, "and robbed the north of a crucial, youthful labour

resource". Ardayfio-Schandorf (1982:4) supports this assertion with data which suggest a 2:1 ratio of male to female net out-migration from the northern regions during the 1960-70 inter-Census period (37,735 males and 18,120 females). It is also arguable that those who leave constitute the entrepreneurial elements of the community, and this is certainly the case with several former residents of Pusiga whose profits from farming or (more often) trading have financed their 'upward mobility' to a more affluent lifestyle in Bawku town, Kumasi or Accra. Since these emigrants tend to be drawn from Pusiga's wealthier households, backward linkages to their rural relatives (in the form of assistance in gaining urban employment or access to institutional credit, more often than remitted income) does little to redress inequality within the village.

A local alternative to seasonal migration is dry season gardening - the cultivation of vegetables and other crops in small plots irrigated by a well or borehole. The most important crops grown by Bawku farmers in these market gardens are onions, beans, sweet potatoes, peppers and tomatoes (for sale) and leafy vegetables (for stew ingredients). Until recently, poor transport and the perishable nature of crops like tomatoes and green vegetables constrained their production for the national market (Ardayfio-Schandorf 1982), but these constraints are less binding now than in the past. Experiences from elsewhere in Africa (eg. Curry *et al.* (1990) in the case of Swaziland) have demonstrated the economic and food security benefits of market gardening as a supplementary source of both income and nutrition.

The growing counter-seasonal significance of dry season gardening is confirmed by data on exports of this produce from Bawku District (see Figure 3.5 and Table 3.6). Exports of onions and beans in 1988 peaked in the dry season months of January to June (95% of annual total) and February to July (78% of total) respectively. By contrast, all recorded exports of millet in 1988 (which were very limited in 1988) occurred in the farming and harvest months, August to December.

Fig 3.5. Dry Season Exports, Bawku 1988

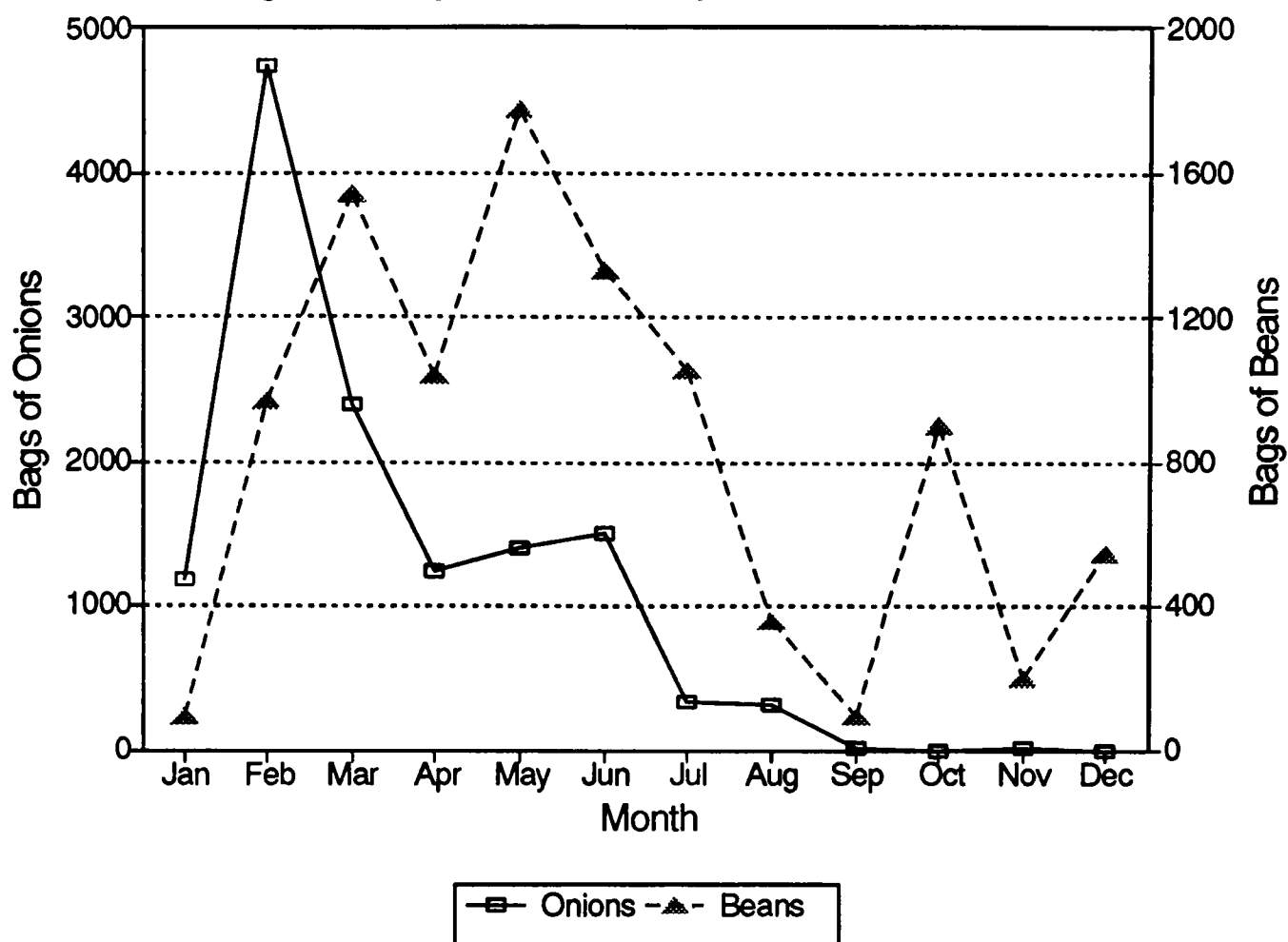


Table 3.6. Commodity Exports (bags), Bawku District, 1988

Month	Onions	Beans	Millet
January	1,180	90	0
February	4,731	966	0
March	2,395	1,542	0
April	1,239	1,040	0
May	1,398	1,776	0
June	1,497	1,330	0
July	336	1,052	0
August	319	358	303
September	2	93	67
October	0	904	26
November	10	196	0
December	0	546	22
Total	13,107	9,893	418

Source: District Accounts Book, Bawku District Council

A sizeable proportion of these exports, particularly of beans and onions, comes from further north (Burkina Faso).⁶⁵ But this fact simply confirms the potential for Bawku farmers to increase production and compete for this lucrative trade. In any event, these official data are subject to at least two sources of systematic underestimation: first, because of unrecorded (illegal) exports; and second, because some produce is exported by alternative routes - from Pusiga, more produce leaves the District via the eastern villages of Bugri, Garu and Nakpanduri than through Bawku town.

2.4. Grain Price Seasonality

A serious obstacle to the achievement of food consumption security in production deficit households is posed by imperfections in local grain markets. In contrast to many African countries, the grain trade in Ghana is not regulated, but the market, though competitive, is imperfect. Grain prices in Upper East Ghana are extremely variable, reflecting two facts: that the single farming season results in a seasonally skewed availability of locally produced grain in the markets, and that the region is poorly integrated economically with the less seasonally affected regions of southern Ghana.

Price variability is not random: production seasonality results in predictable grain price seasonality. In most years, grain prices are lowest after the main annual harvest, when market demand is negligible and supplies are plentiful. As the dry season begins around new year, the price of a 'bittou bowl' of millet or sorghum starts to rise,⁶⁶ peaking during the hungry season in June or July, then falling sharply as early millet arrives in the market. After displaying little movement for two to three months, prices start their climb again in January.

⁶⁵. These figures were derived from District Administration tax records. All produce leaving Bawku District is subject to taxation (C400 per bag of beans or onions in 1989), irrespective of its origin.

⁶⁶. Cereals in northern Ghana are retailed in bowls and sold wholesale in bags. A 'bittou bowl' is a local measure which holds around 2.6 kgs of grain, while a 'bag' contains the equivalent of 38-40 bowls of grain - approximately 100 kg.

This annual pattern is clearly illustrated in Figure 3.6, which plots monthly seasonal coefficients for maize, derived from an analysis of time series price data for 88 months (February 1982 - May 1989), averaged over three major Bawku District markets.⁶⁷ Although millet and sorghum are the local staples, rather than maize, prices of all cereals tend to be closely correlated (see below), and a longer continuous dataset was available for maize (much of which is imported) than for other cereals. (Following the 1982 drought, virtually no millet or sorghum was retailed in Bawku for over a year.)

As Figure 3.6 illustrates, retail and wholesale maize prices track each other closely. Discounting inflation (as this methodology does), the ratio of highest to lowest price months suggests that real retail prices rise by 73% and real wholesale prices by 84% from harvest (October) to hungry season (July) in an 'average' year. After a drought, as in 1983, prices can quadruple in six months. Table 3.7 expresses these seasonal coefficients as a price index (multiplying each figure by 100) and compares these 1980s data to figures derived by Nyanteng (1978b), who applied a similar methodology to national price averages for the 1960s and 1970s. The similarity between the three series reveals how little the problem of seasonal price variability has changed in three decades.

An index of vulnerability to grain price seasonality, based on the timing of grain purchases, is suggested by the work of Ellsworth and Shapiro (1989) in Burkina Faso. In 1988/9, only 24% of production deficit households in Pusiga purchased more than 60% of their grain in the four post-harvest months (November to February); these households can be considered to be minimising the costs of price seasonality. 21% of households concentrated their purchases (60%+) in the four months before the next early millet harvest (March to June 1989); they incurred serious losses because of price seasonality. The remaining 55% of households spread their grain purchases evenly throughout the year; they lost to the extent that price rises exceeded storage costs. In Ellsworth and Shapiro's Burkinabe sample, too, this third pattern dominated.

⁶⁷. The calculation of seasonal coefficients was done multiplicatively, in four steps: (1) isolating the trend component by calculating centred moving averages of order 12; (2) calculating the ratio of each monthly price to its corresponding moving average; (3) calculating the mean of the ratios for each month over the number of years for which observations exist; (4) adjusting these first estimates such that their geometric mean equals 1.

Fig 3.6. Seasonal Coefficients,
Maize Prices, Bawku

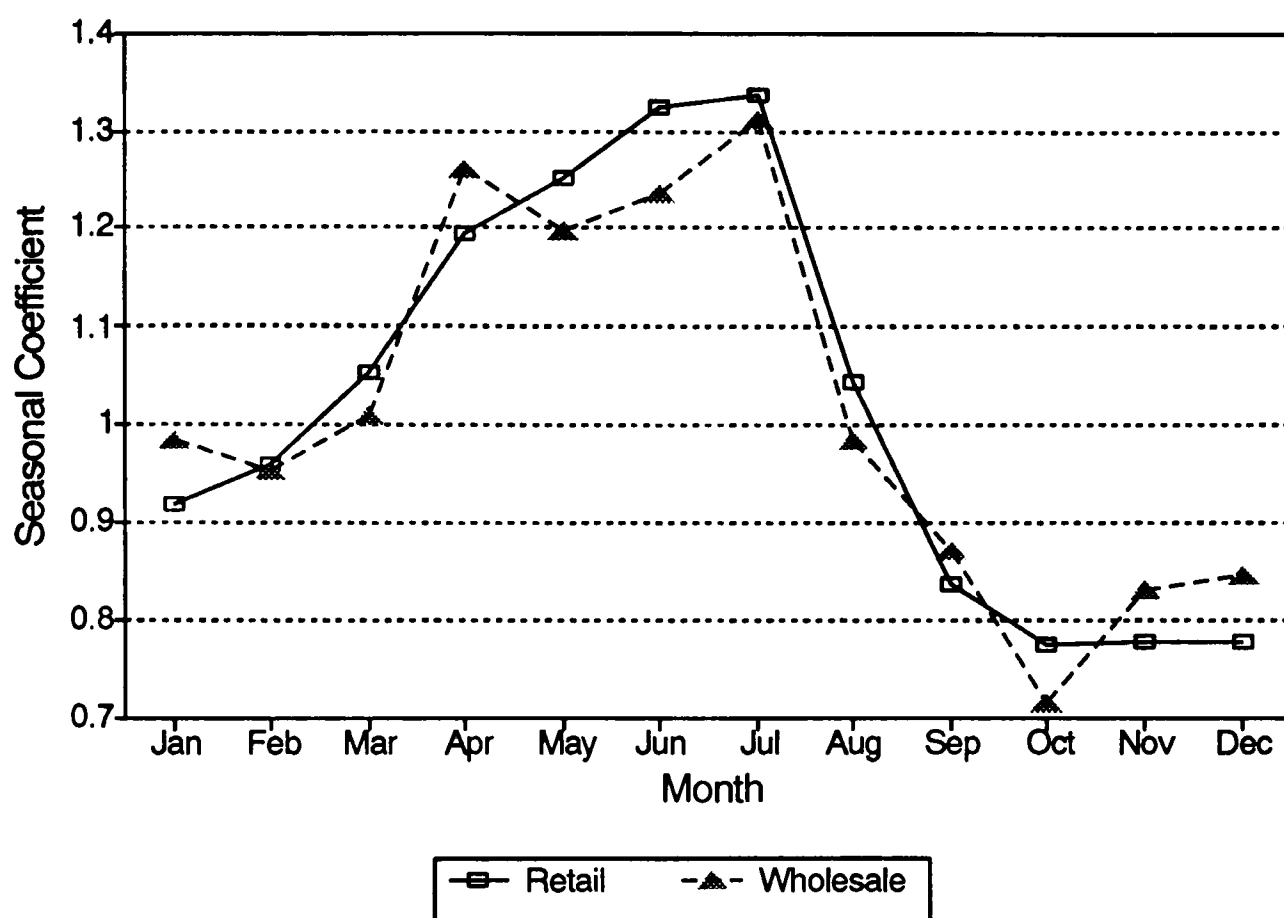


Table 3.7. Monthly Maize Price Indices, Bawku District and Ghana

Month	Bawku: Retail 1982-88	Bawku: Wholesale 1982-88	Ghana: Wholesale 1963-76
January	91.9	98.5	94.5
February	96.0	95.2	97.3
March	105.5	100.9	102.2
April	119.6	126.0	118.1
May	125.0	120.0	129.1
June	132.2	123.6	127.8
July	133.6	131.3	104.9
August	104.3	98.5	79.8
September	83.8	87.2	71.7
October	77.3	71.3	85.3
November	77.6	83.1	88.9
December	77.7	84.7	-

Sources: Bawku 1982-88 - calculated from price data in
Monthly Reports, Ministry of Agriculture/URADEP;
 Ghana 1963-76 - Nyanteng (1978b:12, Table 5.)

Explanations for the failure of production deficit households to buy grain immediately after harvest - when prices are lowest - range from storage losses (Messer 1989:161) to "peasant irrationality" to cash constraints (post-harvest income being needed for payment of debts and taxes) to "fear of having to share surplus grain as the hungry season approaches" (Ellsworth and Shapiro 1989:199).⁶⁸ Storage losses are not a persuasive argument in the dry post-harvest climate of northeastern Ghana, however. Earlier studies reported post-harvest grain losses ranging from 8% to 20% (cited by Nyanteng 1972), or even as high as 50% (Bogaards 1969, cited by Bennett and Schork 1979:65), but these estimates have since been revised radically downwards. A 1987/8 survey of 600 farmers in the Upper East and Brong-Ahafo Regions found post-harvest losses of only 3.0% for maize in the Upper East (11.1% in wetter Brong-Ahafo), and 1.3% losses of millet and sorghum (cited in Alderman and Shiveley 1991:47).

From the farmer's perspective, grain prices rise as granary stocks fall, a movement which is explained theoretically by storage and transaction costs. However, data from northern Nigeria suggest that seasonal price variations in sorghum (wholesale) exceed estimated storage and transaction costs; while data from Burkina Faso reveal large geographical spreads in prices, even between well-connected markets (Sahn and Delgado 1989:186). In rural Ghana, grain marketing transactions costs are high. Feeder roads are inadequate and price information is slow to circulate (FAO 1989:27). But Nyanteng (1978a) has argued that Ghanaian traders collude to keep prices higher than is justified by storage and transport costs alone. Wholesalers transfer produce bought from farmers in bags to smaller bags which hold 15-20% less, before reselling it. Retailers sell grain in variable weights at different times of year - overflowing bowls after harvest, level bowls (or smaller bowls, surreptitiously substituted) during the hungry season. These hidden unit price increases are likely to result in grain marketing margins being underestimated, particularly during the hungry season and famine years.

Evidence for the excess of marketing margins over storage costs in Pusiga can be inferred from the popularity among wealthier farmer-traders of temporal arbitrage in

⁶⁸. These and other explanations are explored further in Chapter 4.3.

grain, groundnut and non-food crops.⁶⁹ Some Pusiga residents object to others who buy grain cheaply after harvest and store it in anticipation of price rises: "This is like praying to God that hunger will come." While this practice can generate sizeable profits to a few individuals, the volume of produce involved is rarely enough to smooth seasonal price variations significantly (this being the neoclassical economist's argument in support of temporal arbitrage).

For net purchasers, grain purchasing patterns are determined less by calculations about storage costs than by household wealth. Richer households can raise comparatively large amounts of cash at short notice; poorer households face seasonal cash constraints as well as chronic poverty. This enables the rich to pay consistently lower unit prices for grain than their neighbours, largely by buying in bulk early in the dry season and storing this for later use. In 1988, 'middle income' households in Pusiga (using a 'wealth ranking' classification - see Appendix 1), like the rich, bought most of their grain in bags, but bought later and paid more. The average 'rich' household purchased 8.0 bags of cereals at C8,257/bag. 'Middle income' households bought 5.5 bags each, @ C8,621, while the 'poor' bought an average of 2.7 bags. Poorer households tended to delay their purchases until the household granary was empty, then bought in basins (3 basins = 1 bag) or bowls. These households paid C8,360 for each bag purchased, but this underestimates the unit cost of their total grain purchases, as retail prices are higher than equivalent wholesale prices (bags), and some bought no bags of grain at all, but only bowls and basins.

Moreover, price data conceal cross-sectional changes in consumption patterns. Wealthier households continued buying preferred cereals, despite their comparatively higher prices. Rich households each bought 4.3 bags of late millet at C8,695 per bag, 2.6 bags of sorghum @ C8,395, and only 0.8 bags of maize, @ C6,472 (30% less). Poorer households switched to less preferred but less expensive varieties of sorghum and maize, while the very poorest purchased cheap but nutritionally inferior grinding mill flour (*zom*) when they could no longer afford anything else.

⁶⁹. 'Temporal arbitrage' here includes deferred sales of surplus produce as well as post-harvest purchases of agricultural produce explicitly for purposes of resale later in the year.

Problems of market dependence for food are exacerbated in years when local production shortfalls exaggerate grain price variability. Table 3.8 reproduces the set of retail maize prices from which the seasonal coefficients plotted in Figure 3.6 were derived.

A steady upward trend is evident through the decade, overlaying the annual rise and fall of nominal prices. Figure 3.7 plots these data along with millet prices for 1984 to early 1989. Figure 3.8 graphs the deseasonalised trend (centred moving averages of order 12), which reveals two periods of massive ($\pm 400\%$) maize price inflation: during the 1983 famine following the failed harvests of 1982; and a prolonged period beginning slowly in early 1985, with sharp increases in actual and trend prices persisting through 1987. The correlation between subsistence crises and grain price surges is strong and independent of underlying trends, as the falling back of the moving average after the main harvest of 1983 and in anticipation of the early millet harvest of 1988 confirms.

The fact that harvests are staggered causes little systematic variation in the prices of locally produced and marketed foodgrains, because millets, sorghums and maize are all highly substitutable for consumption purposes, and demand-switching creates tendencies towards price equalisation. However, while the market availability of locally produced millets and sorghums are highly covariant,⁷⁰ maize is brought in by traders in years of local deficit, so its comparative availability is slightly counter-cyclical. In average to good years, millet sells for slightly less than maize, the difference being attributable to unit transport costs on that portion of marketed maize that is not locally produced.

⁷⁰. Retail prices of sorghum and millet in Bawku District are particularly highly correlated (for the period June 1984 to May 1989, $R^2 = 0.97$, t -statistic = 45.4), even though early millet is harvested in late July and sorghum not until early November. Price correlations between millet or sorghum, on the one hand, and maize, on the other, are only marginally less strong. Although much of this association must be attributed to inflationary pressures in the national economy, Alderman and Shiveley (1991) also find evidence of cross-commodity price integration between all three cereals.

Fig 3.7. Retail Grain Prices, Bawku

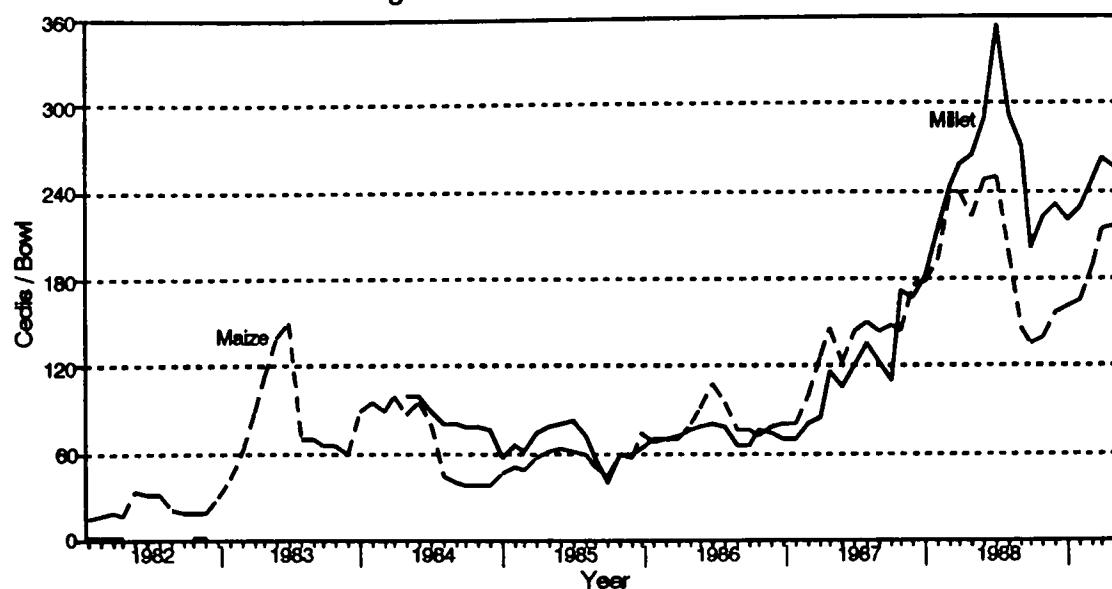


Fig 3.8. Moving Average, Retail Maize Price, Bawku, 1982-1988

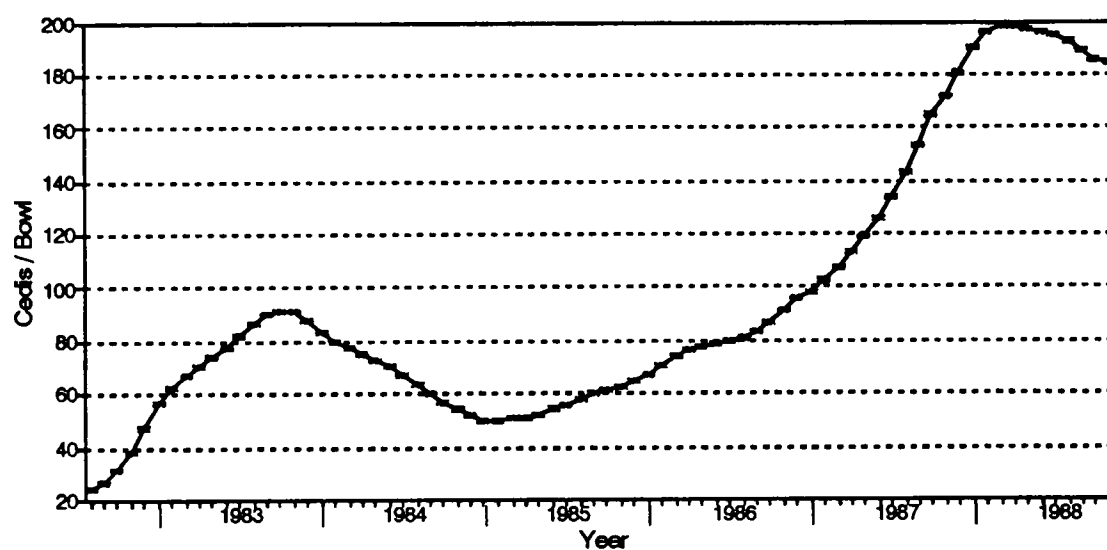


Table 3.8. Retail Maize Prices, Bawku District Markets, 1982-1989

Month	1982	1983	1984	1985	1986	1987	1988	1989
January	-	29	90	46	74	80	178	160
February	15	43	95	50	68	80	193	165
March	18	62	90	49	70	100	240	188
April	20	90	100	57	69	126	240	214
May	18	112	88	62	80	147	223	216
June	34	140	95	63	92	123	248	-
July	32	150	80	61	108	144	250	-
August	32	70	44	60	96	151	196	-
September	22	70	40	50	77	143	147	-
October	20	65	39	45	76	149	135	-
November	20	65	38	60	72	145	140	-
December	20	60	38	57	79	176	156	-

Source: Monthly Reports, Ministry of Agriculture/URADEP, Bawku.

But grain production shortages in northeastern Ghana are signalled by divergences between millet and sorghum prices, on the one hand, and maize prices on the other. Following the poor harvest of 1987, millet and sorghum prices trebled between October 1987 and August 1988. Over the same period, maize imported from southern Ghana to redress the deficit did not even double in price, instead following about 25% below the price of millet (see Figure 3.7). Nonetheless, traders did not import enough grain to reduce seasonal price differentials significantly, probably because effective demand was rather low, and transactions costs were relatively high.

This discussion has demonstrated that the effects of grain price fluctuations are not uniformly distributed across production deficit households. As with most consequences of seasonality and market imperfections, the poorest households suffer the worst effects, while wealthier households minimise their outlays through strategic management of grain purchases. In Pusiga in 1987-89, several farmers and farmer-traders with capital and acumen even seized the opportunity to profit from temporal or spatial arbitrage, through grain storage or long distance trading. Conversely, the poor bore the brunt of the post-harvest price rises in both years, when production deficits made their market dependence unusually acute.

2.5. Institutional Responses to Seasonality

Seasonality was seen above to have significant impacts on both the economy and food security of households and individuals living in northeastern Ghana. This section discusses one attempt by the Ghana government to redress grain price seasonality, and one attempt by a donor to alleviate the seasonal cashflow constraints which inhibit agricultural investment and productivity.

2.5.1. Ghana Food Distribution Corporation⁷¹

The Ghana Food Distribution Corporation (GFDC) is a government parastatal with two explicit food security mandates: intra-seasonal grain price stabilisation and the maintenance of reserve stocks. The GFDC's role can be characterised as one of spatial and temporal arbitrage. In terms of supporting household food security, its objective might be described as attempting to minimise the erosion of entitlements to food induced by post-harvest grain price rises.

Established in 1971, the GFDC has been actively involved in grain marketing since 1982, and by 1989 it operated 59 permanent buying centres, located in all regions except Greater Accra and the Upper East. To date, though, the GFDC remains a peripheral marketing agent: its purchases have never exceeded 5% of national grain production (FAO 1989:4).

One stated objective of GFDC operations is to protect poor consumers from the profiteering of middlemen (or middlewomen - market traders) during the dry season. Grain (mainly rice) is purchased in bulk in southern and Northern Region markets, at low post-harvest prices, and stored in GFDC warehouses for five or six months. (Storage capacity in 1990 was 47,000 metric tons, and due to expand to 74,000 MT by 1991/2.) Then this grain is transported to deficit regions such as the Upper East and Upper West, where it is sold in village markets, mostly between April and July, at prices lower than those prevailing in local markets.

GFDC pricing policy is to sell grain at a markup which covers only unit storage and distribution (transport) costs; in 1989, this markup amounted to 32% over the purchase price. In the 1988/9 season, the GFDC bought 4,900 MT of paddy rice (mostly in the Northern Region, the major rice-producing region in Ghana), 165,000 kg of millet and sorghum, and smaller quantities of maize, beans and groundnuts. There is little market

⁷¹. Unless referenced, information derives from interviews with Mr Steve Sule, Senior Commercial Assistant, the Ghana Food Distribution Corporation, Tamale; 29 March and 25 May 1989.

demand for beans and groundnuts in the Upper Regions, though, so these are mostly exported to southern Ghana.

The GFDC tours the north throughout the dry season. During 1989, one or two GFDC trucks came to Pusiga every second or third market day (every 6 or 9 days) and sold grain directly to traders and to the public. On 25 May, for instance, two trucks arrived in Pusiga market at 1pm, and by 4pm had unloaded and sold all their consignment - 180 bags of rice and 20 bags of maize. The price of GFDC rice was C6,700 per bag throughout 1989, while the price of a bag of rice in Pusiga market started at C5,000 in October 1988 and rose to C7,600 in July 1989 (or C8,000 for rice bought in bowls - a bowl cost C400 and 20 bowls fills a bag).

The market price of rice did not rise as high during 1989 as expected. In March, a GFDC official visiting Pusiga predicted that local prices would rise to C9,000 or C10,000 per bag in June or July, just before the early millet harvest. Then, he said, "women will be queuing up to buy", because the GFDC price would remain fixed at C6,700 per bag. Perhaps the rather small rice price rise in 1989 is a tribute to GFDC activities; more likely it reflects the high level of private trading stimulated by a second successive bad harvest. Pessimistic expectations led to excessive purchases by the GFDC after the 1988 harvest, with the result that, by July 1989, it was left with higher than average grain stocks (20,400 MT, following an average 5,060 MT in the preceding 4 years), because "market supplies were ample and prices relatively low which made GFDC's sales price uncompetitive in the normal lean season" (FAO 1989:12).

The GFDC rarely sells single bags (100 kg sacks), it being more common for a market trader to buy up six or eight bags in bulk, which they would then retail in basins and bowls to poorer consumers who lack the capital to buy even one bag. The fact that the GFDC sells to the middlewomen whose 'profiteering' its interventions are supposed to undermine seems to defeat the stated objective. Admittedly, in 1989 the parastatal had little alternative, since it was desperate to offload as much stock as possible. But if the GFDC sold rice in smaller units, perhaps even on credit, it might make greater progress towards its goal of improving household food security and combating seasonal hunger.

2.5.2. 'Global 2000'

'Global 2000' was started by a Japanese philanthropist called Sasakawa with Japanese money. Its name reflects its ambition to promote global self-sufficiency in foodcrop production by the year 2000. Specifically, Global 2000 assists small farmers with inputs on a deferred payment basis - fertilisers and seeds are distributed at planting time, in return for which participating farmers repay some produce after harvest.

The project started in Ghana in the Upper West Region in 1985, and came to the Upper East in 1987. At first, as is typical with untested initiatives, people were wary and only 57 farmers in Bawku District registered in the first year, though this rose to 1,046 in 1988. In 1989, the Upper East Region registered 10,000 Global 2000 farmers, of which 4,000 were in Bawku District, so the project's growth has been dramatic. A \$1.7m expansion in 1989 was financed jointly by Sasakawa and Ghanaian bank loans.⁷²

By 1989, 30 farmers in ±200 households in Terago and Tesnatinga had a Global 2000 plot, and most other farmers also wanted to participate. This can be explained by two factors identified in the project's 1988 Regional Annual Report - the acute local land shortage, and the seasonal cash constraints facing all poor farmers each year.

"In the Upper East Region, expansion of arable land to increase food production is next to nil. The only alternative is to increase yield per unit land area per farmer. This has been quite successful with the comparatively few farmers who have benefited from the programme. At planting time, usually referred to as 'hunger' season, the urgent need to purchase grain to feed the family conflicts with the cash for production ie. purchase of inputs and hiring of labour."⁷³

⁷². Interview with Mr George Kwaku Badu-Yeboah, District Development Officer, Ministry of Agriculture, Bawku; 12 May 1989.

⁷³. Sasakawa Global 2000, Annual Report, Upper East Region: 1988, Bolgatanga, 1989:4.

The use of chemical fertilisers certainly improves crop yields dramatically, at least in the short run. In 1987, according to a recent study, the average sorghum yield in Global 2000 fields was 1.77 ton/ha, while that of adjacent non-Global 2000 plots was estimated at 0.5 ton/ha (Hong and Martinez, 1989:5).

Global 2000 has no employees. Inputs are distributed through Ministry of Agriculture extension staff, who also train participating farmers in fertiliser application, and recommend adoption of high-yielding varieties of sorghum (*naga white*, *framida*) and maize (*abrotia*, *safita 2*). At first Global 2000 provided only fertiliser, but in 1989 it stepped up its promotion of *abrotia* by offering free seeds. Of 200 Global 2000 farmers in 12 sections of Pusiga, 126 (63%) planted *naga white*, 60 planted *abrotia*, and only 14 planted lower-yielding early millet, *naga red* or guinea corn.

Produce collected from participating farmers is held for some months until prices rise, to generate profit which is returned to the project. In 1988, one bag of produce was demanded from each Global 2000 farmer. This was sold during March 1989 at C6,200 per bag, while the cost of fertiliser provided to farmers in June was C5,600.

The threat of exclusion from valuable further credit provides a strong incentive to repay, and Bawku District has an excellent record of repayment. In 1988, 838 out of 1,046 Global 2000 farmers in Bawku District repaid one bag of produce, 148 paid in cash, and 60 defaulted. Some who could not repay in 1987 because of poor harvests that year repaid two bags in 1988. The recovery rate of 94.3% (Sasakawa 1989:3) was the highest of any District in the Upper East (the total for the Region was itself 87.5%).

One reason for this is the project's selection criteria. The first 57 Global 2000 farmers in Bawku were prosperous 'opinion leaders', carefully chosen to demonstrate the benefits of the scheme - and to ensure recovery of loans. They were not "the poorest of the poor", and although the project's food self-sufficiency emphasis required them to grow a cereal, most sold their Global 2000 produce for (private, not household) cash income. As the project expanded in subsequent years, poorer farmers were included, but the tendency to select wealthier farmers remained, not least because of pressures on

Ministry staff to recover produce after harvest. In neighbouring Navrongo District in 1988, for example, extension officers lost some of their salary for every bag of grain they failed to collect.

It is unclear whether Global 2000 can sustain its growth indefinitely or whether it will collapse under its high expectations and the overstretched Ministry of Agriculture resources on which its initial success has depended. In 1989, the repayment demanded was doubled, from one bag of produce to two (100 kg to 200 kg). The reason given was higher fertiliser costs, but the decision also reflected a view that default rates would rise as poorer farmers were brought into the scheme. In fact, several newly registered poorer farmers in Pusiga immediately dropped out when the increase was announced, complaining that even if fertilisers improved yields, they could not justify to their families giving away two bags of staple food in the event of another poor harvest.

3. Conclusion

This chapter has demonstrated that agriculture in northeastern Ghana is undercapitalised and risky. Nonetheless, the costs of market dependence for subsistence needs are prohibitive for most households, who typically favour a mixed strategy, farming for self-provisioning and pursuing a range of non-agricultural activities for cash income. The analysis of time series data on rainfall and grain prices illustrated: (1) the high inter-seasonal and inter-annual variability of both these crucial determinants of access to food; (2) their adverse interactions - grain prices rise most in years of low or poorly distributed rainfall, compounding problems of food acquisition for households as farmers who are usually self-sufficient producers suddenly become market dependent consumers (Devereux 1988).

Seasonality in northeastern Ghana was seen to produce a combination of adverse events at the most difficult and agriculturally crucial time of year. Labour bottlenecks are faced by poor households because of irregular patterns of work and employment, and the need to do agricultural labour for cash and food during the hungry season. A

dependence on agriculture for both food and cash income leaves farmers vulnerable to covariant production shocks (threatening both 'direct' and 'exchange' entitlements to food from crop sales). Distorted grain and asset markets result in declining terms of trade (post-harvest food price rises and asset price declines, with the worst livestock/grain ratios occurring during the hungry season).⁷⁴ Finally, the 'hungry season' is associated with annual peaks in malnutrition rates. Food stocks are lowest and energy expenditure is highest, exposing both adults and children to enhanced nutritional risk.⁷⁵

Figure 3.9 illustrates the multi-dimensional nature of seasonality by overlaying three data series - rainfall, grain prices and child nutrition - for 1983, a crisis year throughout Ghana. In 1983, total rainfall in Bawku District was substantially below mean levels, retail maize prices increased fivefold, and half of all Ghanaian children were categorised as malnourished.⁷⁶ Maize prices and child malnutrition peaked simultaneously, in June and July - the hungry season months - immediately prior to August, the month of maximum rainfall and the early millet harvest.

On this evidence, the consequences of agricultural production deficits in the semi-arid tropics can be characterised as exacerbations of regular seasonal fluctuations across a range of variables (rainfall is lower or more concentrated, grain prices and malnutrition are higher, than 'average'). The following chapters consider the implications of these adverse movements on household food security, and examine behavioural responses to the threats to subsistence they present.

⁷⁴. 'Distress sales' and falling 'exchange entitlements' are discussed in the context of responses to seasonality and food deficits, in Chapter 4.

⁷⁵. Nutritional consequences of seasonality are explored in depth in Chapter 6.

⁷⁶. These nutrition data are based on children attending health posts nationally, not only in Bawku District, where seasonal variability in anthropometric indicators typically exceeds national aggregates. Children were classified as malnourished by CRS if their weight-for-age fell below the third percentile of the Harvard standard. In Figure 3.9, these data have been scaled so as to emphasise the seasonal variation.

Fig 3.9. Seasonality in NE Ghana, 1983

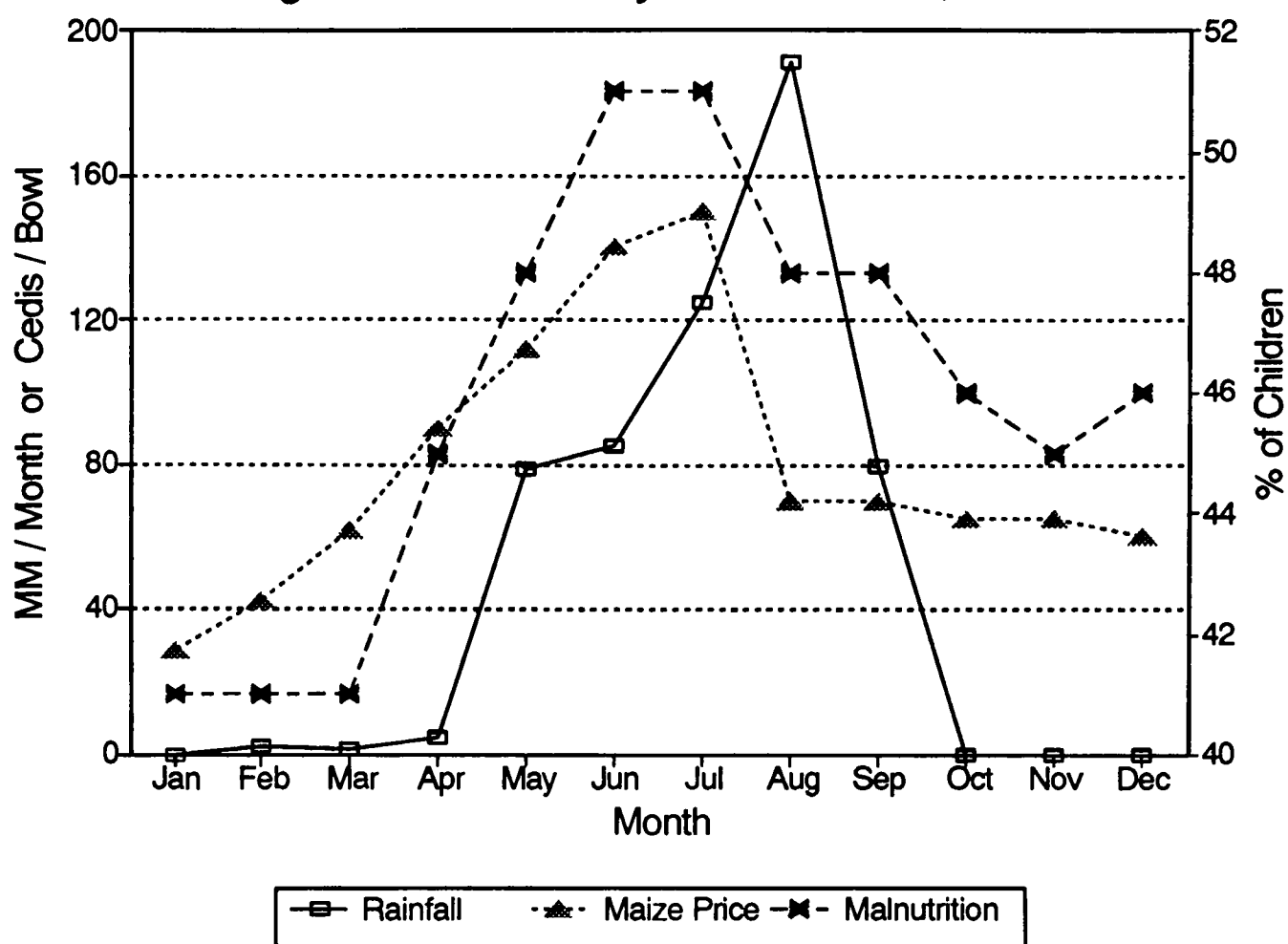


Table 3.9. Rainfall, Grain Price and Nutritional Seasonality, 1983

Month	Rainfall (mm)	Maize Price (bowl)	Malnourished Children (%)
January	0	29	41
February	2	43	41
March	1	62	41
April	5	90	45
May	79	112	48
June	85	140	51
July	125	150	51
August	191	70	48
September	80	70	48
October	0	65	46
November	0	65	45
December	0	60	46

Source of nutrition data: Catholic Relief Services, Ghana, cited in UNICEF-Accra (1988:105). Nutrition data are national, not local averages.

Chapter 4. Responses to Food Deficit: A Critique of the Literature and a Conceptual Approach

0. Introduction

This chapter falls broadly into two halves. The first begins with terminology, proposing a more rigorous set of definitions for household responses to food deficit than presently exists. Next is a summary and critique of the 'coping strategies' literature. Empirical studies have motivated categorisation, sequencing and clustering of observed responses into 'discrete stages' of adoption. Many of these notions are simplistic and vaguely specified, reflecting a weak theoretical foundation. For instance, many *soudure* and famine studies privilege food acquisition behaviour and overlook food rationing. But this is refuted by powerful evidence for rationing (not least in Chapter 6 of this thesis), and by the theoretical recognition that rationing is motivated by economic objectives (protecting future viability at the expense of current consumption). In reality, reduced consumption and asset disposal are parallel processes, not sequential events. This demands a more sophisticated analytical framework than is currently available.

The second half of this chapter conceptualises household responses to food deficit in an original way, by first disaggregating 'entitlement to food' into its components (food production, sales of non-staple crops, off-farm incomes, asset sales, credit and transfers), then examining the efficacy of each in smoothing consumption following a production shock. The extent to which incomes are correlated to foodcrop production is seen to be a crucial determinant of household food insecurity. As for assets, their acquisition costs, liquidity, risk and expected return are identified as determining: (1) their relative attractiveness as consumption buffers; (2) the sequencing of their disposal for food. Finally, access to credit and transfers allows low-income households to smooth production and income fluctuations, and to stabilise consumption, without destituting themselves.

As argued throughout, protecting current consumption is not the only objective of food deficit responses. Section 3.5 demonstrates the economic rationality of consumption rationing over wealth depletion. A final set of issues addressed in this chapter is intra-household conflicts (between genders and generations). The chapter concludes by evaluating the theoretical and policy implications of this discussion and other recent advances in the literature. An Appendix offers a formal specification of entitlement to food, which is invoked in this chapter and the next to analyse sources of food.

1. Definitions and Terminology

The literature on 'coping strategies' has yet to be fully incorporated into theoretical analyses of famine and seasonality, and has only recently entered policy debates about early warning and famine relief interventions by donors and governments. Coping strategies, by definition, imply a focus on indigenous (household and community level) responses to food deficit, rather than exogenous (national and international) responses.

This discussion will not treat responses to seasonality and responses to drought and famine as two separate sets of behaviour, but rather as a continuum. In the semi-arid tropics, the dry season is often described as the "annual drought", and the hungry season or *soudure* as the "annual famine". Moreover, as will be argued, different households experience the same phenomena to varying degrees, and a major subsistence crisis to a poor household can even offer opportunities for accumulation to a wealthier neighbour.

The first problem a reader of this literature encounters is a confusing proliferation of loosely defined or undefined terms. Table 4.1 lists several adjectives and nouns, various combinations of which are used in the literature to describe short term adjustments to food deficits. These phrases are commonly applied to the behaviour of self-provisioning agriculturalists whose aim is production self-sufficiency, when this objective is undermined by drought, flood, or crop blight.

Table 4.1. Terminological Proliferation

Adjective	Noun
adaptive adjustment behavioural coping disaster-avoidance indigenous insurance risk-reducing subsistence survival	strategies responses mechanisms devices

The most popular phrases - 'coping strategies', 'coping mechanisms', 'adaptive responses', and 'survival strategies' - are often used interchangeably, as though synonymous.⁷⁷ Fleuret (1986:224), for instance, defines "adaptive responses" or "coping mechanisms" as "the social and cultural institutions developed to deal with drought-induced food shortages". But she also distinguishes between "normal seasonal variation" and drought, and between "short term and localized droughts" and "once-in-a-century drought-cum-famines, because coping mechanisms were not designed for, and thus were usually inadequate for dealing with, such a major crisis".

This suggests a useful distinction between strategies for dealing with annual seasonality or regular drought, and responses to unexpectedly severe food deficits. While the deepening intensity of food shortage is of course continuous, behavioural responses can be differentiated. Table 4.2 proposes a new taxonomy of terms, implying a more rigorous use of these phrases than is commonly found in the literature. This will provide the basis for the discussion which follows.

⁷⁷. Other terms include: 'disaster-avoidance strategies' (Caldwell, Reddy and Caldwell, 1986); 'behavioral responses', (Campbell and Trechter, 1982); 'subsistence strategies' (Faulkingham 1977); 'indigenous responses' and 'drought-response mechanisms' (Fleuret 1986); 'the adjustment mechanism', 'adjustment devices' (Jodha 1975).

As a generic term, 'coping strategies' is rejected here as unsatisfactory to describe decision-making behaviour under economic stress. Households do not react passively and mechanistically to food deficit, as this term implies. Rather, they deploy a complex range of strategies in response to threats to their economic, nutritional and social well-being. Moreover, food crises are associated with enhanced nutritional risk and even excess mortality: people do not always 'cope'. Unfortunately, most alternative terms, such as 'viability strategies' or 'household reproduction strategies', are equally unhelpful. Throughout this thesis, the neutral (if rather bland) phrase 'responses to food deficit' is generally preferred to 'coping strategies'.

Table 4.2. Levels of Food Deficit and Behavioural Responses

Stage	Level of Food Insecurity	Nature of Response	Example of Response
-1	none	accumulation behaviour	investment
0	predicted	insurance mechanisms	intercropping
1	mild	adaptive responses	food rationing
2	moderate	coping strategies	asset sales
3	critical	survival strategies	mass migration

Table 4.2 asserts a hierarchy in household objectives and behaviour, and in this sense anticipates the discussion (in sub-section 2.1.4) below about 'discrete stages' in response adoption. Households prefer to invest in asset-enhancing wealth accumulation strategies, but agricultural risk and income uncertainty impels them to practice risk-reducing insurance behaviour such as intercropping, which might conflict with yield or income maximisation. During actual food deficits, depending on their severity, a range of less preferred strategies are adopted which aim to protect lives and livelihoods - household food consumption, economic and social viability, and finally life itself.

Table 4.2 can be used in a variety of ways. It might describe the behaviour of a single household over a period of intensifying economic crisis. Or it might describe behaviour adopted by different households within a community who experience subsistence threats to different degrees - accumulation by food secure households might continue (and be enhanced) as poorer members of the community resort to 'coping' and even 'survival' strategies (see Chapter 5.9). Finally, the scenario might be the situation facing an entire community experiencing no food problem, then anticipating (*ex ante*) seasonality or regular drought, then responding (*ex post*) to an actual hungry season or drought, which develops into a severe production deficit, and finally becomes a media famine (level 3).

'Accumulation behaviour' is included in Table 4.2 because this fits logically into the continuum: it describes behaviour in situations of no food threat.⁷⁸ 'Insurance mechanisms' are devised in advance of anticipated food deficits, to reduce either their likelihood or their impact. Most of these strategies (eg. planting drought-resistant crops) involve modifying production decisions. 'Adaptive responses' (eg. sale of 'surplus' smallstock) describes behaviour during a hungry season or regular drought. These might merge into 'coping strategies' (say, distress sales of key assets) following two or more successive poor harvests, which finally tips over into a failure to cope and recourse to 'survival strategies' (eg. whole household distress migration) when the food crisis becomes life-threatening.

This is the point at which adaptive responses and coping strategies are exhausted, households and communities break down, and destitution or even mortality may occur in the absence of intervention. (Distress migration represents a failure of coping strategies, hence the distinction drawn here between 'coping' and 'survival' strategies.) Nonetheless, considering the limited resources and high vulnerability of most drought-prone communities, the range of behaviours encapsulated in Table 4.2 is wide and provides, typically, a remarkable degree of resilience.

⁷⁸. Watts (1983:141) schematises resource flows into and out of rural households, in a two-part diagram of "drought-famine dynamics" in 19th century Hausaland. 'Accumulation' behaviour (inflows) by households in 'normal conditions' becomes 'asset depletion' (outflows) during food shortage years.

2. The Literature on Household 'Coping Strategies'

In 1911, H. Webster, a British Provincial Commissioner in Frafra District, northeastern Ghana (adjacent to Bawku District) wrote the following:

"No-one who has been stationed in FRA-FRA at the end of the dry season can fail to be struck with the food difficulty. ... At the end of every dry season there is a FOOD-SHORTAGE. At present the people are living largely on a kind of soup they make out of a species of grass or herb and the leaf of the BAOBAB TREE. There is said to have been a famine in FRA-FRA fifteen or sixteen years ago, when children were sold for a calabash of corn or a goat" (ADM 56/1/128, 1911).

This quote illustrates two important perceptions:

1. the regularity of seasonal hunger in semi-arid tropical Africa
(the fact that it is a 'normal' annual occurrence);
2. the distinction between 'hungry season' and 'famine' responses
(the fact that people resort to less preferred or extreme behaviour as a food shortage intensifies).

Webster identified just two unusual behaviours - a heavy reliance on wild foods during the hungry season, and "selling children" for food during a famine. Webster may have confused children being "sold" with the betrothing of daughters from poor to richer households, or with local fostering practices, as a means of 'redistributing dependents'

to protect the consumption of all household members.⁷⁹ These and other 'demographic strategies' have persisted to the present (see Chapter 5.7).

Apart from dietary and demographic adjustments, the Frafra must certainly have adopted many other responses not recorded by Webster. People facing food shortages typically adopt an extraordinarily broad range of behavioural responses. Cekan (1990) lists over 80 "traditional coping strategies" among agriculturalists and pastoralists in sub-Saharan Africa alone, as collated from recent anthropological and economic studies. But simply listing these responses has limited analytical or policy application.

2.1. A Summary of Approaches

Attempts to conceptualise or model coping strategies can be divided into four levels of generalisation: enumeration; categorisation; sequencing; and discrete stages.

2.1.1. Responses Enumerated

Many contemporary case studies of 'coping strategies' in sub-Saharan Africa and South Asia merely describe strategies observed, and/or list aggregate numbers of households in the community adopting each particular response (see Beck (1988) on West Bengal; Cekan (1992) on central Mali; Downing *et al.* (1989) on Kenya). Caldwell, Reddy and Caldwell (1986:687) enumerate the "Chief Disaster-Avoidance Strategies in 1983 Drought" in nine Karnataka villages, South India, using this format - 35% of households surveyed rationed consumption, 13% borrowed to buy food, 6% sold animals, and so on. Although Caldwell *et al.* also provide a detailed discussion of the nature and effect of these various responses, this type of reporting leaves many questions unanswered.

⁷⁹. In the 1790s, when Mungo Park travelled through West Africa, he noted "the common practice of pawning a child to a richer neighbour in exchange for grain. The child eats with and works for his new family but will return home when his parents are able to redeem him by repaying the original sum" (Toulmin 1986:65).

Which animals were sold, and how many were left? Whose consumption was rationed, and by how much? With what nutritional and economic consequences? And so on.

2.1.2. Responses Categorised

Many empirical studies of responses to food deficit produce self-evidently incomplete enumerations, omitted responses usually reflecting the researcher's disciplinary bias. Economists, for instance, tend to overemphasise market-based responses (food purchases and asset sales) to the comparative neglect of non-market transfers, demographic and nutritional adjustments.⁸⁰ An improved understanding of household 'coping strategies' demands recognition of all categories of behaviour. One implicit distinction in much of the literature is that between market and non-market strategies. Self-provisioning agriculturalists derive most of their consumption needs from domestic food production. A failure to achieve self-sufficiency impels their involvement in various markets (grain purchases, asset sales, borrowing, labour migration). Food is also sought through non-market transfers (support from kin, begging), as well as from sources not yet commoditised (wild foods).

In a West African context, McCorkle (1987:275) aggregates "distress signals" from rural Burkina Faso during the 1983/4 drought into "five broad categories", each involving relative changes (increases or reductions) over normal or good years. Thus "grain marketing patterns" incorporates reduced grain sales and increased grain purchases by farmers; while "dietary practices" include reduced grain consumption, partly offset by increased consumption of wild foods and of seed grain.⁸¹ McCorkle's approach has the useful feature of treating most responses to food deficit as quantitative intensifications of normal economic and social activities, rather than isolating this

⁸⁰. 'Nutritional adjustments' include 'biological adaptations' such as building up stores of body fat (Longhurst 1986; Payne 1989), as well as post-harvest dietary changes.

⁸¹. McCorkle's other 'distress signals' are: non-market exchanges (reduced exchange of grain for milk or beer); changes in labour utilisation (reduced participation in labour parties and hiring of labour); and socio-political behaviours (reduced gifts, tithes and chiefly tributes in grain; increased thefts of grain). This final category is infrequently mentioned in the literature.

behaviour as qualitatively distinct. Other studies implicitly embody such a division - the diversion of earned income to grain purchases being viewed as a conventional 'hungry season' strategy, while the gathering of wild foods is labelled a 'famine response'. But this is misleading and fails to recognise each community's unique circumstances. In some contexts, wild foods are an integral ingredient of the daily diet, while in other cases they are gathered only by the poor, and/or only in times of food stress.

Zinyama, Campbell and Matiza (1987:30) present a 4 x 4 matrix, derived from southern African fieldwork, which identifies four categories of behaviour - "prevent occurrence", "modify conditions", "share consequences" and "bear consequences" of food deficit. Specific behaviour under each category is further disaggregated into economic, social, environmental, and political strategies. This is an interesting attempt to combine strategy categorisation with sequencing (see section 2.1.3 below). However, Zinyama *et al.* omit nutritional strategies altogether (a significant oversight which is common to many studies). Also, their environmental strategies (fallowing, diversifying crops, applying manure) are mainly pre-deficit insurance mechanisms, while their single 'political' strategy (access to relief) is not strategic behaviour at all in their context, but an exogenous intervention which is beyond the household's control.⁸²

At a broad level of aggregation, all responses to food deficit can be grouped into three categories: buying food (for which money must be raised); receiving food through non-market transfers; and altering consumption patterns (rationing, changing diet, or changing numbers to be fed). The first two of these three are strategies to protect food consumption levels, while the third implies reducing or at least modifying food intakes. Table 4.3 taxonomises these distinctions. Each specific response listed in the right-hand column is one example of a broader strategy (eg. the response "sell non-food crops" is

⁸². In Table 4.3, receiving food aid is included as a coping strategy, because the villagers in Pusiga repeatedly requested assistance from the local District Administration. This distinction - between actively seeking food or cash from any source (including NGOs or the state) and being passive recipients of aid - is subtle but important.

a mechanism for buying grain),⁸³ which in turn falls into one of two even broader categories - in this case, protecting rather than modifying consumption, following a poor harvest. Responses listed here are not mutually exclusive - as will be argued, several responses can be (and usually are) pursued simultaneously.

Most examples of 'specific responses' listed here could be further sub-divided: 'selling assets', for example, divides into (1) animals (which in turn sub-divides into smallstock, cattle and poultry), and (2) non-animal assets (farming implements, consumer durables (bicycles, radios), household goods). Off-farm income includes local employment opportunities, salaries and pensions, trading profits and remittances from migration. Reducing spending implies spending less on clothes and other consumer goods, but also incorporates postponing funerals, weddings and other ceremonies, deferring housing maintenance, and failing to invest in agriculture until circumstances improve (buying grain instead of fertiliser). All these generic strategies and specific responses were adopted by households in the Pusiga sample during 1988/9 (see Chapter 5).

2.1.3. Responses Sequenced

The third stage in conceptualising 'coping strategies' is to suggest that responses tend to be adopted in a particular order by households experiencing the same food crisis or, more ambitiously, in food crises everywhere (though most case studies are careful not to claim that an observed sequence is universal or typical). In a classic paper on drought responses in Rajasthan, Jodha (1975) lists percentages of households adopting various strategies (selling assets, borrowing, migrating), for 7 successive months during 1963-4. These strategies are grouped into 5 categories: "restructuring of current farm activities", "minimisation of current commitments", "disposal of inventories", "sale or mortgage of assets", and "outmigration" (see also Jodha 1977, 1981). These categories are deliberately ordered to suggest a sequence, as Jodha (1975:1613) explains:

⁸³. In a similar context, Campbell (1991:14) suggests that clusters of responses can be aggregated into a smaller number of strategies.

Table 4.3. Categorising Responses to Food Deficit

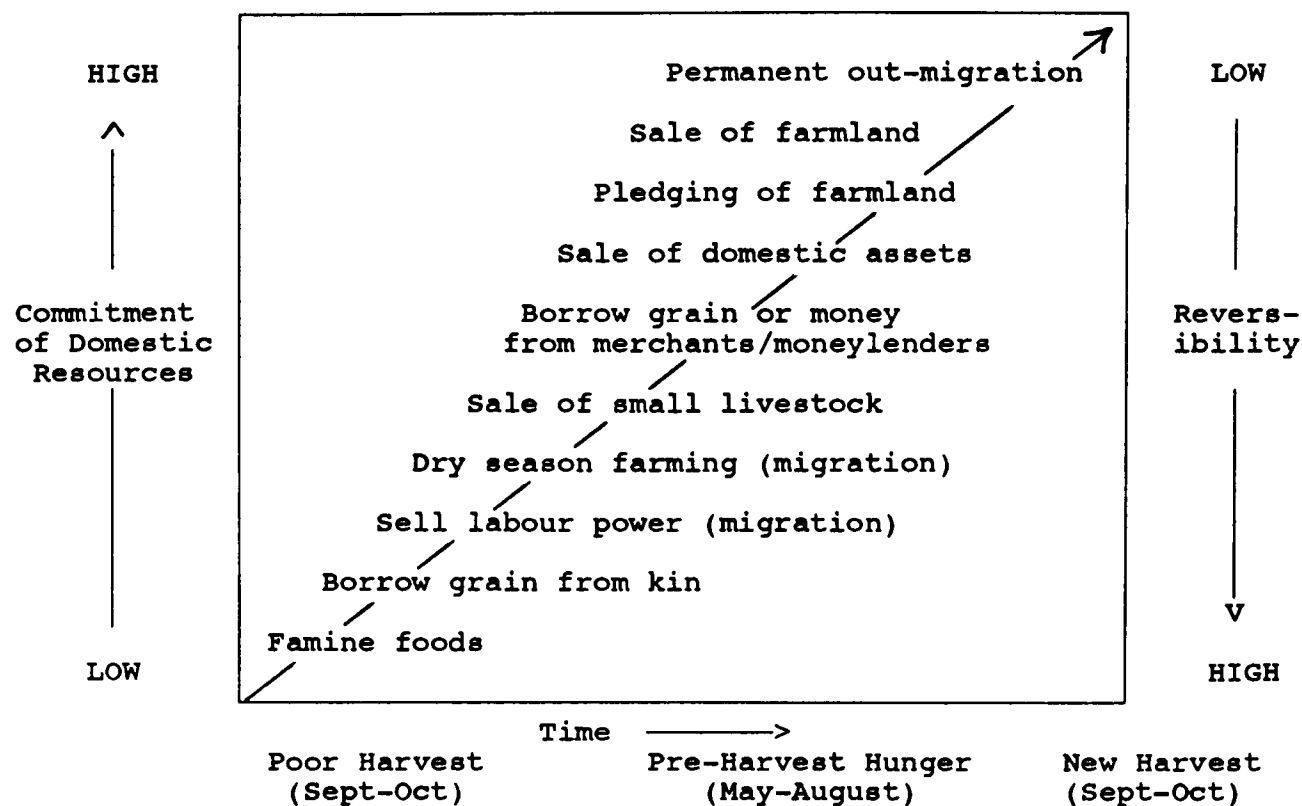
Trigger Event (production)	Behavioural Category (consumption)	Strategy (generic)	Response (specific)
GRAIN PRODUCTION DEFICIT	PROTECT CONSUMPTION	PURCHASE GRAIN (market exchanges)	- sell non-food crops - use off-farm income - sell assets (eg. animals) - borrow cash - postpone debt repayment - reduce non-food spending
		RECEIVE GRAIN (non-market transfers)	- remittances - charity (eg. zakat) - begging - food aid
	MODIFY CONSUMPTION	REDUCE CONSUMPTION (ration)	- smaller portions - fewer meals per day - fewer snack foods
		DIVERSIFY CONSUMPTION (change diet)	- less preferred varieties - wild foods - less nutritious diet (no meat or fish)
		REDUCE CONSUMERS (change HH size)	- wife returns to father - betroth daughter - male temporary migration

"curtailment in current consumption (and other commitments) is resorted to in the early phase of the scarcity period. Sales of inventories are also resorted to simultaneously. Once devices like curtailment in current commitments and disposal of inventories become almost exhausted, farmers resort to mortgaging and, in a few cases, sale of assets. The final phase of the adjustment process consists of outmigration".

In an important footnote, Jodha adds that asset disposal follows a sub-sequence of its own, from unproductive assets (ornaments, utensils) through to productive assets (land), with mortgaging preferred to selling. While there has been much disagreement in subsequent studies as to which response 'typically' precedes or follows another, the sequence in which responses are adopted is widely agreed to reflect increasing distress. As Watts (1983:434) states, "households do not respond arbitrarily to food crises... rather they do so serially, with respect to the intensity" of the crisis. "Minimisation of current commitments" in Jodha's terminology therefore precedes "sale or mortgage of assets" because, although neither option is preferred behaviour, the latter is even less desirable than the former.

Jodha's point about the degree of "commitment" involved in various coping strategies is developed by Watts (1979, 1983). In a study of 74 drought-affected households in Hausaland, Nigeria, Watts (1979:547) places the 10 most commonly observed responses on a continuum over time, a continuum which also corresponds to both increasing "commitment of domestic resources" and increasing "irreversibility" (see Figure 4.1). "Responses to food shortage" start with those which require the smallest commitment of resources and are most easily reversed - gathering famine foods, borrowing from relatives - and ends with the least reversible option - permanent out-migration. This ordering is dictated by the household's desire to retain key productive assets until their disposal becomes essential for physical survival.

Figure 4.1. Temporal Sequence and Organization of Responses to Food Shortage



Source: Watts (1979:547)

Watts assumes a continuum in response behaviour; he does not attempt to group responses into discrete categories such that households 'jump' from one category to the next. However, his application of the notion of 'reversibility' as a continuous variable is questionable. It is unclear in what sense 'dry season farming' is more irreversible than 'selling labour power', for example, and 'sale of domestic assets' covers a range of assets, some of which might be sold before moneylenders are approached for loans. Part of the ambiguity reflects the fact that three sub-sequences - relating to asset sales, borrowing and migration - are embedded within Watts' single posited sequence. Sales of assets to raise cash begin with small stock, followed later by "domestic assets", and finally farmland. Borrowing begins with relatives and shifts to more costly sources - merchants and moneylenders. Migration is first temporary, then permanent. While each sequence in itself seems internally consistent, the interplay between the three is more complex than Watts' diagram implies (as discussed in section 2.3 below).

Other problems with this 'temporal sequence' include its oversight of rationing; and the vagueness of the two sequencing criteria. Nor are the concepts of 'reversibility' and 'commitment of domestic resources' comprehensive. Additional factors, such as an asset's liquidity and expected return (section 3.3 below), and the cost and availability of credit (section 3.4), enter into decision-making and modify the response sequence.

2.1.4. Discrete Stages

The final step in conceptualising food deficit responses synthesises the previous two. Responses are allocated to two, three or four categories or groups, with each category being regarded as discretely distinct from the others, such that the household exhausts each in turn before moving onto the next. Here responses are grouped not according to type or function, but according to their impact and implications for household viability and survival. The purpose is to avoid a mechanistic and misleadingly precise ranking of responses, in favour of an assertion that certain clusters of responses sharing common strategic intents and effects will be adopted before other designated clusters.

Underlying the 'discrete stages' approach is a notion of qualitative differences between sets of responses. Cassels *et al.* (1987) separate "common strategies for managing regular food deficits" in rural Nepal from "extraordinary strategies in response to acute crisis". The basis for this bifurcation is the authors' judgement that strategies in the former category are "normal" while behaviour in the latter category is "forced". An alternative interpretation is that it separates economic behaviours which have multiple functions from those deployed only when food needs are paramount. "Common strategies" (sale of agricultural and cottage industry products, off-farm labouring, borrowing) are employed not only in response to food deficit, but for a variety of other purposes and in years of production self-sufficiency as well. Conversely, "extraordinary

strategies" (sale of draft oxen, mortgage of land, migration) are specific to subsistence crises, of which poor harvests is the most widespread cause.⁸⁴

Table 4.4 summarises the categorisations proposed by different studies. De Waal and el Amin's (1986) model reflects their observation of the 1984/5 famine in Darfur, West Sudan. Dessalegn (1988) interviewed rural households on "peasant survival strategies" during the 1984 famine in Wollo, Ethiopia, while Cutler (1984) bases his hypotheses on secondary data sources from the same region at the same time. Elsewhere, Cutler (1986) derived a "model of pre-famine behaviour" from a survey of 31 famine-affected households in Red Sea Province, Sudan.⁸⁵ Devres (1987), Zinyama *et al.* (1987) and Corbett (1988) each synthesises information from several case studies.

Most models identify three discrete stages, which correspond broadly to some of the terms suggested in Table 4.2 (stage 1 = adaptive responses; stage 2 = coping strategies; stage 3 = survival strategies). In all models, individuals or households are assumed to move from one set of options to the next only with great reluctance. In his study of the 1984 Wollo famine, Dessalegn (1988:22) argues that "peasant survival strategies" have four components - to anticipate, prepare for, withstand, and withdraw from, a crisis. This translates into "four sequential stages of activities": (1) austerity and reduced consumption; (2) temporary migration; (3) divestment; (4) crisis migration. A comparable terminology is developed by Cekan (1990), who identifies "four escalating phases": continuation or intensification; substitution; extension; abdication. Although Cassels *et al.* (1987) classify strategies into just two categories, the only real difference between their model and others is that "permanent outmigration" is usually treated as a distinct third category. Similarly, the first two of Dessalegn's four stages tend to be compressed into a single first stage in other models.

⁸⁴. Other "events likely to precipitate crisis" (Cassels *et al.* 1987:25) - weddings and funerals, illness or death of family members, the division of parental land and assets - are household-specific rather than community-wide.

⁸⁵. Recent advances in the definition of famine (eg. Rangasami 1985) would question Cutler's description of these responses as "pre-famine behaviour".

Table 4.4. 'Discrete Stages' of Adoption of Responses to Food Deficit

Stage	India (Rajasthan) 1963-4	India (Karnataka) 1983	Ethiopia (northern) 1984	Ethiopia (Wollo) 1984	Sudan (Darfur) 1984/5	Composite Models			
						(Devres)	(Zinyama)	(Corbett)	(Devereux)
0	restructuring current farm activities						prevent occurrence of deficit	stage 1: insurance mechanisms	insurance mechanisms
1	minimisation of current commitments	reducing consumption		austerity and reduced consumption	first stage of destitution	conserving resources stage (early)	modify conditions of deficit		adaptive responses
	disposal of inventories	selling possessions	selling animals						
		employment	wage labouring	temporary migration for work					
2			borrowing		second stage of destitution	disinvesting resources stage (middle)	share consequences of deficit	stage 2: disposal of productive assets	coping strategies
	sale or mortgage of assets	exchange trans-actions	selling valuables	divestment and asset disposal					
3	outmigration		distress migration	crisis migration	third stage of destitution	destitution stage (late)	bear consequences of deficit	stage 3: destitution	survival strategies

Sources: India (Rajasthan) - Jodha (1975)
India (Karnataka) - Caldwell, Reddy and Caldwell (1986)
Ethiopia (northern) - Cutler (1984)
Ethiopia (Wollo) - Dessalegn Rahmato (1988)
Sudan (Darfur) - De Waal and el Amin (1986)

According to Corbett (1988:1107), insurance mechanisms (Stage 0 in Tables 4.2 and 4.4) consist of various "forms of self or interhousehold insurance" which "have been developed to cope with predictable and non-severe risks". These mechanisms anticipate shortages by, *inter alia*, "the acquisition of surplus livestock, the building up of grain stocks, the development of systems of reciprocal obligations between relatives and neighbors and the safeguarding of reserves of wild foods".

Responses typically listed under Stage 1 ("adaptive responses" in Table 4.4) include minor dietary adjustments (mild rationing, wild foods) and standard ways of raising money for food - sale of poultry and smallstock (sheep and goats), sale of personal possessions (jewellery), wage labouring (both local and migratory), intensified petty income-earning activities, and borrowing cash or grain from relatives. Dessalegn (1988) and de Waal and el Amin (1986) differ in one significant respect from Watts and Cutler (though not from Jodha). They recognise reduced food consumption as a strategic response to food shortage, not simply as a predictable manifestation of shortage. (This issue is discussed at length in sections 2.2 and 3.5 below.)

Dessalegn also adds demographic and social strategies not mentioned by the others, including changing household composition (elderly people move in with younger relatives), postponing or reducing spending on marriages. Dessalegn (1988:4) argues that "rural money-lending dries up in times of serious food shortages, as the risks of lending are very high", so that he does not see borrowing as an option to the extent suggested by other models. Instead he identifies a range of other types of reciprocal exchanges, sharing of food stocks, pawning and inter-household barter arrangements.

Stage 2 responses emerge when insurance mechanisms (reserves of grain, smallstock and community goodwill) are exhausted, and households begin reluctantly to dispose of key productive assets - farming equipment, draft oxen, land - in response to the imperative to buy food. "This stage of asset disposal will jeopardize the future economic welfare of the household, even if it helps to ensure its current survival" (Corbett 1988:1107). De Waal and el Amin, like Corbett, add high-interest borrowing

(of cash or food) from moneylenders and merchants at this stage, which corresponds broadly to the narrow definition of 'coping strategies' proposed in Table 4.2.

The crucial distinction between Stage 1 and Stage 2 responses is that the former are organised around the preservation of key productive assets, while the latter involve (reluctant) disposal of these assets. Corbett concludes that all responses can be categorised into those which cut into a household's productive base and those which do not, and that households exhaust the second category before resorting to the first. De Waal (1989:141) refers to strategies which impinge on the household's "normative subsistence level".⁸⁶ According to de Waal, the primary objective of households during famine is to avoid destitution (to preserve not just lives, but livelihoods), and this consideration dictates the sequence in which strategies are adopted.

By Stage 3, entitlements to food are virtually depleted, and the household's "ability to generate either current or future income is severely diminished" (Corbett 1988:1107). At this point, in terms of Table 4.2, households are no longer 'coping'; strategic considerations about the management of resources and preservation of productive assets now take second place behind the priority of survival. The dominant behavioural response at this stage is 'distress' or 'crisis' migration (as distinct from 'seasonal' or 'temporary' migration by a subset of household members (Dessalegn's "stage 2"), a response which typically precedes whole household 'crisis' migration). Devres adds three new "coping mechanisms" at this stage - consumption of taboo foods, default on loans from merchants, and total breakdown in shared activity and division of labour. De Waal and el Amin add starvation and dependence on charity, but dependence is hardly a strategic response. Nor are mass mortality and the dislocation of communities referred to by Dessalegn.

To summarise, 'discrete stages' embody the 'sequencing' notion of increasingly costly and irreversible responses being adopted as threats to subsistence intensify. The

⁸⁶. This phrase implies a "subsistence ideology" among small farmers, which has been criticised (Sharif 1986). The phrase "productive base" seems more appropriate, since responses can then be classified according to whether or not they reduce the household's future productive capacity.

'hungry season' is a transitory threat to food consumption, inducing mild rationing and the disposal of assets held as liquid savings. A drought or crop blight requires a larger commitment of resources and is therefore a threat to economic viability. Strategies will focus on the delicate balance between acquiring food while protecting the individual's or household's key productive assets. Finally, during a major, life-threatening food crisis, the objective of physical survival dominates the selection of strategies, and any attempt to preserve productive assets is abandoned as households are rendered destitute, families break up, and people migrate in search of relief.

2.2. Rational Rationing and Nutritional Reductionism

One deficiency of much of the economic literature on famine is its assumption that hunger is simply an inevitable consequence of food shortage. This is responsible for a widespread failure to recognise consumption rationing as a strategic response, even though rationing (defined here as the voluntary adoption of a nutritionally inferior or quantitatively restricted diet) is motivated by economic considerations. The problem facing individuals and households is invariably seen simply as one of gaining access to 'adequate' food at all times. This nutritional reductionism pervades Amartya Sen's seminal contribution, Poverty and Famines (1981), where the focus throughout on "entitlement to food" implies that people strive to maintain a constant level of nutrient intake, at any cost. Sen (1981:50) dismisses any failure by individuals or households to realise fully their entitlements during a food deficit as being due to "ignorance, fixed food habits, or apathy". Jodha's important alternative explanation is relegated to a footnote: "Also, people sometimes choose to starve rather than sell their productive assets (see Jodha, 1975)".

The assumption that a binding constraint (lack of entitlements, or of food supplies) forces people towards hunger and starvation is questionable even during famine, but a similar bias is evident in many contributions to the seasonality and 'household food security' literatures - as in this introductory statement by Reardon, Matlon and Delgado (1988:1065): "The purpose of this paper is to examine the strategies used by rural

households to ensure consumption security in the face of drought-induced production shortfalls." Having thus prejudged household objectives as consumption driven, these authors cannot but conclude that any hunger they recorded in their Burkinabe sample reflected the failure or inadequacy of entitlement-generating strategies.

Jodha (1975:1614) was perhaps the first observer to note that the relationship between nutritional and economic objectives among drought victims was more complex than relief interventions and most theorists recognised.

"the fact that current consumption is the first thing to be curtailed during the scarcity period indicates that protection of a given consumption level is not the final goal of the adjustment mechanisms during the scarcity period. protection of future streams of income is the main goal."

This behaviour might also be interpreted as a preference for future over present consumption. Jodha's finding was verified by several writers during the 1980s. Svedberg (1985) challenged Sen's assertion that rationing of food consumption to preserve productive assets reflects 'ignorance' or 'irrationality'. De Waal (1989:7) provided empirical support for Jodha's more complex view of behaviour under food stress, in his study of the 1984/5 Darfur famine.

"Satisfying the pangs of hunger is not a major concern for famine-stricken families. Even during the worst of the famine, households spent only a fraction of their potential income on food. Their priority was instead to preserve their way of life, to avoid destitution."

In other words, people suffering hunger chose not to realise fully their entitlements to food, but rather protected their longer term viability. Similarly, as will be demonstrated in Chapter 5, the 89 households in the Pusiga sample which imposed rationing during 1989 liquidated only 27.9%, on average, of their entitlements to food (defined as value of assets owned plus earned income). Severe rationing and hunger were reported in 31 'severely food insecure' households (nutritional evidence is presented in Chapter 6);

they liquidated an average 65.5% of entitlements. It is simplistic therefore to assume that production deficit households will achieve consumption security whenever the total value of their assets and incomes earned before the next harvest exceeds the cost of food needed to close the 'food gap'. People facing threats to their subsistence retain multiple objectives, among which acquiring food is only one - perhaps not even the dominant one.

Table 4.3 above drew a basic bifurcation between strategies that protect and strategies that modify consumption. A food deficit household can choose between selling assets for food or going hungry - but these options are motivated by diametrically opposed objectives. Selling assets to buy grain is an economic adjustment aimed at protecting consumption; rationing is a nutritional adjustment which protects assets. Table 4.5, which lists selected economic, nutritional and demographic responses, illustrates the broader point that each type of adjustment is associated with different objectives and has different consequences. To mention another example, betrothing a daughter is a demographic restructuring of household consumption units, which has the economic objective of limiting asset sales for food, but is associated with a social cost - disgrace.

Table 4.5. Objectives and Costs of Various Responses to Food Deficit

Example of Response	Nature of Adjustment	Primary Objective	Primary Effect or Consequence
Ration grain; Gather wild foods	nutritional (modify consumption)	economic (protect assets)	nutritional (hunger)
Sell assets; Borrow cash; Mortgage crops	economic (reduce wealth base)	nutritional (protect consumption)	economic (impoverishment)
Betroth daughter; Wife goes to father	demographic (reduce consumers)	economic (protect assets)	social (disgrace)
Postpone funeral; Beg	economic (reduce spending; raise cash)	nutritional (protect consumption)	social (disgrace)

The effect of seeing rationing as a nutritional adjustment made for economic reasons would be to re-evaluate at least some proportion of seasonal and even acute malnutrition as strategic responses to, rather than inevitable consequences of, food scarcity. This proposition was supported in Pusiga by the way responses to food shortage were articulated during 1989. Several farmers explicitly stated that their behaviour recognised this trade-off: "Rationing begins as soon as you have to buy food in the market"; "Because we did not get the food from the land, we say there is hunger - because the food was got through purchasing"; "If you have to buy food in the market there is never enough - there is always hunger."

Among the reasons given for 'choosing hunger' rather than selling off all animals were (1) 'contingency planning' ("If I sell all my animals and next year there is hunger, what will I sell to buy food?"); and (2) the desire to retain animals for other uses - bullocks for ploughing, cows for brideprice payments ("I need the cows for when my sons marry and need cows for dowry"), sheep and goats for funeral ceremonies ("If something happens in the night, where will my family get the goats to perform the funeral?"). Some household heads were determined not to sell any animals at all, while others sold some but retained a 'minimum stock'. Few sold all their animals.

Common to all the above quotations are: (1) a recognition that decisions made in response to food deficits reflect trade-offs between competing sets of objectives (whose relative prioritisation may also change during the episode of shortage); (2) an awareness of a post-hunger future in which animals would be needed for more important purposes than to bridge a transitory food gap. The literature to date has treated rationing simply as a way of making scarce resources last longer, but the reasons for 'choosing hunger' are more complex, and should be analysed in relation to the management of assets (and other entitlements) over time. This intertemporal aspect of strategic decision-making is developed later in this chapter.

2.3. A Critique of Sequencing and Discrete Stages

Models which rank or sequence 'coping strategies' imply that households move down a predictable path, dictated at the outset by crop failure, as though nothing changes along the way. But the sequence in which responses are adopted is conditioned by the wider environment. Also, the costs and returns of pursuing various strategies can change radically during the period of food deficit.

Advocates of sequences and 'discrete stages' group responses to food deficit by type rather than objective. In Watts' sequence, 'famine foods' precedes 'borrow grain from kin' and 'sale of small livestock' because borrowing and selling assets entail higher costs than gathering wild foods. But this linear sequencing is misleading. In Pusiga in 1988/9, some smallstock and even cattle were sold soon after the harvest to buy grain, even though consumption was not maintained at the level enjoyed during a year of production self-sufficiency. Later in the process, austerity in poorer households increased to the point of severe hunger, when major assets were sold to maintain a minimum level of consumption. Reduced consumption and asset disposal are parallel processes, not sequential events.

'Discrete stages' implies discrete responses. The notion of a sequence (or distinct stages) of responses to food deficits suggests that each response (or cluster of responses) is adopted and exhausted before the household moves on to the next. This probably derives from the perception of strategies such as asset sales, borrowing or migration as discrete events. Yet assets can be sold one at a time, borrowing and migration take a diversity of forms, and rationing (a process of intensification) is not 'exhaustible' in the sense that finite stocks of animals can be exhausted. The confusion arises because three different levels of response are involved:

1. discrete, 'once-only' events (eg. 'crisis migration');
2. a series of discrete events (eg. animal sales);
3. continuous processes (eg. rationing).

A continuum reflecting increasing stress exists within most strategies as well as between different strategies, some of which are processes while others are events. This recognition is hinted at in several studies. Three sub-sequences were identified within Watts' ten responses, for instance. In another example, Jiggins (1986:16) presents a Table illustrating women's options in times of "seasonal crisis" and "calamity", with each option lying along a continuum - e.g., "female income-earning" shifts from food processing and trading during a normal season to wage labour during a "seasonal crisis" to food-for-work and then prostitution during a "calamity".

Discussing divestment and asset disposal in Ethiopian famines, Dessalegn (1988:22) observes that sales of animals are selective and graduated. Typically, smallstock (goats, sheep) are sold first, followed by young cattle, then cows, and finally draft bullocks. Bullocks are more productive than sheep, and more costly to replace (see section 3.3.1). However, it is too simplistic to claim, as many commentators do, that sheep and goats are all kept as liquid savings, to be sold for cash when the need arises (cf. Cutler (1984:49): there is "a tendency for goats to be sold off first, as relatively unimportant assets"). Most household heads in Pusiga tried to retain one or two animals as a 'basic stock', to breed or as insurance, preferring to use current income for food purchases.⁸⁷

It would be equally inaccurate to label as 'distress behaviour' all sales of animals for grain. If a household builds up a flock of sheep as a precaution against recurrent droughts, then selling some of those sheep is analogous to a Westerner drawing on savings from the bank when cash is needed. Breeding animals for sale is a regular economic activity in most households. The problem lies in separating 'normal' patterns of asset accumulation and divestment from 'distress' sales during the hungry season or a food crisis, since the latter is simply a 'continuation' of the former. If two farmers each sell 3 sheep, but this leaves one farmer with 8 sheep and the other with none, is the first transaction an 'adaptive response' and the second a 'coping strategy'?

⁸⁷. In 1988/9, off-farm sources of income were available to most households all year round, but a rising proportion of this income was used to buy grain in each successive month (see Chapter 5.5).

The distinction is starker in Pusiga in the case of bullocks, given that a pair of bullocks is essential for ploughing. In 1989, some wealthier households owning more than two bullocks readily sold one of these 'spare' animals for grain, rather than radically deplete their herds of sheep and goats. Several other farmers who owned only two bullocks reluctantly sold one of the pair, but tried to protect their ability to plough by entering into sharing arrangements with neighbours in the same position. In one triangular arrangement, three households were left owning two bullocks and one plough between them. In these cases, the sale of a 'key productive asset' had weakened but not significantly threatened each household's ability to generate future entitlements to food.

As a rule, 'discrete' responses are more amenable to categorisation than 'continuous' responses. For instance, the decision to sell farming land is a discrete action, the consequences of which are more or less irreversible. Selling land or land rights invariably signals deep economic distress. But perhaps the most difficult response to categorise is self-imposed rationing of food consumption. Rationing, being a process, continues alongside other responses (probably intensifying as 'discrete' responses are exhausted in turn), up to and including distress migration. This conclusion may seem self-evident, but the literature has found rationing difficult to incorporate into the behavioural 'sequence', either ignoring it altogether or placing it (equally dramatically) ahead of all other responses in significance (as seen above).

It is clear from this discussion that the 'discrete stages' approach to modelling responses to food deficits is simplistic. To the extent that a linear sequence exists, it operates on several dimensions, not one. In Table 4.6, households are seen as deploying responses to food deficits in complex combinations. They move across the columns within each category of response (though not necessarily in the discrete 'packages' suggested by the four stages, which are invoked here merely as an organising framework). They also move down each column, though less rigidly - perhaps more in parallel than sequence.

Each row in Table 4.6 reflects the recognition that several different continua are embedded in the chronological sequencing of responses. Rationing intensifies over time through mild hunger to severe hunger and starvation - a biological or nutritional

continuum. Asset sales involve incremental stages of wealth depletion, from liquidation of 'surplus' animals and consumer goods through to key productive assets, culminating in total destitution - an economic continuum. In the same category, loans are sought first from family and friends, then from merchants and moneylenders, on increasingly unfavourable terms, until no consumption loans are obtainable from any source.

The final continua in Table 4.6 are labelled 'social' and 'demographic' responses. These behaviours draw on inter-household networks and/or compromise social status (on this, see Chapter 5.7). Demographic strategies suggest a further way of categorising 'coping strategies' - by their geographical scope. In spatial terms, a food crisis not only deepens, it broadens. The search for work and food starts within the local community and radiates out from the village to the district and national level (temporary, then permanent migration). Responses can be distinguished according to those which operate outside the affected community (remittances or food aid), across households within the community (loans and gifts), and within individual households (selective rationing, migration of individuals). A parallel process of 'broadening' is observed in the right-hand column of Table 4.6, which suggests that the impact of particular responses is felt first at the level of individuals, households and the local community. Then the nation becomes involved, as does (if food aid is sought) the international community.

Instead of a single linear and irreversible sequence, therefore, Table 4.6 conceptualises household responses to food deficit as a succession of overlapping and interlocking 'waves'. The agricultural year is punctuated by seasonal opportunities and constraints, so that behaviour is modified by expectations about the timing and volume of the next harvest, and of income streams. Households facing food deficits might move along the path part of the way, then retreat towards relative food security, or continue further if the next harvest is poor or alternative income sources are inadequate. Seasonality, changing expectations and shifting opportunities must be seen as underlying behavioural responses, substantially influencing each household's position on and movement along (in terms of both direction and speed) the path between food security and food crisis.

Table 4.6. Sequencing and Continua Within and Between Responses to Food Deficit

Nature of Response	Stage 1 Deficit (mild)	Stage 2 Deficit (moderate)	Stage 3 Deficit (critical)	'Stage 4' (termination)	Impact of Response
	Stage 1 Deficit (mild) >----->	Stage 2 Deficit (moderate) >----->	Stage 3 Deficit (critical) >----->	'Stage 4' (termination)	
<u>Nutritional</u>	mild rationing: smaller portions	moderate rationing: skipped meals; wild foods to supplement	severe rationing: no meals all day; famine foods	starvation	individual v household v community v national v international
<u>Economic</u>					
Asset sales	liquidation of 'savings': cash; 'surplus' poultry and smallstock	hardship: sheep, goats, pigs, donkeys, consumer goods	impoverishment: key productive assets (plough, bullocks, land)	destitution	
Borrowing	from friends and close kin (no interest)	merchants and distant kin; crop mortgaging	moneylenders (very high interest)	no loans available	
<u>Social</u>	support from relatives and neighbours; Islamic alms	postpone ceremonies (funerals, weddings)	begging	dependence on food aid	
<u>Demographic</u>	seasonal migration for work and food	women return to natal homes	betroth daughter	whole household distress migration	

3. Conceptualising Household Responses to Food Deficit

The preceding section identified and critiqued several categorisations of behavioural responses to food deficit. Response sequencing and 'discrete stages' were seen to be inadequately conceptualised or otherwise open to challenge, while consumption rationing and the simultaneous adoption of multiple strategies are often overlooked. Worse, these approaches are not useful. A fresh approach is needed, one which enables key unanswered questions in this literature to be modelled and tested. How precisely do households decide which of their assets to sell for food? Why do the poor tend to retain assets until their prices have fallen and grain prices have peaked, before selling the assets for food - isn't this behaviour irrational?

Some structure was imposed on the literature by defining terms more precisely (Table 4.2) and taxonomising responses (Table 4.3) and alleged sequencing (Tables 4.4 and 4.6). Nonetheless, it is not possible to take the discussion further within the weak and incomplete frameworks outlined above. This section draws on Sen's entitlement approach to develop a conceptual framework for disaggregating sources of food. Selection criteria for evaluating alternative options are proposed for the case of asset sales, drawing on criteria used in portfolio management theory (such as the asset's liquidity and expected return).

The sources from which smallholder households acquire food can be categorised as follows: food production (self-provisioning), incomes (agricultural and non-agricultural), asset sales, credit, and transfers. These correspond broadly to the four categories of 'entitlement' named by Sen (1981) in Poverty and Famines, except that Sen omits credit.⁸⁸ In the context of household responses to food deficit, the entitlement approach can be criticised for privileging markets and prices, which marginalises non-economic (social, nutritional or demographic) adjustments; and for its inability to consider intra-household dynamics. Despite these limitations, entitlement offers a useful organising framework for examining short-term changes in sources of food.

⁸⁸. An algebraic formulation and disaggregation of 'entitlement to food' is presented in Appendix 4.1.

Separate discussions below will emphasise: (3.1.) the role of pre-harvest production strategies in minimising the risk of production deficits occurring; (3.2.) the importance of non-correlated incomes in redressing production deficits; (3.3.) criteria for sequencing and timing of asset disposal;⁸⁹ (3.4.) the role of credit in intertemporal consumption smoothing. Entitlements is unhelpful in analysing those responses to food deficit that do not involve the acquisition of food ('modifying consumption', in the terminology of Table 4.2). Section 3.5 discusses nutritional strategies (rationing) in an intertemporal context. 'Social' strategies are deferred to Chapter 5.7.

3.1. Production Strategies

Adaptive responses, coping and survival strategies were defined above as *ex post* adjustments to food deficit. In self-provisioning households, these are invoked following a failure of food production to meet domestic consumption requirements. Farming households also adopt *ex ante* strategies, to reduce the risk of production deficits occurring. The extent to which these are successful defines the extent to which 'coping strategies' will need to be invoked at all. The main harvest each year is a turning point between pre-harvest risk-minimising behaviour and (in the event of actual deficits) post-harvest risk management behaviour.⁹⁰

This separation of pre-harvest insurance behaviour from responses activated by the shortage itself is not always made. In Corbett's (1988) three-stage model (discussed above), 'Stage One' includes both "changes in cropping and planting practices" and "sale of small stock". Fleuret's (1986:227) ten categories of behaviour similarly conflate production- and consumption-related strategies.

⁸⁹. The case of asset sales receives extended attention, because it highlights several seminal issues in the literature.

⁹⁰. Farming households also have incentives to invest in assets (as consumption buffers), social ties and creditworthiness, and to diversify incomes. These *ex ante* behaviours are discussed below.

Pre-harvest production strategies lie in the realms of risk analysis and farming systems research, and are not of primary concern here.⁹¹ Nonetheless, given that production decisions and consumption outcomes are inextricably interrelated, a brief discussion of this dimension of farmer behaviour is pertinent before the focus on post-harvest adjustments is renewed.

Small farmers are risk-averse insofar as they prefer lower but more certain returns to higher but less certain returns (Binswanger 1980; Roe and Graham-Tomasi 1986). In West Africa and elsewhere, the riskiness of rainfed agriculture motivates the adoption of yield-stabilising practices by farmers, even when these imply lower aggregate incomes. But this risk-return trade-off is not universal: some technological and agronomic innovations simultaneously reduce yield variance and raise average yields.

Walker and Jodha (1986), and Moris (1989) identify several agronomic practices with risk-minimising objectives, sub-divided into spatial and crop diversification strategies. Spatial diversification occurs in three dimensions - vertical (upland and lowland plots), horizontal (spatial scattering) and temporal (staggered plantings). These practices insure farmers against yield instability to the extent that production risks are imperfectly correlated within and between micro-environments or over (intra-seasonal) time. Crop diversification to reduce risk occurs not only in terms of crop selection (early-maturing, high-yielding, or drought-resistant varieties), but also with respect to cropping practices (intercropping, crop rotation). Intercropping or multiple cropping spreads risk by offsetting a low yield of one crop with a better yield of another. Empirical evidence suggests that crop diversification is generally a more effective stabiliser of net crop income than is spatial diversification (Walker and Jodha 1986:25).

The following agronomic adjustments to minimise output variability and/or raise expected farm income were observed in Pusiga in 1988/9:

⁹¹. On the theoretical aspects of agricultural risk, see Roumasset, Boussard and Singh (1979); Newbery and Stiglitz (1981); also Singh, Squire and Strauss (1986). For an application of farming systems research in northern Nigeria, see Norman, Simmons and Hays (1982).

- crop rotation (to maintain soil fertility);
- intercropping and multiple cropping;
- favouring earlier-maturing, drought-resistant and higher-yielding varieties of millet and sorghum, planting maize instead of millet and sorghum;
- applying chemical fertilisers to improve yields;
- registering for 'Global 2000';
- farming scattered plots over a wide radius (because of different soil types and the localised nature of rain failure and armyworm attack);
- growing cash crops alongside cereal crops, as an income source should grain purchases be needed.

Of 12 major crops cultivated in Pusiga in 1988 - 5 cereals, 4 pulses, 1 tuber and 2 inedible cash crops - the mean number planted by the 201 Terago and Tesnatinga households was 7.8. The main advantage of this diversity is in spreading risk (because of different rainfall requirements, soil types, vulnerability to pests, etc.). However, all rainfed crops are susceptible to rain failure, and most crop yields are closely correlated with rainfall volume and distribution. Evidence for the strong association between grain and 'cash crop' output in northeastern Ghana is provided by a simple regression of maize prices against groundnut prices in Bawku District markets. Over a 5-year period (May 1984 to May 1989) retail price movements of these two crops were significantly positively correlated ($R^2 = 0.62$, $t = 9.8$; see also Chapter 2.3.4).

The production strategies described here reduce but do not eliminate agricultural risk. Diversification has the general advantage of providing alternatives in times of stress, but agronomic diversity is less effective in generating entitlements to food than is diversification into non-agricultural sources of income which are not correlated to local climatic variability.

3.2. Income Diversification Strategies

Diversification of income sources has been recognised as crucial to household viability and accumulation prospects in a variety of African contexts.⁹² In the West African semi-arid tropics, characterised by an annual 'hungry season' and regular droughts, diversification spreads risk and reduces total income variance. Yet policymakers and researchers conventionally assume that West African agriculturalists derive their food security almost entirely from self-provisioning. This is an assumption which Reardon, Matlon and Delgado (1992:1) correctly challenge.

Income diversification is the norm rather than the exception in Upper East Ghana. Off-farm incomes supplied 36% of cash toward food purchases by the Pusiga sample in 1988/9, while crop sales provided 19%. (The remaining 45% came from asset sales, credit and transfers - see Chapter 5.5.) Two important distinctions between these income categories are that most sources of off-farm income are less variable and more predictable than agricultural income, and that off-farm incomes are typically not closely correlated to food production. Income diversification out of agriculture spreads risk more effectively than crop or spatial diversification within agriculture. However, this assertion must be qualified by the recognition that covariance between agricultural and non-agricultural incomes is greater the more the latter depends on the former. If a household's off-farm income derives from the agricultural income of neighbouring households, then it is vulnerable to 'derived destitution' (Sen 1981) when a localised production shock reduces local incomes and demand for non-farm goods and services.

During the 1989 dry season in Pusiga, house-builders, beer brewers, mat-makers, drummers, smock weavers and sewers suffered from lack of demand for their products and services. Some even resorted to alternative occupations such as market gardening, since the demand from southern Ghana for garden produce remained strong. Those occupations whose income was not tied to local economic fortunes (long distance

⁹². See, *inter alia*, Heyer (1991) on Kenya; Dercon (1992) on Tanzania; Christensen (1989) and Reardon, Matlon and Delgado (1992) on Burkina Faso.

trading, seasonal migration), or where a regular salary was guaranteed (teachers and other state employees), were better protected against the localised recession.

To the extent that food production and off-farm incomes are not correlated, it follows that, irrespective of which is higher or lower on average, non-agricultural incomes guarantee some level of consumption even in periods when agricultural incomes and asset holdings are very low. So a consumption smoothing strategy, given the availability of lucrative and reliable alternative sources of income, need not require holding buffer stocks or assets as savings. Where off-farm income exceeds what would be needed to purchase adequate food for the household at all plausible prices of food, the household might not even strive for production self-sufficiency. This appears to be true of some wealthy farmer-traders in the Pusiga sample.⁹³ In general, though, Pusiga is an example of a community where self-sufficiency remains a powerful ethos among farming households. Elsewhere in Africa - for example, in pastoral societies or where rural residents depend heavily on remittances - alternative sources of income normally contribute a sizeable proportion of domestic food consumption.

Consumption secure households in Pusiga typically enjoy access to income sources with high mean returns and/or low positive covariance with agricultural production. Cattle trading, for example, offers high mean income and low (even negative) covariance with crop production;⁹⁴ salaried employment and seasonal migration offer somewhat lower but very reliable returns (zero covariance with local crop production). Weaving and agricultural labour provide low mean incomes which are highly covariant with crop production ('derived destitution'); households engaging in these activities tended to be among the mildly or severely food insecure during 1989.

⁹³. These households are also more likely to experiment with 'improved' crop varieties and farming methods, so they tend to be selected as opinion leaders for projects such as 'Global 2000'. While this preferential access reinforces existing inequalities within the community, it also demonstrates a greater willingness to take chances by those who can afford to do so and a greater relative risk aversion (once denigrated in the literature as 'innate conservatism') by those who can not.

⁹⁴. Negative covariance is possible if distress sales of animal assets following poor harvests increase turnover and profit margins for cattle dealers.

All households and individuals do not enjoy access to the same off-farm opportunities. This is true not only in northern Ghana, but in a more general sense. Entry barriers to lucrative income sources include: labour requirements (competition with agricultural production, particularly binding in smaller households), skill requirements (business acumen, investment in education to achieve literacy and numeracy), capital requirements (working capital needed to start trading or to purchase inputs for craft activities). Ethnic barriers, and a rigid gendered demarcation of male and female enterprises, further restrict individuals' access to certain trades and occupations. The wealthy are preferentially positioned in the labour market, being better able to take advantage of opportunities and to overcome working capital, educational and other barriers.

Another constraint on certain occupations is temporal. Rural labour markets in northeastern Ghana are fragmented in many ways, not least seasonally. Many off-farm activities are confined to the dry season, not only because they compete for male labour during the farming months but because outdoor work such as housebuilding or weaving is impossible during the rains. Conversely, agricultural labouring work is available only during the rains, when it is poorly paid and conflicts with own-farm labour demands. Other occupations, such as cattle dealing or salaried employment, are available all year round - to those who have access to them. Farmers engaging in these second careers need to allocate carefully their agricultural and non-agricultural labour time. Seasonally contingent occupations also tend to offer lower incomes than permanent employment opportunities.

In multi-member households, 'household income' comprises the sum of each working member's stream of earnings. As will be seen (in section 4 below), these incomes are not additive - male and female incomes (and assets) are distinctly held and rarely pooled. However, when agricultural income declines and pressures on household reproduction increase, this rigid separation of incomes tends to erode, and women will divert some of their resources to meeting the household's staple food needs. This can be done: (1) directly and unconditionally, by buying grain or giving money to the husband to buy grain; (2) directly but conditionally, by lending money to the husband

(often at high rates of interest) to buy grain; or (3) indirectly, by providing children with snacks and other supplementary foods (see Chapter 6.5).

Women's incomes tend to be less lucrative but more reliable (lower means but smaller variances) than men's agricultural incomes. The most common economic activities of women in Pusiga - sale of snack foods, retailing of stew ingredients - are less subject to 'derived destitution'. Consumption of these secondary foods tends to rise in years of grain production deficit, to compensate for grain rationing. In good agricultural years, women's incomes are relatively minor components of total household earnings, but in bad years, these smaller but steadier year-round incomes become a crucial factor in the reproduction of poor households where men have few alternatives to agricultural income. One way of conceptualising this is to see women's earnings as 'latent income', which becomes part of 'household income' only as other sources are exhausted, and/or when key productive assets are at risk of being sold for food.

To summarise, cash incomes are a vital component of entitlement to food, even in nominally self-provisioning communities. In terms of responses to production deficit, the significance of cash incomes has as much to do with their reliability (specifically, the extent to which they are not correlated to grain production) as their monetary value.

3.3. Asset Strategies

Like incomes, assets provide insurance against threats of food insecurity. Unlike incomes, assets form part of the 'entitlement set' in advance of such threats. Expected cash crop income may evaporate along with the millet harvest, but a bullock or bicycle will not, even if it loses some of its resale value. In smallholder farming households, assets are accumulated partly as a store of wealth and partly for self-insurance purposes. A number of factors influence decisions about asset accumulation, *ex ante*, and about the sequencing and timing of asset disposal, *ex post*, when divestment (in this context, for food purchases) becomes necessary. These issues are explored below.

3.3.1. Determinants of Asset Accumulation

In rural Ghana, according to a recent study of credit and savings markets by Aryeetey *et al.* (1990:7), "over 80% of [savings] is kept in real assets", mainly because of poorly developed financial intermediation and limited investment opportunities. But assets (again, like incomes) are not undifferentiated. The efficacy of asset accumulation as an insurance strategy against years of low income depends on such characteristics of assets as their expected return, liquidity and riskiness, as well as the investment needed to acquire them. Table 4.7 compares various assets in these terms; a brief discussion of each criterion follows.

In Table 4.7, the unit cost of acquisition of grain stocks and cash is very low, though a fairly sizeable holding of each would be required before they had much value as consumption buffers. For animals, acquisition (or replacement) costs per head vary according to which animals are purchased; being very low for poultry, low for sheep and goats, high for cows and very high for bullocks. Direct costs of education (school fees) are low in Ghana (unlike, say, in Kenya), but opportunity costs (lost labour of schoolgoing children) can be high, and typically rise as the child grows older and more potentially productive at home or on the farm. This effect, like many others, is mediated by household size, being most acute in small, labour-constrained households and insignificant in large households, where the marginal product of additional children may be close to zero.

In terms of expected returns (in terms of cash or food), assets can be viewed broadly as either productive (generating positive returns), or non-productive (generating zero or negative returns). In the former category are investment in agricultural inputs (ploughs, bullocks, land rights) and in human capital (health, education). In the latter category are inanimate stores of wealth (grain stocks, jewellery), and durable goods (bicycles, radios). But this distinction is not rigid. Grain could be stored for speculative, not precautionary, reasons; animals are stores of wealth which also generate positive returns. Ploughs, once acquired, are rarely relinquished, because they generate extremely high returns for several decades and are more difficult to replace than animals. Some

farmers in Pusiga still enjoy enhanced crop production using ploughs distributed to their fathers in the 1950s.

Table 4.7. Characteristics of Assets as Consumption Buffers⁹⁵

Asset	Unit Cost of Acquisition	Expected Return	Liquidity	Risk
Cash	low	negative (inflation)	high	high
Grain stocks	low	negative (storage losses)	high	high
Smallstock	low	medium (offspring)	high	medium
Cattle	high	high (farming+offspring)	medium	medium
Plough	high	high (enhanced yields)	medium	high
Radio	medium	negative (depreciation)	medium	low
Education	low (direct); high (indirect)	medium-high (but deferred)	zero	low

An alternative classification ranks assets by their relative liquidity - defined here as ease of convertibility into food. The illiquid nature of investment in education (and its low immediate return) and the high cost of agricultural technology restricts investment by poor households in these assets. Cash savings and grain stocks (held as food, not for sale) are highly liquid but have negative real returns - arising respectively from Ghana's high rates of inflation and storage losses. Animals are preferred to cash as a liquid

⁹⁵. This Table was suggested by discussions in Binswanger, McIntire and Udry (1989:129) and in Dercon (1992:17).

asset and store of wealth because they generate positive returns in a society where savings deposits are not an option: "Shillings do not breed".⁹⁶ Animals have a dual function: consumption smoothing (because of their liquidity), and accumulation (because they reproduce and generate agricultural income).

Finally, 'risk' is defined here as covariance of expected return (eg. the crop output of a plough) or market value (eg. the retail price of an asset) with crop income. Consumer durables (bicycles, radios) are sometimes sold during difficult years because they retain their value better than animals. (Several seasonal migrants from Pusiga remitted income in 1989 in the form of bicycles which they re-sold for food.) The main drawback to animals as an insurance substitute is the possibility that the exchange entitlement they provide will fall following a poor harvest. This can be experienced either directly (death of animals from drought or hunger) or indirectly (a terms of trade 'scissors movement' between animal and grain prices (Sen 1981) - the more so the less well integrated are asset markets over space and time). Nonetheless, as Binswanger *et al.* (1989:129) assert, crop-livestock covariance is less than the yield covariance of different crops in the same area. It follows that animals are the major store of wealth and insurance substitute for risk-averse households in rural Africa.

However, Binswanger *et al.* fail to distinguish between smallstock and cattle. Poorer households in Pusiga and elsewhere favour goats and sheep over bullocks and cows. Higher transactions costs arise from the bulkiness and indivisibility of cattle relative to small ruminants, reducing cattle's attractiveness as a savings asset.⁹⁷ Investment in several goats and sheep also spreads the risk (of disease or theft) relative to fewer units of cattle. This may explain why, in Pusiga during 1989, no process of accumulation was evident in the form of 'trading up' (several sheep or goats being sold to allow a

⁹⁶. Tanzanian (Sukuma) saying, quoted by Dercon (1992:i).

⁹⁷. On the other hand, the indivisibility of bulky assets also serves to protect savings. One old man in Pusiga bought a donkey after the 1988 harvest for C11,000, which he sold during the hungry season for C8,000 to buy millet. When challenged to explain this C3,000 'loss', he argued that he had, instead, gained C8,000 by acquiring the donkey, since otherwise the C11,000 would have been frittered away on minor expenses.

single cow or bullock to be purchased). Instead, since this was a bad year, some 'trading down' occurred - cattle being sold for grain plus a few smallstock.

To conclude, smallstock are perhaps the only cheap and relatively safe liquid asset offering a positive rate of return in which the rural poor can invest their savings and self-insure against crop failure. Cash constraints and risk aversion in the face of income instability and hunger motivate investment in goats and sheep, rather than in high cost, higher return but less liquid assets (cattle, ploughs, education). Few poor households in Pusiga owned a bullock or plough in 1989, and few of their children attended school. Conversely, investment in precisely these productive assets facilitates accumulation by the rich, and guarantees their food security even in bad agricultural years.

3.3.2. Sequencing of Asset Disposal

It was argued above that empirically observed sequences of 'coping strategies' are not universal, so cannot be generalised, and that sub-sequences exist within and not just between strategies. A case in point is the disposal of physical assets for food. This section examines the motivations underlying decisions to monetise assets, and argues that factors need to be brought into the analysis which have previously been overlooked.

Rural households throughout Africa hold a portfolio of assets, the majority of which can be converted, through exchanges, into food - though some, as seen above, are less liquid, more 'lumpy' (indivisible), and riskier than others. In calculating household entitlements (see Appendix 4.1), the only relevant consideration is each asset's market value in terms of food. But this ignores the stream of financial returns, social and other benefits generated by various assets - their entitlement value being just one component of total value. In Pusiga, certain assets are held for directly productive purposes (ploughs), some are held primarily as savings (goats), some are retained against future claims (cows for brideprice), while others can be thought of as luxuries (radios).

Beyond these is a further category of resources that can be marshalled in times of distress, which will be called 'latent assets' - those sources of food or cash which are not invoked until absolutely needed (eg. brideprice cows owed to the household, which in northern Ghana ought not to be sold for cash, but can be).⁹⁸ A related point is that property rights are not always clearly specified or individualised. The case of land has already been discussed. Land is not alienated, but men (and not women) can 'sell' usufruct rights. Rights over animals are equally complex, with individuals, households, extended families and lineages each having some private or collective claim over cattle and smallstock (see section 4 below). Individuals sometimes appear extremely reluctant to dispose of 'their' animals, for this reason.⁹⁹

This more discerning analysis still overlooks two further facts: that the same asset might serve different purposes at various times or in different households; and that most assets generate a number of benefits simultaneously. A bicycle, for example, can be merely a luxury item or status symbol, but it might equally be an investment which provides opportunities for expanded crop production by enabling the farmer to cultivate a field several miles from the compound, or to retail goods between markets.

The decision to realise (i.e. monetise) asset entitlements to food is a decision about the management of the household's asset portfolio. Even if motivated by a specific need for food, asset sales have wider-ranging ramifications, both immediately and for the future. Portfolio management is motivated by a range of objectives, among these being wealth accumulation and protecting economic viability. Liquidating assets to negotiate short-term difficulties conflicts with these broader and longer-term objectives.

⁹⁸. Related to this is the local practice of 'betrothing' teenage daughters to wealthier households in exchange for an advance payment of brideprice cows (see Chapter 5.7), a strategy which has also been observed in Kenya (Moris 1989:223). While not suggesting that pubescent girls should be considered as part of each household's 'exchange entitlement set', there is a sense in which they represent a source of 'latent entitlements'.

⁹⁹. Asked why he had not sold his two cows for grain, an old Terago farmer who was complaining of hunger during 1989 replied: "The cows belonged to my father, so the family would not understand if I sold them and kept the money for myself."

In terms of modelling household responses to food deficit, the critical relationship is that between an asset's current 'entitlement value', on the one hand, and its impact on 'future entitlement', on the other. This contrasts sharply with the explicitly short-term calculation of the entitlement approach. The argument here is that relative preferences among assets (for disposal purposes) have as much to do with the expected utility losses associated with selling each asset as with its immediate cash value or replacement cost.¹⁰⁰ Owning a plough, for instance, raises average foodgrain production and income from sales of surplus grain and/or cash crops, so selling a plough to generate current entitlements can be expected to reduce future entitlements through its inhibiting impact on both food and cash crop production.

In effect, two distinct values are associated with each asset: (1) the asset's immediate realisable value (its current selling price); (2) the stream of future value the asset generates. The owner's portfolio management problem, given a number of assets (A_t), a set of prices associated with those assets (p_{At}), and a need to purchase grain to the value of $F.p_F$, is how to decide: (1) which assets to sell to raise the needed cash (and how many to sell of each); (2) in what sequence to sell these assets; (3) when to sell each asset. (This third issue is addressed in the following sub-section.) The decision rule must rank assets for disposal according to both the immediate and the future value of each asset, as summarised by the following ranking ratio (R):

$$R = \frac{\sum_{t=0}^T [Y_{At} \cdot (1+g_A)^t / (1+r)^t \cdot (1+\delta_A)^t]}{P_{A0}} \quad [4.1]$$

subject to: $A.p_{A0} \geq F.p_F$

where:

Y_{At} = the income generated by asset A in time period t ;
 p_{At} = the selling price of asset A at time t ;
 g_A = the rate of growth of asset A ($g \geq 0$);
 δ_A = the rate of depreciation of asset A ($\delta \geq 0$);
 r = the discount rate, constant for all assets and time periods ($r > 0$);
also: ψ_A = the real rate of return on asset A ($\psi_A = Y_{At}/p_{At}$; $\psi \geq 0$).

¹⁰⁰.

Neither of Watts' two explanations for coping strategy sequencing - 'irreversibility' and 'degree of commitment of domestic resources' - adequately captures this crucial point.

For sequencing purposes, the criterion is to sell first (or next) the asset which minimises the return lost per unit of cash raised by its sale. Compound rather than simple growth is assumed $((1+g_A)^t)$. In the case of animals, for instance, reproduction increases the basic stock each period.

Table 4.8 solves equation [4.1], taking a 10-year time horizon, for five types of asset. Indicative values are imputed for each variable, and a constant discount rate is applied across all assets and time periods ($r = 0.05$). In the case of the plough, for instance, its mean market price (p_{A0}) in Pusiga in 1989 was C25,000. The incremental agricultural income generated by each plough (compared to non-plough owners) was estimated at C30,000 *p.a.* ($\psi_A=1.2$). The plough does not grow ($g_A=0$), but is expected to remain functional for 20 years ($\delta_A=0.05$). Inserting these values, assuming constant prices and incomes over time and solving the equation for $T = 10$ yields a solution for R of 13.2, which can be interpreted as meaning that C13.2 will be lost in future earnings for each C1 raised by the plough’s immediate sale.

In Table 4.8, assets are ranked from lowest to highest net return per unit cash raised - the radio is most likely, and the plough least likely, to be sold for food. Assume the household’s asset portfolio includes 1 plough, 2 bullocks, 8 goats and 1 radio. If the decision-maker’s problem is to raise a total of C25,000 for food purchases, the optimal strategy is to sell first the radio, then 5 goats, rather than 7 goats or the plough alone.

Table 4.8. Sequencing Asset Sales by Present Value and Selling Price

Asset	P_{A0}	Y_{At}	ψ_A	g_A	δ_A	R (T=10)
Radio	6,000	0	0.00	0.0	0.15	0.00
Goat	4,000	200	0.05	0.3	0.00	1.99
Bicycle	18,000	3,000	0.17	0.0	0.10	2.34
Bullock	50,000	15,000	0.30	0.2	0.00	7.02
Plough	25,000	30,000	1.20	0.0	0.05	13.20

This model is not claimed to be comprehensive. Non-monetary returns on assets are excluded (eg. social status) and other characteristics might enter into the calculation of an asset's value, such as its risk-reducing properties and replacement cost. A radio, for instance, clearly provides positive utility of some kind, despite not generating any income. The above formula could be extended to incorporate this with little difficulty.

3.3.3. Timing of Asset Disposal

Confounding the problem of whether to sell assets for food, and in what order, is the question of timing, given the variability of exchange entitlements because of shifts in relative prices. Dessalegn (1988) notes that the sequence in which assets are divested during food crises is modified by current market conditions, because asset prices change in both absolute and relative terms. A fall in asset prices or wages, a rise in the cost of credit or in food prices: all these reduce the value of entitlements to food, even if the composition of entitlements is unchanged. Were this not the case, entitlements could be specified and estimated over a defined period (say, between harvests), given fixed asset holdings and constant income streams.

In terms of equation [4.1], a fall in the current selling price of an asset, *ceteris paribus*, raises its R-value - that is, the owner's reluctance to sell increases. In Table 4.8, for example, a fall of 25% in average goat prices (from C4,000 to C3,000) would raise its R-value to 2.65. It now becomes optimal to sell the bicycle (unless its price falls too), simply because each goat generates less cash per unit of future revenue forgone. Given that goats and other animals tend to depreciate in grain deficit situations, it follows that they should probably be sold earlier rather than later. De Waal (1989:163) found that animal sales during the Darfur 1984 famine occurred in two peaks - first for 'strategic' reasons (owners anticipated that their animals might die and that prices would fall, so sold them early), and later for 'distress' reasons (money was needed for grain or migration). Wealthy farmers and herders sold off surplus animals early at high prices, while the poor retained their animals until forced to sell, when prices were lowest.

In Pusiga in 1987/8, a total of 103 head of cattle (bullocks and cows) plus donkeys were sold. Households categorised as 'rich' (using a wealth ranking methodology) earned C43,230 per animal sold (n=30), 'middle' households earned C28,276 per head (n=47), and 'poor' households earned C22,810 per head (n=26).¹⁰¹ This discrepancy can be partly explained by timing of sales; part by quality differences (the rich owned more long-horned Zebu cattle, a superior breed), and part by differential involvement in long distance trading, which allowed the rich to send animals directly to cattle markets in Kumasi or Accra, where prices were higher than those achieved by poorer farmers who sold their animals to local middlemen.

In 1988/9, 45 bullocks were bought or sold by sampled households in Pusiga. In December 1988 (post-harvest), the mean price per head sold was C62,720 (n=14); in January-February it was C58,680 (n=9); by March-April it had fallen to C51,040 (n=10): a drop of 22.9% in four months. (11 bullocks were purchased in May-June for the new farming season, @ C70,400.) Nor did consumer durables escape seasonal price variability. Imported (Chinese) bicycles sold in Bawku town at prices 10-15% cheaper in the dry season months of April and May 1989 than in November 1988.

As demonstrated in Chapter 3.2, staple grain prices were rising as asset prices fell. The effect of these adverse shifts (or 'scissors movements') in relative prices is that exchange entitlements to food contract precisely when self-provisioning households become market dependent for food. In making decisions about asset disposal, the market value of each asset relative to others at each point in the seasonal cycle must be taken into account. These prevailing market conditions are independent of the intrinsic characteristics of various assets.

This raises a problematic issue in the literature on seasonality and famine, relating to the strategic management of grain purchases and asset disposal in the face of food deficits. Poor households appear not to maximise entitlements by liquidating their

¹⁰¹. Wealthier households also owned and sold more animals. Total income generated from livestock sales was C76,294 per 'rich' household - who each sold 1.8 head - considerably more than the C37,970 and C28,243 earned by 'middle' and 'poor' households, who sold 1.3 and 1.2 head each.

deficits. Poor households appear not to maximise entitlements by liquidating their assets after harvest, when terms of trade (p_{At} / p_{Ft}) are most favourable, instead selling them months later, when asset prices are lowest and food prices highest. This was the case in Pusiga after the poor harvest of 1988, when sales of smallstock and non-animal assets for grain rose month by month, even though asset prices were falling and grain prices were steadily rising (see Chapter 5.3). Three explanations are considered here: irrationality; uncertainty; and utility maximisation.

The 'irrational peasant' view has a strong tradition in development studies. In northeastern Ghana (in Frafra District, adjacent to Bawku), Fortes and Fortes (1936)

"alleged that native food production, distribution and consumption practices among the Tallensi aggravated their precarious nutritional situation. the problem [was] one of allocation of resources, since in the season immediately following the harvest, the Tallensi spent liberally on beer brewing and only later began rationing" (Messer 1989:155).

Ellsworth and Shapiro (1989:199) dismiss similar explanations of farmers selling grain at low post-harvest prices and buying it back later at higher prices as "outdated notions of peasant irrationality", preferring explanations related to economic and social pressures. Nonetheless, the idea that hunger in peasant households is at least partly due to their misallocating or squandering their limited resources has not disappeared. This preoccupation leads de Garine (1991) to criticise the Massa and Mussey of Cameroon for their "(mis-)management" of seasonal food shortages, as revealed by their apparent

preference for malnutrition over destitution.¹⁰² More convincing alternatives can be suggested for this supposedly irrational behaviour. Uncertainty plays a major part.

Even if the direction of relative price shifts is known in advance, the precise value of exchange entitlements through the coming months cannot be predicted for each asset at each point in time. Besides, food may be acquired from some other (not yet obvious) source - food aid, loans, remittances, gifts. These options are generally preferred to asset sales. These two sources of uncertainty and incomplete information might motivate decisions to defer entitlement related transactions, even if this leads to an *ex post* judgement that decision-makers behaved 'sub-optimally' by selling assets late.

Individuals might also exhibit strong 'asset preference' because asset ownership confers a guaranteed future entitlement to food which is not true of most alternative sources of entitlement (crops not yet harvested, income not yet earned, loans not yet secured). Assets function as savings and insurance substitutes for as long as they are retained, but once sold, another line of defence against next year's potential crisis has gone. This 'security value', which raises the asset's net present value, might well dominate any short-term shift in its entitlement value, even if that shift is predicted.

It is also possible that decisions to sell assets late at low prices are entirely 'rational', even in terms of narrow economic measures of utility maximisation. As argued above, most assets produce streams of value (income, social status, insurance, offspring). These end abruptly when the asset is disposed of. This provides one reason for retaining an asset even as its price is falling. Goats, for example, breed twice each year, so the farmer might choose to sell a goat late, at a lower price, because by then

102.

"Massa and Mussey adhere to a traditional vision which advocates that any normal family head should be self-sufficient in terms of food. Only idiots are willing to spend money, which is a rare commodity, on such trivial items as food stores. There may appear to be reasons to try to increase the food resources but certainly not to alter a consumption style which favours hospitality and even daily wastage on the dogs. The traditional outlook on seasonal food shortage and its (mis-)management allows the Massa and the Mussey to get away with it at the expense of minor malnutrition inconvenience (children's growth) in normal years" (de Garine 1991:87-88). A clearer statement of everything this thesis argues against would be hard to find!

it has produced a kid to replace it. The total value of the asset has increased, not decreased, by deferred sale at a lower price.

As for food purchases, it is possible (though unlikely) that buying early might be as costly as buying at higher prices later. In Chapter 3, grain storage losses in northern Ghana were shown to be relatively low, but they are higher in poor households who lack the labour and cash to build new granaries every 2-3 years, and cannot afford the chemicals that wealthy farmers apply to their grain to deter insects and rodents. Perhaps more significant are what might be called 'social losses' - requests for 'help' from households with grain by relatives and neighbours who have none ("fear of having to share surplus grain" (Ellsworth and Shapiro 1989:199).¹⁰³ Within the household, farmers in Pusiga also complain of 'snacking' by their children of purchased grain. When there is grain in the granary, rationing is harder to enforce.

Even if storage losses alone are relatively low, therefore, storage plus 'social' plus 'snacking' losses together may be high enough to discourage holding of grain stocks. This decision-making problem can be assessed by adapting the notation developed for equation [4.1] above. An asset (*A*) will be sold later rather than earlier if:

$$P_{A0} / P_{F0} - (1+g_A)P_{A1} / P_{F1} < (1+g_A)P_{A1} / P_{F1} + \Phi [P_{A0} / P_{F0}] \quad [4.2]$$

where:

- P_{A0} = selling price of asset *A* at the start of the period;
- P_{A1} = selling price of asset *A* at the end of the period
(where $P_{A0} > P_{A1}$);
- P_{F0} = buying price of foodcrop *F* at the start of the period;
- P_{F1} = buying price of foodcrop *F* at the end of the period
(where $P_{F0} < P_{F1}$);
- g_A = the rate of growth of asset *A* in time period $t1 - t0$ ($g \geq 0$);
- Φ = that proportion of purchased grain lost in storage or to 'social' and snacking 'leakages' ($0 \leq \Phi \leq 1$).

¹⁰³.

Social pressure to share food is weaker in contemporary Pusiga than in the past. A section of Pusiga adjoining Terago is nicknamed 'Soyande', meaning "hide and eat", because during a famine its residents were accused of concealing grain and refusing to share food with their neighbours.

The lefthand side of inequality [4.2] quantifies the entitlement loss (in terms of grain) from selling the asset late rather than early. The righthand side sums the returns from holding the asset for as long as possible, plus the savings in grain losses by buying late.¹⁰⁴ A numerical example, taking a goat as the asset concerned, might clarify this idea. Assume that: $p_{A0} = \text{C}5,000$, $p_{A1} = \text{C}4,000$, $p_{F0} = \text{C}100/\text{kg}$, $p_{F1} = \text{C}200/\text{kg}$, $g_A = 0.2$ (the goat reproduces) and $\Phi = 0.25$. Now the grain value of the goat at harvest time is 50 kg ($5,000/100$), while its value six months later is 24 kg ($1.2 \times 4,000/200$); an entitlement loss of 26 kg. The return from selling the goat late is (again) 24 kg, and the savings in grain losses are 12.5 kg ($0.25 \times 5,000/100$). The total gain of 36.5 kg exceeds the terms of trade loss incurred by 10.5 kg, despite the 52% fall in the goat's exchange entitlement value. Also, there is a kid which will gain in value as it grows.

To summarise, the decision to sell an asset is rarely taken as soon as a production deficit is registered. Instead, the household hopes to survive by other means - rationing, off-farm incomes, borrowing, perhaps food aid. Since assets generate returns which cash does not, incomes will be diverted to food purchasing first, assets later. This sequencing among responses is one reason for assets being sold late, at 'distress prices'. Even if considered in isolation from broader sequencing considerations, the delayed sale of an asset for food might not be economically irrational, given the benefits that accrue from holding assets and the costs of holding stocks of grain.

More generally, this discussion has taken the literature on response sequencing further, by identifying more precisely the criteria that influence decision-making processes in the specific area of asset sales for food purchasing. The vague notions of 'reversibility' and 'preservation of household viability' as behavioural determinants have been replaced with testable characteristics of assets such as their liquidity, risk, and expected returns. The 'exchange entitlement' value of an asset has been given an intertemporal dimension, which was lacking in Sen's original formulation.

¹⁰⁴. For simplicity, asset growth here incorporates income generated; depreciation and discount rates are ignored for this single period (inter-seasonal) case.

As with incomes and food production, asset sales is only one source of entitlement to food. A final major category remains to be considered - credit and transfers.

3.4. Credit and Transfers

"Before the harvest time we always borrow money, so after the harvest we sell to give money to the rich people."

(A Tesnatinga farmer)

The distinction between credit and transfers is significant for a household's future as well as current food security. Transfers (remittances, gifts, food aid) amount to a costless increase in current income and entitlement to food. Borrowing, conversely, must be repaid out of future income or wealth. This amounts to a reallocation of household resources between time periods, at some economic cost (the interest rate) implicitly calculated by decision-makers as lower than the welfare cost (in terms of current hunger, say) of not borrowing.

A recent review of survey evidence from Northern Nigeria, Senegal, and Burkina Faso concluded that inter-household transfers comprised only a fraction of household income and consumption, and provided "an ineffectual 'social safety net'" following harvest shortfalls (Reardon, Matlon and Delgado 1992:4). One village-level study from central Mali found that inter-household transfers (cereal gifts) supplied 15% of food shortage days in production deficit households during 1989 (Adams 1992:229). The present fieldwork, conducted in a more commercialised community than those sampled by Adams, found transfers to be a minor factor by comparison with asset and income strategies, even for very poor households.

More significant than transfers is credit. In terms of responses to food deficit, people will try to secure loans if and when they perceive the cost of borrowing as less than the cost of other strategies - eg. the revenue loss from selling a particular asset. Again, this supports the idea of a sequencing of responses, not only as regards which assets to

liquidate first, but between alternative strategies. Despite amounting to the acquisition of a negative asset, often at high cost,¹⁰⁵ taking a loan enables the household to protect its revenue-earning assets, and thus to generate future income with which to repay the loan. Access to credit, even on unfavourable terms, allows consumption and income to be smoothed across seasons and over good and bad years, reducing the likelihood that assets will be exhausted following poor harvests.

Formal sector credit is not available to smallholder farmers in northeastern Ghana. As in much of rural Africa, credit markets are incomplete and access to bank loans at market-determined interest rates is strictly rationed (Abukyi 1984; Acquah 1985). One factor in northern Ghana's case is the non-availability of (unalienated) land as collateral. Institutional lenders also face high information costs about borrowers, and the threat of correlated risks to agricultural production (Hazell *et al.* 1986:5). Two farmers in Tesnatinga or Terago had once been members of formal credit groups, but in both cases the group had collapsed following mass default in drought years.¹⁰⁶

Instead, most rural credit is informal. Personal knowledge of borrowers by lenders obviates the need for collateral and reduces the probability of moral hazard and adverse selection (Akerlof 1970; Rothschild and Stiglitz 1976). Where credit forms part of a broader relationship between households, the threat of exclusion from further loans reduces the borrower's incentive to default, while the lender can manipulate borrower dependency to secure preferential access to cheap labour, land rights or produce through contractual interlinkages of credit with labour, land or crop mortgaging - all of which are common practices in Pusiga.

¹⁰⁵. The modal rate of interest in Pusiga was "two for one" - two units of cash, grain, or groundnut were owed for every unit borrowed. Since payment was due after harvest (often only 5 or 6 months after the loan was taken) this amounted to well over 100% (simple interest) per annum.

¹⁰⁶. Information on Ghana Commercial Bank credit groups was obtained in an interview with Mr Alex Bempah, Branch Manager, Bawku; 11 April 1989. (See also Owusu and Tetteh (1982), on formal sector credit groups in Ghana.)

Collier and Lal (1986) in Kenya, and Udry (1990) in northern Nigeria, found that the majority of loans were secured from within the borrower's village or kinship group. Data from Pusiga in 1988/9 support this finding - 45% of 109 sampled households acquired at least one new loan during 1989; 60% of 104 new loans were taken for food purchases; 74% of these loans were obtained within Pusiga itself (Chapter 5.3). A large proportion of these came from relatives or patrons within the kinship group.

But many poor farmers complained of difficulties in securing loans, suggesting that their demand for credit was rationed to the extent that covariance existed between borrower and lender incomes (Pollak 1985), or where personal knowledge led to unfavourable assessments by lenders of an applicant's creditworthiness. Much loan capital within Pusiga derives from trading profits, which are not correlated to local farming conditions or seasonal cycles. Merchant capital is important in increasing the volume of credit that circulates locally, but does not ensure access to consumption credit by food insecure households who are adjudged by lenders to have few prospects.

Exclusion from both formal and informal consumption credit removes a vital secondary tier of entitlements from households whose income and asset status is so tenuous that bridging production deficits is already difficult. Conversely, the incorporation of poorer households (through patron-client relationships) into the relative economic security of wealthy households allows community-wide risks to be shared, and partly insures poor households against 'idiosyncratic risks' such as illness (Udry 1991:31).¹⁰⁷

The use of credit for risk-pooling or consumption smoothing purposes is evident in the fact that many loans and other inter-household transfers in Pusiga are 'state-contingent': repayment dates and interest rates are often unspecified, being negotiated only after the annual harvest. If the harvest is good, the borrower is typically asked to repay double the principal to the lender; if the harvest is poor, zero interest will be demanded or the

¹⁰⁷. Writing on credit-production interlinkages in northern Nigeria, Clough (1981:289) describes patron-client relations as "the structural connection between the capitalist and the household-based economy". The endurance of these relationships in northern Ghana similarly functions both to sustain the farming household's ability to reproduce itself and as a mechanism for exploitation.

lender may defer repayment until the next harvest.¹⁰⁸ Occasionally, the debt will be forgiven altogether, without necessarily prejudicing the long term relationship between borrower and lender. This contrasts strikingly with the inflexible repayment terms usually imposed by formal lenders such as banks (von Pischke *et al.* 1983).

Nonetheless, the observation that poor households in Pusiga faced credit constraints which intensified during 1988/9, a year of economic stress, suggests that credit markets play a limited, albeit significant, role in intertemporal consumption smoothing. Asset management and current incomes are more significant in bridging food production deficits. The ability of the poor to smooth consumption by borrowing against expected future incomes is inhibited; rather, they are thrown back heavily onto their own resources, which they usually try to conserve, by rationing consumption. Accordingly, having completed this survey of the means whereby production deficit households protect food intakes, attention now shifts to consumption modifying strategies.

3.5. Nutritional Strategies

Consumer theory argues that welfare costs are associated with income or production instability to the extent that this translates into consumption variability (Deaton and Muellbauer 1980; Newbery and Stiglitz 1981). In high-risk agricultural environments such as northeastern Ghana, where production and incomes are subject to periodic but unpredictable shocks, a primary objective of (*ex ante*) asset accumulation and income diversification strategies is to reduce consumption variability relative to production variability. On the other hand, some current consumption will be sacrificed (*ex post*) if acquiring food undermines the household's resource base and threatens its future consumption: rationing is also a strategy.

¹⁰⁸.

This flexibility is in the lender's as much as the borrower's interest. Defaulters are often asked to redouble their payment. One farmer in Terago, having borrowed 2 bags of groundnuts in 1987 and defaulted twice in succession, owed 16 bags by 1989.

The first question facing every smallholder household after each harvest is: is foodcrop production (or 'direct entitlement') this year (F_t) adequate to ensure self-sufficiency until the next harvest? 'Production self-sufficiency'¹⁰⁹ may be represented by F_t^* (where F_t^* varies across households and over time according to economic circumstances as well as biological imperatives.) If $F_t \geq F_t^*$, then the household is production sufficient and, barring intra-household misallocations of food, all members should be consumption secure. Assets and incomes can be used for purposes other than food purchases, and consumption need not be rationed. Alternatively, if the household's consumption expectations are not met by domestic food production, there is a 'food gap' (equivalent to $F_t^* - F_t$), and decisions must be made about whether, when and how far to draw on alternative entitlements to food, to partly or wholly bridge the deficit.

Against the pressure to reallocate assets, incomes and other entitlements towards meeting immediate consumption needs is the desire of individual members to protect both (1) individual wealth and (2) household viability, by retaining control over productive resources. Preceding discussions have treated asset sales and borrowing as discrete decision problems; in fact, both interact strongly with decisions about food consumption in production deficit years. Assets and incomes can either be conserved (by restraining current consumption and eschewing borrowing), or consumed, which in an uncertain climate raises vulnerability to future food deficits, since the resource base with which to redress production shortfalls has been correspondingly reduced. Since (mild) rationing costs little and is easily reversible, it is entirely 'rational' for rationing to precede asset sales or borrowing. (This 'belt-tightening' might be thought of the imposition of a temporary reduction in the value of F_t^* on household members.)

This can be modelled in terms of intertemporal utility maximisation, the decision rule being to equalise expected marginal utilities of consumption over time, discounting for time preferences (Deaton 1990, 1991; Dercon 1992). In a production deficit year, two possibilities arise. Either the household has access to adequate supplementary sources

¹⁰⁹. 'Production sufficiency' is defined here as a normative expectation of household consumption adequacy, rather than a biologically deterministic notion of daily per capita calorie requirements.

of cash or food in addition to its stock of assets and current income, or it faces liquidity constraints (specifically, it cannot borrow enough to equalise marginal utility of consumption across time periods).

In the first case, the consumption smoothing rule can be followed. Consumption in each period can be set at the discounted present value of current and expected future incomes. But this 'permanent income' model of intertemporal utility maximisation is predicated on full knowledge of prices, incomes and interest rates in each period (Alderman and Sahn 1989:97). The problem facing the food insecure is that few of these figures are known - future income (including food production) is subject to fluctuations which are largely beyond the farmer's control, while off-farm incomes and access to credit, as well as the prices of assets, food and credit, may be closely correlated to these fluctuations.

In the second case, the household is constrained: the marginal utility of present consumption exceeds the expected marginal utility of future consumption, and credit rationing means that all current income and liquid assets are consumed. As stated above, the volume of informal credit circulating in Pusiga's local economy diminishes with each successive difficult year, and the poor exhaust their access to consumption credit rapidly if they are known to be seriously in debt.

Restricted access to credit or transfers forces the household to depend largely on its own resources for its survival over a succession of (unpredictable) good and bad years. Given liquidity constraints and pessimistic expectations, the incentive to accumulate buffer stocks of grain, animals and other convertible assets is high. The household's primary objective must be to minimise the possibility of holding 'sub-subsistence' entitlements in any given period (having inadequate grain stocks, assets and income to achieve minimum consumption levels). The uncertainty of future income, plus aversion to consumption fluctuations, motivate precautionary savings even where this requires austerity and rationing (Dercon 1992). Present consumption will be sacrificed, and assets protected, in anticipation of possible future shortfalls.

This explains the observation, in the present fieldwork and other empirical studies of responses to food deficit, that households protect their wealth base (savings as well as 'productive' assets) and accept rationing, despite having non-zero entitlements to food. More precisely, the bleaker are expectations about future incomes, the smaller is the non-stochastic component of total income, the closer to subsistence is the household's entitlement base, and the higher the future is valued relative to the present, the more severely current consumption will be rationed. As a rule, no asset will be sold until the perceived cost of doing so is exceeded by the perceived cost of rationing.

Even without financial intermediation and with no risk sharing between households, the strategic management of household resources can ensure that consumption fluctuations are dampened relative to fluctuations in income. Nonetheless, liquidity constraints pose more difficulties than a scenario where credit allows consumption to be effectively smoothed across time periods (Deaton 1991). The worst case scenario for poor households facing liquidity constraints is a succession of two or more poor harvests, since their savings will rapidly be exhausted without the intervention of a good year in which stocks of food and animals can be replenished. Put another way, five good years followed by five bad years is more likely to result in household dissolution and/or mortality than ten years of alternating good and bad harvests. This possibility of successive low income years leads to the illuminating conclusion that poor households, far from liquidating their meagre assets to buy food in bad agricultural years, are likely to ration their consumption most stringently in years of severe food deficit. The cost of consuming resources rises as the level of resources owned falls.

A final point about consumption modifying strategies is that they, perhaps more than consumption protecting strategies, impact on individuals as well as on larger units such as the household. While intra-household issues are not a central theoretical focus of this thesis, the fieldwork context was characterised by conflicting objectives and differential impact of food deficit responses - within, not only between, households. These aspects are discussed below. Supporting evidence from the nutrition surveillance component of the fieldwork can be found in Chapter 6.

4. Intra-Household Considerations

Several reasons for the failure of households to bridge production shortfalls by fully realising available entitlements to food have been suggested in this chapter. A final set of factors relates to the unit of analysis itself - the household.

"In most studies of coping strategies the household is taken as the unit of analysis because it is assumed that decisions about production, investment and consumption are taken primarily at the household level."
(Corbett 1988:1101.)

This chapter has followed the convention, for two reasons: (1) the people of Pusiga define their domestic arrangements in precisely this way (a household (*yir*) is defined as a group of people who "farm together and feed themselves" (see Appendix 1)); (2) individual household members have clearly defined roles in the sphere of domestic reproduction (men provide cereal, women provide stew ingredients), such that most responses to food deficit discussed above were attempts by men to acquire food for the household. However, it is important to consider behavioural responses to food deficit at the intra-household level, and especially their impact, for three related reasons.

1. *intra-household conflicts*: the household is not an appropriate unit for analytical purposes if individual members have competing priorities and conflicting views about how a food problem should be faced;
2. *differential vulnerability*: since the household is assumed to act as a cohesive unit, there is a further implicit assumption that the costs of austerity will be shared equally (or at least fairly) among all household members - an empirically unfounded assumption;
3. *household dissolution*: a striking feature of major food crises is the disintegration of households, which signifies a level of stress being imposed on the household which makes its existence as a unit untenable.

4.1. Intra-Household Conflicts

Taking the household as the unit of analysis glosses the complex 'black box' of intra-household behaviour. Individuals may respond in diverse ways; and decisions made under stress may involve conflict and dissent between household members.¹¹⁰ Decision-makers clearly have a range of priorities in responding to food deficits, but these are unlikely to be homogeneous either between or within households. In northern Ghana, old men are particularly concerned with retaining their animals (a man's life being assessed by the living things - children, animals - that survive him); while a young man might want to preserve his bullocks and plough for farming; and a young mother might be most concerned with feeding her children. Each individual has a different ranking of primary and secondary objectives, and is willing to make different sacrifices to achieve these. Which behavioural responses are actually adopted should therefore be seen as the outcome of struggles within the household over the allocation of resources and the prioritisation of economic, nutritional and social objectives - struggles for control between both genders and generations.

Among the LoDagaba of northwestern Ghana, male and female wealth is conceptually and legally distinct, as in Pusiga. "Although a woman will try and keep her wealth apart, in the last resort she will always use it to feed her husband, and more particularly, her children, if the husband has been unable to provide sufficient for them" (Goody 1958:73). While this happened in several Pusiga households in 1989, this should not necessarily be seen as a joint decision agreed between equal partners in the marriage relationship, but as two sets of strategies adopted independently, reflecting each partner's different priorities. Sometimes this was articulated as wives 'helping' their husbands - by effectively pooling their separate incomes - but in other cases it was apparent that the household head had abrogated his responsibilities, leaving his wife with no choice but to feed herself and their children from her own resources (or to leave him, as also occurred).

¹¹⁰. A review of the literature on "conflict management strategies in intimate relationships" is provided by Kirchler (1990), though not in a developing country context.

On the other hand, this is not to suggest that men typically care less for their family's welfare than do women. The often repeated assertion that men squander their money while women go hungry to feed the children (selfish fathers, caring mothers) amounts to an assertion that mothers have a higher marginal propensity to transfer their personal resources or entitlements to their children's immediate consumption needs. Even if this were empirically verified, this chapter has identified alternative explanations. Fathers' objectives may be lexicographic, with child health and nutrition being prioritised until a threat to the household's economic base induces a switch in focus to the household's longer term viability, for which food consumption (by some or all members) may have to be sacrificed in the short term. Even if decision-makers believe they are acting in the broader interests of the household, this may result (during famines for instance) in vulnerable dependants being 'sacrificed' to allow the household to survive.

4.2. Differential Vulnerability

A related problem with the household-level approach to 'coping strategies' is the implication that the people making decisions about resource allocation under stress also bear the full consequences of those decisions. This corresponds to what Sen (1983:16) labels "the glued-together family", a model which he critically dismisses as having little "realism or relevance". Yet this view is implicit in his entitlement approach. As Swift (1989:10) has noted, the entitlement approach "does not help very much in analysing *differential vulnerability between individuals within households*". Intra-household asymmetries between entitlement-related decisions and their impact may result, for example, in consumption being excessively rationed for some household members, by others who enforce this while protecting their own consumption levels.

This "despotic family" archetype (Sen 1983:17) contains two groups of members: a dictatorial patriarch who controls most resources and decides unilaterally on their disposal; women and children with considerably less power who suffer the worst consequences of heightened nutritional risk. Of course, rationing is a special case.

Unlike, say, selling a plough, which has measurable economic costs, rationing is associated with uncertain nutritional outcomes (Ravallion 1987).

In northern Ghana, there is a powerful social insistence that men should feed their families well, particularly those members (children, elderly dependants) who lack direct entitlements to food in their own right. "It is a cultural norm among the Kusasis that children will be fed first and adults will go hungry" (John Abugri, nutritionist, Bawku hospital). This ethos was expressed by several Pusiga farmers in 1989:

"It is a must that the children should eat well - morning, lunch and evening."

"If a man does not feed his parents when they are alive, they will not give him blessings when they die."

"A man has to feed his family. That is why I always grow foodcrops first, and other crops to sell in the market only second. What kind of farmer would I be if I could not even feed my own family?"

Notional rights to subsistence for all household members do not extend to rights over assets owned and income earned by individual members. The contents of the household granary are one of the few assets that belong jointly to 'the household'. Property rights over animals, consumer durables, cooking utensils and other assets are vested, usually, in individual men and women. Where ownership is attributed instead to lineage groups (Kludze 1983), these are clearly delineated by gender - a woman has no claim over assets belonging to her husband's family. Any income earned from private plots or from activities outside agriculture similarly belongs to each individual, not to a 'household pot'. Subsistence crops apart, therefore, assets are not jointly owned and incomes are rarely pooled.

This distinction between household and private assets is institutionalised and regulated by norms regarding family behaviour, economic and otherwise. Within each household,

it is the men's responsibility to provide for staple foodgrain needs. If household production is insufficient, it is men's responsibility to make up the difference, drawing on their own resources - selling cash crops or animals to buy grain, migrating for work. If these sources of entitlements are inadequate, or they refuse to meet these familial obligations, then the women of the house might draw on their resources to buy grain. This is articulated as women 'helping' men, and it is a social disgrace to the man concerned: "A man who cannot feed his family is not a man." He will be regarded by his neighbours as a lazy farmer, an irresponsible person, and a bad husband.

However, whenever individuals have to sacrifice private wealth to meet the food needs of the household as a whole, other factors such as self-interest or a long-term planning horizon intervene, requiring choices to be made in which private assets or household consumption, or both, will inevitably be compromised. The "cultural norm" which insists that a man must feed his family comes under stress as soon as his personal stock of wealth is threatened by this norm. An identical conflict of interests is noted in southern Cameroon by Guyer (1989:149): "There are customarily accepted norms supporting a man's obligation to provide certain kinds of food to the family economy, while at the same time a man's discretionary power over his income is also recognised."

So inequalities of wealth distribution and power within households translate into inequalities in vulnerability to food deficit. Household members may all have 'equal rights' to food, but not all enjoy actual entitlements to food. This distinction between 'claims' and 'ownership' can be a source of profound domestic tension, especially in difficult years.

4.3. Household Dissolution

It is often observed that the stress associated with subsistence crises such as famine results in marital breakdown, the abandoning of aged and infirm dependants, and the splitting up of families. The preceding discussion would suggest that conflicts within households under stress - disagreements over decisions about the allocation of resources

and the disposal of privately owned assets - may provide an explanation for this outcome. As the threat to personal survival intensifies, so individuals tend *in extremis* to retreat from their obligations to others. The breakdown of reciprocity and support commonly noted between households during food crises is mirrored by a breakdown of support within households.

In Pusiga during 1989, there were several cases of women leaving their husbands, usually to return to their fathers, and one case of a man abandoning his family to "go south". Whether these separations were temporary or permanent, and whether they were a direct consequence of subsistence stress within the household, or instead reflected some unrelated personal discord, was not always obvious. Food stress was certainly to blame in at least two instances. It was interesting that women tended to leave men more than the reverse. Clearly, the failure of the 1988 harvest put pressure on men within the household to find alternative sources of grain, and if they could not or would not do so, this was seen as a failure for which they (men) were responsible.

5. Conclusion

This chapter has contributed to an improved theoretical understanding of responses by self-provisioning agriculturalists to chronic food insecurity, seasonality and famine. Previous attempts to model 'coping strategies' were criticised for their errors and omissions. Among these oversights are: (1) unquantifiable responses and objectives (eg. rationing, 'status costs'); (2) continua or sub-sequences within strategies (not just between strategies); (3) costs of investment in responses to food deficit and 'costs of failure'; (4) changing exogenous conditions (seasonal income opportunities, fluctuating asset and food prices).

Behavioural responses to food production deficits illuminate several issues:

- securing access to 'adequate' food is only one concern for people facing food shortages - avoiding destitution is at least as important a priority;

- liquidating assets for immediate consumption needs also entails complex decisions about the intertemporal allocation of scarce resources;
- destitution and starvation are incremental processes, not absolutes - so responses to food deficit are characterised by iterative trade-offs between hunger, impoverishment, loss of social status, and so on;
- the choice of which responses to food deficit to adopt (in particular, how to acquire food and how to finance food purchases) brings out deep conflicts of interest between individuals within households.

Recognising these complex aspects of the decision-making process motivates a more complicated approach to modelling responses to food deficit. In this chapter a dynamic approach has been proposed, in order to capture aspects overlooked by other models. Criteria have been identified for the selection, sequencing and timing of 'economic' and 'nutritional' strategies, with particular emphasis on the intertemporal consequences of current decisions. This modelling is not comprehensive, but it does suggest areas for further research, theoretical development and empirical testing.

These findings and ideas will inform the detailed discussions of data collected during fieldwork, which follow this chapter. Chapter 5 describes the causes of harvest failure in the fieldwork site during 1987 and 1988, and concentrates on consumption protection - market-based responses to production deficits (the volume and financing of grain purchases). Chapter 6 presents nutritional evidence not only for the severity of the 1989 'hungry season', but for the strategic deployment of consumption rationing, notably among the poor.

Appendix 4.1. The Specification of Household Entitlements to Food

The concept of 'entitlement to food' was developed in the late 1970s by Professor Amartya Sen, and articulated most clearly in his 1981 book, Poverty and Famines. Sen (1981:2) identifies four forms of entitlement relations "accepted in a private ownership market economy" - 'production-based', 'own-labour', 'trade-based' and 'inheritance and transfer' entitlement. Adapting these for the rural self-provisioning context, these categories correspond roughly to foodgrain production,¹¹¹ earned income, asset sales,¹¹² and transfers. Ignored by Sen is credit;¹¹³ adding this as a fifth component allows entitlement at a point in time (t) to be described as a function of the following:

$$E_t = f \{ F_t, NF_{jt}, L_{kt}, A_{mt}, B_t, T_t ; p_{Ft}, p_{NFjt}, w_{kt}, p_{Amt}, r_t \} \quad [4.3]$$

where:

- E_t = total entitlement to foodgrains at time t ;
- F_t = the level of foodgrain production plus carry-over food stocks;
- NF_{jt} = the level of agricultural production of j non-staple ('cash') crops;
- L_{kt} = labour time allocated to k sources of off-farm employment (eg. trading) and non-agricultural production (eg. craftwork);
- A_{mt} = numbers of assets (of m kinds) owned;
- B_t = total borrowed (consumption credit) at time t ;
- T_t = total transfers received (costless receipts) at time t ;
- p_{Ft} = buying price of foodgrains;
- p_{NFjt} = selling price of non-food agricultural produce;
- w_{kt} = wage rate, or return to non-agricultural labour time;
- p_{Amt} = selling price of assets;
- r_t = interest rate, or cost of credit.

¹¹¹. Following Sen, it is assumed that there is a single foodgrain crop (F) which is both produced and purchased for home consumption.

¹¹². Earned income here includes crop sales and other revenue-generating uses of 'own-labour'; while 'trade-based entitlement' is restricted to exchange (sale) of non-labour assets for food.

¹¹³. One reason for Sen's omission of credit might be his conceptualisation of entitlement as rights over food. Strictly speaking, credit is not an owned asset which falls within the household's legal control, but including transfers (eg. food aid) while excluding loans seems incomplete.

Entitlements are a positive function of all the above except food prices (p_{F_t}), by which any income, asset, transfer or loan used to purchase food must be deflated, and interest rates ($1-r_t$). Strictly speaking, entitlements should also include the value of any staple grain sold. This requires disaggregating F_t into: $\beta F_t + (1-\beta)F_t p_{F_{st}}$, where βF_t = the proportion of food production that is consumed ($0 \leq \beta \leq 1$); $(1-\beta)F_t$ = the proportion that is sold; and $p_{F_{st}}$ = the selling price of foodgrains (which might be substantially lower than p_{F_t} , the buying price of foodgrains). However, typically, and certainly in bad years like 1988, all foodgrain produced by farmers in Pusiga is consumed by the household, so that no income accrues from foodgrain sales ($\beta = 1$; $(1-\beta)F_t p_{F_{st}} = 0$).

More generally, given the powerful self-provisioning ethos in Pusiga, sales of 'surplus' foodgrain would occur only if production exceeded some (normatively determined) minimum level of consumption requirements: $F_t p_{F_{st}} > 0$ iff $F_t > F_t^*$, where F_t^* = 'household consumption expectations'.

There are at least three circumstances under which sales of non-surplus foodgrains might occur, none of which significantly affects the argument:

1. 'forced commerce' (the sale of staple food to meet unavoidable expenses such as taxes (not applicable in this context, except that two Pusiga farmers sold small amounts of early millet in 1988 to pay for health expenses));
2. substitution between grains (the sale of rice for millet, for instance, which occurred in many Pusiga households in 1989 but can continue to be regarded as constituting a 'direct entitlement');
3. farmers selling grain cheaply after harvest and buying it back at higher prices later in the year (though observed in many other village studies (see, for instance, Ellsworth and Shapiro (1989), in Burkina Faso), this practice is not common in Pusiga, and no such cases were recorded during this fieldwork).

Some of the terms in function [4.3] require elaboration or disaggregation. Agricultural output has already been separated into food (F_t) and non-food (NF_{it}) crop production, the former constituting what Sen calls 'direct entitlement to food' while the latter is a component of income that needs to be exchanged for food ('exchange entitlement'), its value in food terms being determined by both foodcrop (purchasing) and non-food crop (selling) prices.

Secondly, farmers earn 'own-labour' income not only from sales of non-staple crops (agricultural income), but also from a variety of off-farm occupations and employment (non-agricultural income). Total income held at a point in time (Y_t), therefore, is the sum of earnings accrued through crop sales and off-farm employment:

$$Y_t = \sum_{j=1}^J NF_{jt} \cdot P_{NFjt} + \sum_{k=1}^K L_{kt} \cdot w_{kt} \quad [4.4]$$

The j subscripts in equation [4.4] recognise that different crops sell for different prices, while the k subscripts recognise that individuals engage in a number of income-earning activities, each associated with a unique return to labour. Similarly, assets have different selling prices, so a further summation is required to estimate the total value of household assets:

$$\sum_{m=1}^M A_{mt} \cdot P_{Amt} = A_{1t} P_{A1t} + A_{2t} P_{A2t} + \dots + A_{Mt} P_{AMt} \quad [4.5]$$

This is, in effect, how household wealth was estimated for wealth ranking purposes following the first census of 201 Terago and Tesnatinga households in October 1988. At the then prevailing market price for millet of C8,000 per 100kg bag, a hypothetical household owning C51,200 worth of saleable assets could have purchased 6.4 bags, or 640 kgs of staple food - this being its 'trade-based entitlement' to food at that date.

Finally, credit and transfers can each be received in either food or non-food form (cash, animals, non-grain agricultural produce). This distinction is significant because the

latter set of transfers and loans must be deflated by food prices in calculating total entitlements to food, while the former need not be.

$$B_t \cdot (1 - r_t) = B_{ft} \cdot (1 - r_{ft}) + B_{nt} \cdot (1 - r_{nt}) \cdot P_{Bnt} \quad [4.6]$$

$$T_t = T_{ft} + T_{nt} \cdot P_{Tnt} \quad [4.7]$$

where:

- B_{ft} = consumption credit received in the form of grain;
- B_{nt} = consumption credit received in non-grain form (eg. cash);¹¹⁴
- P_{Bnt} = selling price of non-grain non-cash credit;
- T_{ft} = transfers received in the form of grain (eg. food aid);
- T_{nt} = transfers received in non-grain form (eg. remitted earnings);
- P_{Tnt} = selling price of non-grain non-cash transfers.

Substituting equations [4.4], [4.5], [4.6] and [4.7] into function [4.3], the components of a household's entitlement to food at any point in time can now be more precisely specified as an additive function of its staple foodgrain production plus carry-over stocks from the previous production period (F_t), plus its income from agriculture and off-farm labour, the value (in food terms) of its portfolio of assets, and any transfers (gifts or remittances) and consumption credit to which it secures access. The food entitlement of an individual household at time t can now be defined as follows:

$$\begin{aligned}
 E_t &= \text{production-based entitlement } (F_t) \\
 &+ \text{own-labour entitlement } \left(\sum_{j=1}^J NF_{i=jt} \cdot P_{NFjt} + \sum_{k=1}^K L_{kt} \cdot w_{kt} \right) / P_{Ft} \\
 &+ \text{trade-based entitlement } \sum_{m=1}^M A_{mt} \cdot P_{Amt} / P_{Ft} \\
 &+ \text{credit entitlement } B_{ft} \cdot (1 - r_{ft}) + B_{nt} \cdot (1 - r_{nt}) / P_{Ft} \\
 &+ \text{transfer entitlement } T_{ft} + T_{nt} / P_{Ft}
 \end{aligned}$$

This can be rearranged into the following equation:

¹¹⁴.

'Consumption' credit because conditional, non-fungible loans (eg. of fertiliser or farm implements that cannot be sold) would not affect the household's access to food in the current period.

$$E_t = F_t + \left\{ \sum_{j=1}^J NF_{jt} \cdot p_{NFjt} + \sum_{k=1}^K L_{kt} \cdot w_{kt} + \sum_{m=1}^M A_{mt} \cdot p_{Amt} + B_{nt} \cdot (1-r_{nt}) \cdot p_{Bnt} + T_{nt} \cdot p_{Tnt} \right\} / p_{Ft} \\ + B_{ft} \cdot (1-r_{ft}) + T_{ft} \quad [4.8]$$

Equation [4.8] amounts to an expanded form of Sen's original specification of the "maximum food entitlement" of occupation group j , which is defined as: $F_j = q_j p_j / p_f$, where j also represents the single commodity produced and sold or consumed by members of that occupation group (Sen 1981:50).

The usefulness of this exercise is not so much in exhaustively cataloguing all possible sources of entitlements, but in allowing each component to be analysed separately (for its value, liquidity, risk and so on), as in section 3 of this chapter. The following chapter quantifies and discusses the contribution of these various sources to household food acquisition in Pusiga during 1988/9.

Chapter 5. Responses to Food Deficit in Pusiga, 1988/9

0. Introduction

This chapter relates the ideas presented in the previous chapter to specific responses to food shortage adopted by households in Pusiga, northeastern Ghana during 1988/9. These data are presented both cross-sectionally, to capture significant inter-household differences in behaviour, and by interview round, to capture seasonal patterns of behaviour. 1988/9 was a year in which most households failed to achieve production self-sufficiency, and a wide diversity of responses to food deficit were recorded. These differed markedly across households. Many options were not taken up by wealthier households, who achieved consumption security (defined as the avoidance of food rationing) through 'conventional' means - sales of crops and some animals, and use of off-farm incomes, to buy grain. Certain strategies were avoided because they incurred higher economic or social costs: some were associated with a loss of social standing, a factor which is overlooked by most other studies.

The cross-sectional analysis of household behaviour within the community is pursued in section 6, which considers accumulation behaviour by wealthy households prospering from the distress of poorer neighbours. The question of sequential adoption of strategies in Pusiga is incorporated into a discussion of seasonal patterns of responses. Other factors modifying the adoption of strategies across different households are the distinction between adoption and availability of strategies, and the implications of changing market conditions for the sequencing of food purchases and asset sales.

1. Direct Entitlement Declines in Pusiga, 1987-1988

Farmers in Pusiga suffered below average harvests in both 1987 and 1988, for reasons previously mentioned which are described in more detail below. As will be seen, the

official (government and donor) response was entirely inadequate, and households were left to cope virtually unaided in both years.

1.1. Causes of Crop Failure in 1987

The poor harvests of 1987 in Pusiga were caused by a localised invasion of armyworms (*spodoptera exempta*), interacting with an unfavourable distribution of rains. In Terago and Tesnatinga, named in Ministry reports as the worst affected sections in the District (and chosen as fieldwork sites partly for this reason), 67% of households harvested no grain at all, 26% had a small harvest, and only 7% reported no decline in yields over 'normal' years. The chronology of events during the farming season was as follows:

1. May-June: The rains started late and developed slowly, leaving newly planted crops vulnerable to armyworms, which feed best on young plants and are washed away by rain.
2. end-June: The armyworm invasion was unexpected and inadequately acted on, due to a shortage of insecticides, their high cost to farmers, and a shortage of trained staff.
3. July: The rains which finally swept the armyworms away continued so heavily that replanting was hindered - some days farmers could not work in their fields at all; rain washed away replanted seeds; and the sunny days between rainfalls were inadequate to promote rapid growth.
4. September: The rains stopped early, so that replanted crops did not have enough time to mature, having been planted late in the season anyway.

The armyworms migrated into Bawku District from neighbouring Togo, arriving first in Pusiga, on 24 June 1987.¹¹⁵ Since there had been no outbreak of armyworms in the District for over a decade, the Ministry of Agriculture had only 10 litres of insecticide in stock - sufficient to spray just 10 acres. Although further supplies of Perfekthion, Roxion and Elocron were purchased from FASCOM (the Farmers Services Company), the number of trained Ministry staff was inadequate. The fact that farmers had to pay for insecticides further limited their coverage and effectiveness.

"....most farmers could not afford to allow spraying of surrounding bushes which in most cases were more heavily infested than the farms themselves and which served as favourable habitats for the worms. It was therefore not surprising that most of the fields on which FASCOM chemical was used were reinfested a few days after spraying."¹¹⁶

A total of 155 litres of insecticide was sprayed throughout the District during July. Of this, 40 litres were applied to 40 acres in Terago and Tesnatinga - a minute percentage of total cereals acreage. The armyworms attacked cereals exclusively, rather than pulses or non-food crops. In Pusiga alone, the Ministry report estimated that 4,500 acres of cereal crops were planted for the 1987 agricultural season, 65% of which (2,925 acres) were destroyed. This is far higher, in both percentage terms and number of acres lost, than any other village in Bawku District.

Towards the end of July 1987, the rains which had stopped for much of the month finally restarted, and soon washed the armyworms away. By this time, farmers had lost most or all of their early millet crop, plus a high proportion of their late millet and sorghum seedlings. This left them without early millet to break the hungry season, and facing the prospect of no main harvest either. They therefore replanted their fields immediately. Those with cash to spend on seeds replanted groundnuts and cowpeas,

¹¹⁵. Army Worm Outbreak, Bawku District: Comprehensive Report, Plant Protection and Regulatory Services, Ministry of Agriculture/URADEP, Bawku, 30 July 1987.

¹¹⁶. Report on Army Worms Outbreak in the Bawku District of the Upper East Region, District Development Officer, Ministry of Agriculture/URADEP, Bawku, 1 August 1987.

since these were resistant to a possible recurrence of armyworms. Fertilisers were applied - by those who could afford the recently raised prices - to stimulate rapid growth and replace nitrogen lost to the armyworms' devouring of greenery. Those who replanted pulses generally had a satisfactory harvest, which they sold for grain. Those (mainly poorer farmers) who replanted cereals suffered a further setback when an early termination of the rains in September compounded the problem of late planting, so that crops withered on their stalks.

While Pusiga's armyworms were regarded as a localised problem, the drought came as a District-wide shock. Before September, weather conditions were favourable, the early millet harvest (Pusiga aside) was good, and the District Development Officer (DDO) noted in his 'Monthly Progress Report' for August that: "With the harvesting of early millet, early maturing maize and groundnuts there is enough supply of food stuff in the district market centres". One month later, the "unexpected drought" led the DDO to conclude: "It is clear that there is a general failure in sorghum and millet crops. It is apparent that food prices this year will be quite high: beyond the reach of most people's pockets." The drought continued into October, with disastrous results. "Generally the yields for both late millet and sorghum fell below 50% of projected yields."¹¹⁷

It was an unfortunate coincidence that the specific problems faced by Pusiga with armyworms early in the season (which were confined to the northeastern corner of Bawku District) should be exacerbated by a more widespread rain failure later in the same season. As the DDO predicted, the rain failure raised food prices to exceptionally high levels (as seen in Chapter 3). For three months running, in November, December and January, the DDO appealed for government intervention.¹¹⁸ These appeals were

¹¹⁷. Monthly Progress Report for the Month of October 1987, Ministry of Agriculture/URADEP, Bawku District. Preceding excerpts are from the Monthly Reports for August and September.

¹¹⁸. Monthly Progress Report for the Month of January 1988, Ministry of Agriculture/URADEP, Bawku District.

not acted on by the District Administration, and the problems facing northeastern Ghana went largely unnoticed by both government and the international community.¹¹⁹

1.2. Causes of Crop Failure in 1988

As in 1987, armyworms again attacked cereals crops in Pusiga, in early July 1988. Terago was worst affected, with an estimated 220 acres being infested, followed by 170 acres in Pusiga-natinga (the town and its environs), and 60 acres in Tesnatinga.¹²⁰ This time, the Ministry was better prepared, but in any event a heavy downpour on 13 July washed most of the insects away.¹²¹

As argued in Chapter 3, 1988 was a paradoxical climatic year in northeastern Ghana, with Bawku District enjoying record rainfall and a severe agricultural drought in the same farming season. A 40% increase in total rainfall (1,372 mm) over the 1930-60 mean (973 mm) fell mostly in the middle months of the rainy season - July and August. Again as in 1987, the farming season seemed to be proceeding well until the rains effectively ended in the last week of September. The sporadic showers which occurred during October amounted to 32 mm (half the 1930-60 average of 65 mm) and were insufficient to promote crop maturation. Yields of late millet, sorghums and maize were low throughout the District.

This time, unlike 1987, groundnuts were equally adversely affected, because the drought baked the earth rock-hard, making groundnuts impossible to harvest except by chopping them out of the soil with hoes. Even then, the seeds were so shrivelled that many farmers left entire fields unharvested. The 1988 groundnuts yield was estimated at a

¹¹⁹. According to one official interviewed in Bawku town, no formal request for assistance was made because the scale of the problem was such that no quantity of food the government could provide would have been sufficient!

¹²⁰. Report on the Food Situation in Bawku East District, 1989, Relief and Disaster Sub-Committee of the District Assembly, Bawku District, May 1989.

¹²¹. Pusiga FSC Monthly Progress Report, Pusiga, Bawku District, July 1988.

third or a quarter of the average in non-drought years. This loss added another dimension to the problems facing food deficit households. In 1987/8 sales of pulses for cereals had been their salvation, especially in Pusiga, where many millet and sorghum fields ravaged by armyworms had been replanted with groundnuts.

The unusual coincidence of two successive bad years exacerbated food insecurity in 1988/9, since there was no intervening recovery period in which reserves depleted during the 1987/8 hungry season could be replenished. This meant that a wide variety of 'coping strategies' (as defined in Table 4.2) had to be adopted by poor households, especially in the second year, after their usual 'adaptive responses' had been exhausted.

On the positive side, cereals prices did not rise as high as was feared at first. Perhaps primed by the experience of the year before, traders responded quickly to signs of food shortage in Bawku District, and trucks ferried bags of millet, sorghum and maize from the Northern Region continually. The abundant supplies of cereals in Pusiga market throughout 1989 led (wealthier) locals to dismiss the food situation as mere 'money hunger' (*ligidi kom*)¹²² rather than a more serious 'food shortage' problem, as in 1946.

"Real hunger occurs when there is no food anywhere, like during the *Poyanglal*, when you couldn't find food anywhere in the Northern Territories, you had to go to Upper Volta. Even if you had money to buy, there was no food in the market. This year is not so serious because there is plenty of food in the market, only the prices are sometimes too high and poor people don't have money to buy it."¹²³

¹²². The word *kom* in Kusaal describes everything from 'hunger' to 'rationing' to 'famine'.

¹²³. A comment by Seidu Mumuni, research assistant, Pusiga, in October 1988. Like many others, Seidu perceived 1946 (and, to a lesser extent, 1983) as a year of hunger caused by general supply failure (of both food production and the market), and 1987-89 as years of hunger caused by household-specific demand failure (poverty causing differential access to market supplies of grain).

1.3. The Government Response: Food Aid Comes to Pusiga

In 1988, in contrast to 1987, an official appeal for assistance was made by Bawku's District Administration, following the armyworms of July 1988 in Pusiga and elsewhere. The government delivered limited quantities of food aid in October 1988. By then, the rains had ended early throughout the District, and the National Mobilisation Committee, which was distributing the aid, redefined "the needy" to include victims of drought as well as victims of armyworms.

A total of 2,000 mini-bags (50 kg sacks) of maize formed the basis of the food aid distribution. Of this, 415 mini-bags (21%) were allocated to Pusiga.¹²⁴ Also included were smaller quantities of groundnuts and cowpeas, Pusiga receiving 50 mini-bags of each. From the Pusiga allocation, a total of 104 mini-bags was delivered to Terago - 90 maize, 7 groundnut, 7 cowpeas - and none to Tesnatinga. Although the food itself was free, recipients paid C250 per mini-bag to cover distribution costs: C150 for lorry fare (Kumasi to Pusiga) and C100 for the sack.

It was decided to distribute one bag per compound, and a list of compounds was drawn up for this purpose. But the large compounds complained that this criterion meant they were being "cheated" by their smaller neighbours. (In fact, large, multi-household compounds tend to be wealthier *per capita* than small, single-household compounds.) So extra bags were given to each household within large compounds, or even to each nuclear unit within complex households.¹²⁵ This change of policy required most small compounds to share a mini-bag between 2 or 3 compounds. Some households were so incensed by this inequity that they declined to collect the 16.7 kg or 25 kg of grain or beans owed to them. Although 25 kg of maize could feed a household of 2 adults plus

¹²⁴. Allocation of Relief Food Aid to Famine Areas, Bawku District, National Mobilisation Committee, Bawku District, 20 September 1988.

¹²⁵. For example, two minibags were allocated to one vertically extended farmer-trader household: one to the household head, Alhaji Mumuni Azure, a prosperous farmer who owns two grinding mills, and one to his senior son, a kolanut trader who owns a motorbike and farms with his father.

2 children for 7-10 days with rationing, this would have made a paltry contribution toward the mean grain purchases by sampled households of 422 kg in 1988/9.

Initially, Tesnatinga was allocated no food aid at all, despite complaining vociferously (and inaccurately) that they had been equally affected by armyworms as Terago. The problem was not resolved when a letter arrived from the District branch of the National Mobilisation Committee, ordering Terago to hand over 10 mini-bags to Tesnatinga. After a flurry of local politics following the arrival of this food, the sub-chief of Tesnatinga decided to return it to Terago, as no formula for allocating such a paltry amount could be found which simultaneously assisted the poor and yet pacified the rich.

Later in the year, during a somewhat muted harvest festival, the Paramount Chief of Bawku District made a further appeal for government assistance, but confined his request to subsidised grain through the GFDC (which would have been delivered anyway), rather than famine relief.

"Due to the inconsistency in the rainfall pattern coupled with the devastating effect of the armyworm on some of our crops this year, the Bawku Traditional Area is again likely to experience severe hunger. I therefore wish to seize this opportunity in appealing to the Honourable PNDC Regional Secretary to use his good offices in letting the Ghana Food Distribution Corporation send sufficient stock of foodstuff to their depot in Bawku to sell at moderate prices to us in the lean season."¹²⁶

No additional food aid was provided during 1988/9.

¹²⁶. Welcome Address by the Bawku-Naba on the Occasion of the Annual Saman-Piig Festival, Asigri Abugrago Azoka II, Paramount Chief of the Bawku Traditional Area, Bawku, 10 December 1988.

2. Classifying Households in Pusiga by Food Security Criteria

Achieving consumption security through grain production self-sufficiency is the objective of all farming households, and of most farmer-traders, in northeastern Ghana. When first interviewed, in September 1988, 72% of 201 households in Tesnatinga and Terago claimed to have bought millet or sorghum very rarely before 1987 (eg. only in critical years such as 1983). But in 1988, a year of rain failure and armyworms, only 4 of 110 randomly sampled households achieved production self-sufficiency. These were among the wealthiest households in Terago and Tesnatinga. They farm the most and best land, using their own bullocks and ploughs, and are surplus grain producers in most years. Their wealth and status enabled them to hire labour, purchase fertilisers and enjoy privileged access to insecticides following the armyworms attack, thereby ensuring that they remained self-sufficient even when their surpluses were reduced or eliminated.¹²⁷

Of the 106 production deficit households, 19 (17.3%) achieved consumption security through deploying various coping strategies, without experiencing rationing or hunger during 1989. But 87 (79.1%) were both production and consumption insecure. (A household was defined as 'production insecure' if grain was obtained from any source other than the household granary during 1989, and as 'consumption insecure' if rationing was reported for either adults or children.)

The following 2 x 2 matrix illustrating these distinctions was developed out of Reardon *et al.*'s (1988:1066) observation that a rural household "can be food production deficient and either consumption secure or insecure, depending on the level of food purchases ... and the receipt of food transfers". The percentages reflect the households in the Pusiga sample classified as belonging to each cell in 1989. The figures indicate that 96.4% of households faced food production deficits, and that less than one-fifth of these made good the shortfall and avoided rationing.

¹²⁷. Two other (non-sampled) households which maintained self-sufficiency in 1988 and 1989 were those of the Ministry of Agriculture's extension workers in each section. Although not the wealthiest men in the area, they too enjoyed preferential access to fertilisers and insecticides.

Figure 5.1. Food Production and Consumption (In)security in Pusiga

		PRODUCTION	
		Secure (Self-Sufficient)	Insecure (Production Deficit)
CONSUMPTION	Secure (Sufficient)	3.6% No food problem	17.3% Compensating adjustments (adequate food from other sources)
	Insecure (Insufficient)	0% Unavoidable expenditures; intra-household misallocations	79.1% Inadequate alternatives (not enough food from other sources)

The three categories identified in Figure 5.1 will provide the basis for disaggregating sampled households and discussing their behaviour for the remainder of this chapter, but with two modifications. First, the two 'consumption secure' categories are often combined into a single group of 23 households (though the self-sufficient are excluded when responses to production deficit are considered). Second, 'production deficit, consumption insecure' households, the largest group, are sub-divided into 'mildly' and 'severely' consumption insecure, according to local consumption norms - households where children ate less than 3 meals per day, and adults less than 2, on average, were deemed to be 'severely consumption insecure'.¹²⁸ The 'mild/severe' bifurcation also corresponds to a subtle distinction made locally in production deficit years between "rationing without hunger" and "rationing with hunger".

¹²⁸. Different authors have defined and measured food insecurity in West Africa in various ways. Polly Hill (1972), for instance, favours "months of self-provisioning" in northern Nigeria, while Reardon, Matlon and Delgado (1988) express "consumption insecurity" in Burkina Faso in terms of caloric intake. Adams (1992), working in Mali, prefers changes in diet - duration of wild food consumption - to delineate household categories by intensifying food insecurity.

There were no cases of production self-sufficient households falling into consumption insecurity.¹²⁹ (Two of the poorest household heads sold some staple grain for health expenses, but this only exacerbated their already precarious food situation.)

It is important at this point to consider how households ascribed to each food security category differ demographically and economically, not least because their endowments (of labour, assets and incomes) substantially influenced the responses available to them during 1988/9. Table 5.1 summarises basic demographic and economic data on the 110 sampled households.

Table 5.1. Household Demographic and Economic Characteristics

Household Characteristics	Severely Insecure (n=31)	Mildly Insecure (n=56)	Food Secure (n=23)
<u>Demographic</u>			
Household size	5.4 [.44]	8.9 [.49]	16.2 [.48]
Adult Equivalents per household	4.0 [.60]	6.5 [.62]	11.6 [.64]
<u>Economic</u>			
Wealth/HH (cedis)	29,339 [1.84]	124,138 [0.99]	558,126 [0.91]
Income/HH (cedis)	17,981 [0.72]	57,109 [1.01]	520,311 [1.93]
Entitlements/HH (wealth+income)	47,320 [1.13]	181,247 [0.80]	1,078,437 [1.22]

[Coefficients of Variation in parentheses]

In Tables 5.1 and 5.2, 'entitlement' is defined as the market value of tradeable assets owned (animals, farm implements, consumer durables) in September 1988, plus the

¹²⁹. This can happen if the household either sells some grain or has some of its produce appropriated. State appropriation of grain was largely responsible for the Ukrainian famine of 1933. In French West Africa, the imposition of taxes by colonial administrations forced poor households into selling grain and undermined their self-sufficiency (Harriss 1981b). On 'forced commerce' see Bhaduri (1986); and Spitz (1980, 1981) on 'the forces of extraction' v. 'the forces of retention'.

value of income earned (from off-farm activities plus sales of crops, animals and other assets) between the November 1988 harvest and July 1989.¹³⁰

The highest coefficients of variation in Table 5.1 are registered for income among food secure households and for asset values (wealth) among the severely insecure. This reflects a wide spread of incomes among the rich (in particular, the enormous incomes earned by a tiny minority), and the comparatively wide spread of asset holdings among the poor, for whom investment in assets (physical wealth) is the most secure defence against food deficits, given their limited access to lucrative income sources.

The positive association between household entitlements and food security status is clear. On the other hand, the association between household entitlements and household size suggests that some of this inequality would be dissipated if entitlements were measured per capita (or adult equivalent) rather than per household. As seen in Table 5.2, which compares food secure and severely insecure households in terms of demographic structure, economic status, and labour market involvement, deflating entitlements by household membership reduces but does not eliminate the association between wealth and household size.¹³¹ Larger households enjoy economies of scale and other advantages which enable them to accumulate more wealth per member than smaller households. Conversely, wealth (either inherited or earned, typically, through trading) provides the financial basis for men to acquire several wives and expand household size. Causation runs both ways.

Consumption secure households have three times as many members as the severely food insecure. High dependency ratios are not associated with food insecurity - on the

¹³⁰. Although asset stocks and income flows cannot be summed, the 'stock-flow' distinction is not rigid. In calculating a household's total entitlement to food over a given period (in this case, between two harvests), potential sources of food include purchases made both with monetised stocks (asset sales) and with cash income. Assets can become income; incomes can become grain stocks. (Note that, if an animal or other asset was sold in this period, it was not double-counted.)

¹³¹. In order to emphasise contrasts between 'consumption secure' and 'severely insecure' households, the 'mildly insecure' are excluded from Table 5.2. Values for this intermediate category generally lie between those for the two other categories.

Table 5.2. Food Secure and Severely Food Insecure Households Compared

Household Characteristics	Severely Food Insecure HHs (n=31)	Food Secure Households (n=23)	Ratio (FS/ SI)
<u>Demography:</u>			
Mean HH Size	5.4	16.2	3.0
Dependency Ratio	0.49	0.40	0.8
Adult Men/HH	1.2	2.2	1.8
Adult Women/HH	1.4	4.2	3.0
Children/HH	2.7	9.8	3.6
Mean Age HH Head	51	50	
<u>Compound Status:</u>			
Single Household	19 (61%)	11 (48%)	
Senior Household	3 (10%)	8 (35%)	
Junior Household	9 (29%)	4 (17%)	
Complex Households:	1 (3%)	8 (35%)	
<u>Entitlement:</u>			
Wealth/HH	29,339	558,126	19.0
Incomes/HH	17,981	520,311	28.9
Entitlement/HH	47,320	1078,437	22.8
Entitlement/HHSIZE	13,168	65,148	4.9
Entitlement/AE	20,336	93,321	4.6
<u>Labour use:</u>			
Family only	20 (65%)	1 (4%)	
Communal only	8 (26%)	4 (17%)	
Hired only	3 (10%)	8 (35%)	
Hired + Communal	0 (0%)	10 (43%)	
<u>Labour sale:</u>			
Went for 'badi'	13 (42%)	0 (0%)	

$$\text{Dependency ratio} = N \{ 60 < \text{AGE} < 16 \} / \text{HHSIZE}$$

Consumption secure households have three times as many members as the severely food insecure. High dependency ratios are not associated with food insecurity - on the contrary, severely consumption insecure households have lower dependency ratios (0.95 adults/child) than self-sufficient and consumption secure households, where children outnumber adults 3 to 2 (0.65 adults/child). More pertinent is the fact that the food secure have more adults as well as more children. For the wealthy, children are the family's future labour supply, rather than a drain on scarce resources. Food secure

households also had higher women/men ratios, a factor which Adams (1992) similarly found to be strongly associated with food security in central Mali.

Wealthier households in Pusiga are more likely to be structurally complex than simple - either vertically extended (multi-generational) or horizontally extended (multiple siblings). The presence of several economically active adults creates economies of scale (in agricultural labour, pooling resources to invest in technology, etc.) and facilitates diversification (individual specialisation in trading and other risk-spreading and income-enhancing activities). Extended households are also better able to insure individual members against specific risks like illness (Bardhan 1989).

Finally, food secure households are less dependent on family labour alone, and are more likely to hire labour for farming activities (78% made use of hired labour in 1988) - mainly from severely insecure households, whose involvement in Pusiga's incipient agricultural labour market is more often as employee (42%) than employer (10%).

3. Enumerating Responses to Food Deficit in Pusiga

Table 5.3 lists the main behavioural responses adopted by the 106 production deficit households in the Pusiga sample during 1988/9 (the 4 self-sufficient households are now excluded). These responses are grouped first according to a distinction drawn in Chapter 4, between responses to production deficit which protect food consumption and those which involve modifying consumption. The former category comprises a variety of mechanisms for grain purchasing (crop sales, off-farm incomes, animal sales, sale of inanimate assets, borrowing), while the latter includes rationing, inferior food sources, and demographic responses. A final hybrid category - 'invoked social disgrace' - collates several responses which are associated with loss of social status (as discussed in section 7 below). These include: women bought grain, household head bought grinding mill flour, deferred debt repayment, postponed a funeral, collected brideprice cows owed or betrothed a daughter for brideprice cows (which were then sold for grain). Table 5.3 also aggregates other sets of figures - eg. 'major income

sources' includes trading profits, salaries and savings. 'Middle' and 'minor' income activities were defined and enumerated in Chapter 2.5.

For this analysis, an activity was recorded as a response to food deficit only if the respondent stated that something was done specifically for the purpose of buying food (eg. in the case of selling assets or borrowing), or as a response to food shortage (eg. rationing or migration). For instance, many more households borrowed groundnuts than are counted here, but if groundnuts were borrowed for planting, rather than to be sold for buying grain, that transaction is not recorded here.

Within each strategy, responses are ordered from most to least frequently adopted. Thus under "sold animals", 45 households sold poultry (chickens and guinea fowls) for grain, 37 sold smallstock (sheep and goats), and 15 sold cattle (cows and bullocks). This supports the proposition in Chapter 4, of a sub-sequence within each response. Table 5.5 will show that this particular sub-sequence holds even when non-owners of each form of livestock are excluded. (Of 31 'severely insecure' households, 4 (12.9%) owned no animals or poultry at all.) The 'popularity' of each option was not reversed by its relative 'availability'.

Table 5.3. Responses to Food Deficit Adopted in Pusiga, 1988/9

Consumption Protecting Responses	% of Sample (n=106)	Severe Insecure (n=31)	Mildly Insecure (n=56)	Consum. Secure (n=19)	Chi- square (χ^2)	Proba- bility ($p <$)
<u>Crop sales:</u>						
Groundnuts	34.0	25.8	32.1	52.6	3.96	0.138
Other non-grain food	34.0	32.3	37.5	26.3	0.85	0.654 *
'Cash crops'	13.2	16.1	10.7	15.8	0.65	0.724 *
Rice (to buy millet)	10.4	9.7	12.5	5.3	0.82	0.663
Sold any crops	58.5	48.4	62.5	63.2	1.85	0.398
<u>Animal sales:</u>						
Poultry	42.5	45.2	46.4	26.3	2.48	0.289
Smallstock	34.9	35.5	41.1	15.8	3.40	0.136 *
Cattle	14.2	3.2	19.6	15.8	4.48	0.107
Any animals/poultry	60.4	61.3	66.1	42.1	3.42	0.181
<u>Off-farm incomes:</u>						
By-day labour	25.5	38.7	26.8	0.0	9.41	0.009
Minor income activities	24.5	41.9	23.2	0.0	11.30	0.004
Middle income activities	25.5	16.1	32.1	21.1	2.93	0.231
Remitted income	21.7	12.9	26.8	21.1	2.27	0.322
Profits from trading	6.6	0.0	3.6	26.3	15.00	0.001 **
Savings	6.6	6.5	0.0	26.3	15.93	0.000 **
Salary	4.7	0.0	5.4	10.5	3.01	0.222
Major income sources	17.0	6.5	8.9	57.9	27.57	0.000
Any off-farm income	75.5	77.4	69.6	89.5	3.10	0.212

Consumption Protecting Responses	% of Sample (n=106)	Severe Insecure (n=31)	Mildly Insecure (n=56)	Consum. Secure (n=19)	Chi- square (χ^2)	Proba- bility ($p <$)
<u>Sale of inanimate assets:</u>						
Sold bicycle or radio	6.6	6.5	8.9	0.0	1.84	0.399 **
Sold plough	0.9	0.0	1.8	0.0	0.90	0.637 **
Any inanimate asset	7.6	6.5	10.7	0.0	2.41	0.300 **
<u>Borrowing:</u>						
Borrowed cash	33.0	41.9	32.1	21.1	2.36	0.307 **
Borrowed foodgrains	2.8	3.2	3.6	0.0	0.68	0.711 **
Borrowed groundnuts	3.8	3.2	5.4	0.0	1.15	0.561 **
Mortgaged groundnuts	1.9	6.5	0.0	0.0	4.93	0.085 **
Mortgaged henna	4.7	6.5	5.4	0.0	1.12	0.549 **
Borrowed or mortgaged	40.6	51.6	41.1	21.1	4.58	0.101 **
Tried to borrow, failed	6.6	6.5	8.9	0.0	1.84	0.399 **
<u>Deferred expenses:</u>						
Postponed debt payment	41.5	64.5	41.1	5.3	17.04	0.000 **
Postponed a funeral	2.8	9.7	0.0	0.0	7.47	0.024 **
<u>Monetised brideprice:</u>						
Collected brideprice cow	2.8	3.2	3.6	0.0	0.68	0.711 **
Betrothed daughter	0.9	0.0	1.8	0.0	0.90	0.637 **
<u>Unusual sources of grain:</u>						
Free food from other HHs	26.4	61.3	16.1	0.0	29.30	0.000
Women bought grain	19.8	19.4	26.8	0.0	6.41	0.041

Consumption Modifying Responses	% of Sample (n=106)	Severe Insecure (n=31)	Mildly Insecure (n=56)	Consum. Secure (n=19)	Chi- square (χ^2)	Proba- bility (p <)
<u>Rationed:</u>						
Adults rationed food	68.9	93.5	78.6	0.0	53.30	0.000
Children rationed food	55.7	80.6	60.7	0.0	32.27	0.000
Some or all HH rationed	68.9	93.5	78.6	0.0	53.30	0.000
<u>Inferior food sources:</u>						
HH head bought flour	28.3	48.4	26.8	0.0	13.73	0.001
Ate seeds for planting	17.0	32.3	14.3	0.0	9.31	0.010
Used inferior foods	35.9	58.1	35.7	0.0	17.27	0.000
<u>Demographic responses:</u>						
Wife or child went away	9.4	12.9	10.7	0.0	2.52	0.283 *
Whole household migrated	0.9	3.2	0.0	0.0	2.44	0.295 **
<u>"Invoked social disgrace":</u>						
	65.1	96.8	67.9	5.3	43.82	0.000

* χ^2 may not be a valid test (expected counts < 5 in 33% of cells)

** χ^2 may not be a valid test (expected counts < 5 in 50% of cells)

4. Cross-Sectional Differences in Household Behaviour

A theoretical weaknesses of the 'coping strategies' literature was identified in Chapter 4 as its failure to differentiate between households in terms of strategy adoption. Many descriptive accounts of hungry seasons or famines imply homogeneous rather than individualised responses within the affected population ("they" sell their assets, then "they" migrate). In fact, exogenous shocks (climatic, agricultural or market) are mediated by each household's unique socioeconomic circumstances. A severe 'hungry season' might be sufficient to destitute a poor household, while a regional famine may provide opportunities for further accumulation by the rich (see section 9 below).

In this section the behaviour of richer and poorer households in Pusiga during 1988/9 is compared. The right-hand columns of Table 5.3 above list results from a chi-square test for differences between the numbers of households adopting each response, by food security category (the association between wealth and food security status having been demonstrated above). Where cell sizes are small (for either adoption or non-adoption), the χ^2 -test is not valid, even if a clear association between household category and response adoption is apparent. This applies particularly to those strategies adopted by only a few households - e.g. postponing funerals (3 households, all 'severely insecure').

By way of contrast, some composite strategies yield non-significant differences between household categories because they incorporate significantly different individual responses within them, working in opposing directions. The best example of this 'cancelling out' effect is off-farm incomes, which were used by 75.5% of households to buy grain. Including all sources of off-farm income together produces no significant difference across household categories ($\chi^2 = 3.1, p < 0.212$), but this conceals a highly significant inverse association ($\chi^2 = 11.3, p < 0.004$) between minor income-generating activities and wealth (these activities being undertaken mainly by the poor), and an even stronger positive association ($\chi^2 = 27.6, p < 0.000$) between major income sources and wealth (these activities being the prerogative of the rich).

Campbell and Trechter (1982), drawing on fieldwork in northern Cameroon, also tested the idea that households within a community affected by a food production decline will be at different stages along the "*soudure* - famine" continuum at the same time. They define food deficits on a three-stage continuum corresponding to increasing severity. (The first stage is the annual *soudure* or hungry season, the second is "distributional" shortage caused by economic constraints in vulnerable households, while the third stage is a 'food shortage' famine.) Campbell and Trechter divided their sample of 60 households into quartiles according to caloric intakes. A χ^2 analysis of women's responses found significant overall differences in adoption between quartiles (at the 0.1 level of significance). The authors argue that these differences in behaviour between "poorly nourished" and "adequately nourished" households suggest that the poorer households were moving from "stage 1" to "stage 2" food deficit.¹³²

A similar conclusion was reached by Watts (1983:440), in his discussion of a coping sequence of increasing commitment and irreversibility (see Figure 4.1). Households in his northern Nigerian sample were allocated to three classes, and only those in the poorest class resorted to desperation measures during the drought of 1973/4 - such as pledging or selling farmland (18% of poor households, n=93), or migrating (5%). A few rich households bought grain (5% of the rich, n=56) and sold livestock (7%); but none sold labour (a response adopted by 94% of poor households), assets (51% of the poor) or farmland; and no rich household borrowed or migrated.

As Zinyama *et al.* (1987:12) conclude, "poorer families enter and move along the sequence of strategies ahead of wealthier ones". This fact - that the poor adopt responses to food deficits which differ qualitatively and not just quantitatively from those adopted by the rich - has important theoretical and policy implications, and is supported by the present fieldwork. The distinction between "rich man's strategies" and

¹³². However, statistically significant differences between quartiles were found for just 2 of 11 specific responses reported: "gathering wild food" (significant only at 0.2) and "no meal for entire day" (0.01). The values in each cell are also rather small (from least to best nourished quartile, 2, 3, 0, 1 and 7, 1, 2, 0 for each strategy respectively). Since expected counts per cell should be at least 5 for the χ^2 test, these results must be treated with caution, despite their intuitive appeal.

"poor man's strategies" in Pusiga becomes clear from Table 5.4, which ranks recorded responses by frequency of adoption (number of households).

Table 5.4. Responses to Food Deficit in Pusiga Aggregated and Ranked

Response	% of Sample (n=106)	Severe Insecure (n=31)	Mildly Insecure (n=56)	Consum. Secure (n=19)
Used any off-farm income	75.5	77.4	69.6	89.5
Some or all HH rationed	68.9	93.5	78.6	0.0
Sold animals or poultry	60.4	61.3	66.1	42.1
Sold any crops	58.5	48.4	62.5	63.2
-----	-----	-----	-----	-----
Postponed debt repayment	41.5	64.5	41.1	5.3
Borrowed or mortgaged	40.6	51.6	41.1	21.1
Consumed inferior foods	35.9	58.1	35.7	0.0
Free food from other HHs	26.4	61.3	16.1	0.0
Women bought grain	19.8	19.4	26.8	0.0
Ate seeds for planting	17.0	32.3	14.3	0.0
Wife or child went away	9.4	12.9	10.7	0.0
Sold consumer durables	7.6	6.5	10.7	0.0
Postponed a funeral	2.8	9.7	0.0	0.0
Sold brideprice cow	2.8	3.2	3.6	0.0
Sold plough	0.9	0.0	1.8	0.0
Betrothed daughter	0.9	0.0	1.8	0.0
-----	-----	-----	-----	-----
Whole household migrated	0.9	3.2	0.0	0.0
Number of strategies:	17	15	15	5

Once behavioural responses are aggregated into categories, it becomes clear that the rich adopted fewer strategies than the poor. Of 17 strategies listed in Table 5.4, severely insecure households employed 15 (yet failed to achieve consumption security), while the food secure deployed just 5 (and achieved consumption security). As will be seen, there was little difference, in absolute terms, in spending on food between household categories. This does not imply that the rich or food secure had fewer options - on the contrary - but rather that:

- their strategies were more effective, or lucrative. A wealthy household might sell a cow to buy millet. A poor farmer, having no cows to sell, might sell

several goats and fowls, go for by-day labour, try to raise small loans, and mortgage his next groundnuts crop to raise the same amount of cash.¹³³

- the rich could avoid the desperate measures employed by the poor. Far fewer rich households rationed consumption, borrowed, mortgaged crops, or deferred debt payments; and none migrated, used inferior foods, or postponed a funeral.

The ranking of responses in Table 5.4 reflects increasing distress. The dotted lines signify (posited) divisions between 'adaptive responses', 'coping strategies' and 'survival strategies', as defined in Table 4.2. The first four responses were each employed by over half the sample - these being the three major sources of raising cash to buy grain (agricultural income, off-farm income, and animal sales), and rationing consumption of grain. Apart from rationing, which is negatively correlated with household wealth, these four 'adaptive responses' were universally popular across household categories.

In terms of response sequencing and categorisation, the complete avoidance of rationing by the food secure suggests that this should be regarded as a 'coping strategy' for wealthier households. They prefer to use incomes and sell animals to buy grain, before imposing rationing. However, this conclusion depends crucially on the household's economic status. Among the mildly and severely insecure, rationing was the most frequently adopted response. For those having fewer resources to spare, therefore, rationing appears to be an 'adaptive response' - a behavioural adjustment which accompanies grain production deficit almost automatically.

Below the first cut-off line in Table 5.4, no one strategy was adopted by more than half the sample: there is a slump in adoption from almost 60% to just over 40%. Most of this is explained by relative avoidance of these 'coping strategies' by mildly insecure and food secure households. Among the severely insecure, adoption of credit-related

¹³³. Table 5.3 revealed that only one (3% of 31) 'severely insecure' household sold cattle for grain in 1988/9, but that 11 (20% of 56) 'mildly insecure' and 3 (16% of 19) of 'consumption secure' households did so.

strategies, receipt of gifts of food, and dietary change were all higher than sales of crops. Among the food secure, the only strategies adopted below the first cut-off line at all are credit-related (borrowed or postponed debt repayment). Below the second cut-off line, the one household which left Pusiga (apparently permanently) during 1989 is recorded as a 'survival strategy', the reason for this migration being that it was unable to secure its reproduction locally.

Underlying observed differences in responses to food deficit are differences across households in terms of response availability. Behavioural responses are neither entirely 'chosen' nor entirely 'forced'. Rather, the adoption of increasingly unpleasant or costly responses reflects a narrowing of options, from initial flexibility (adaptive responses) to eventual inevitability (survival strategies). This degree of flexibility largely reflects the household's economic and social positioning before and during the period of food deficit, so that poorer households enter the 'adaptive responses - survival strategies continuum' much later than the rich, with correspondingly restricted alternatives.

In Pusiga in 1989, few people earned salaries or were involved in major trading, which explains why these were infrequently mentioned by respondents as sources of income for purchasing food (see Table 5.3). Not every household included a pubescent daughter who might be betrothed to another household so that brideprice cows could be collected and sold for grain. Nor did every household plant groundnuts which could be sold or mortgaged for grain. Table 5.5, which isolates these and other disparities for 31 responses, allows consideration of the 'adoption *versus* availability' dynamic. Some figures do not change across the two columns - in theory, every household could have consumed its seeds, bought grinding mill flour (an inferior food), or sent one of its members for by-day labour.

To some extent the ranking of 31 responses in Table 5.5 parallels the sequence of 10 responses in Watts' Hausaland study (Figure 4.1). As with Watts, a number of sub-sequences are incorporated within this single ranking. In terms of nutritional responses, for instance, rationing is near the top of the list (a low commitment which is easily reversible) and eating all seeds reserved for planting (high commitment,

irreversible) is near the bottom, suggesting that it is a less preferred response. This ranking changes little when the relative availability of the responses is considered.

The importance of this 'adoption v. availability' exercise becomes apparent when off-farm income sources are considered, 'before and after'. Far from being an insignificant factor in household food security, as the figures for adoption suggest, these non-agricultural incomes provide the most important form of protection against food shortages. Although only 5 members of the sample (4.6%) earned a salary, all 5 (100%) used this cash income to buy food, so that this response moves up from 26th in the list to 1st. Close behind are remittances (converted into grain by 88.5% of migrants or their relatives), middle- income and minor-income activities, also both used for grain purchasing by over 80% of those households which had access to them.

Table 5.5. Responses to Food Deficit in Pusiga: Adoption v. Availability

Rank	Response	% of sample who did	Response	% who did of those who could
1	Adults rationed food	66.4	Used salary	100.0
2	Children rationed food	52.7	Remitted income	88.5
3	Sold poultry	40.9	Middle income activities	84.4
4	Postponed debt payment	38.2	Minor income activities	81.3
5	Sold smallstock	33.6	Adults rationed food	66.4
6	Borrowed cash	32.7	Postponed debt payment	58.7
7	Sold groundnuts	32.7	Used profits from trading	58.3
8	Sold other non-grain food	32.7	Children rationed food	52.7
9	HH head bought flour	27.3	Sold rice to buy millets	50.0
10	Free food from other HHs	25.5	Sold other non-grain food	48.0
11	By-day labour	24.6	Sold poultry	45.5
12	Middle income activities	22.7	Sold smallstock	44.0
13	Minor income activities	22.7	Sold groundnuts	42.9
14	Remitted income	20.9	Postponed a funeral	42.8
15	Women bought grain	19.1	Sold pure cash crops	41.2
16	Sold cattle	13.6	Used savings	33.3
17	Ate some seeds	12.7	Borrowed cash	32.7
18	Sold pure cash crops	12.7	Sold cattle	30.6
19	Sold rice to buy millets	9.1	HH head bought flour	27.3
20	Sent wife or child away	9.1	Collected brideprice cow	27.3
21	Tried to borrow, failed	6.4	Free food from other HHs	25.5
22	Used profits from trading	6.4	By-day labour	24.6
23	Sold bicycle or radio	6.4	Women bought grain	21.0
24	Used savings	5.5	Mortgaged henna	17.9
25	Mortgaged henna	4.6	Sold bicycle or radio	13.2
26	Used salary	4.6	Ate some seeds	12.7
27	Borrowed groundnuts	3.6	Sent wife or child away	9.8
28	Ate all seeds	3.6	Tried to borrow, failed	6.4
29	Postponed a funeral	2.7	Mortgaged groundnuts	4.2
30	Collected brideprice cow	2.7	Borrowed groundnuts	3.6
31	Mortgaged groundnuts	4.2	Borrowed groundnuts	3.6

To summarise, Tables 5.4 and 5.5 suggest that there are qualitative and quantitative distinctions in responses available to, and adopted by, households with varying endowments. Specifically, it appears that, while the rich generally had more options than the poor, they needed to use fewer in practice. The wider diversity and more lucrative nature of their potential sources of cash and food gave them greater flexibility and efficiency in achieving consumption security, while the poor were forced towards costly and even irreversible actions which nonetheless often failed to guarantee their reproduction.

5. Consumption Protecting Strategies

This section focuses on purchases of staple grain by the Pusiga sample during 1988/9. First it examines spending on grain by household category and season; next it discusses primary sources of income for grain purchases; and finally two 'secondary sources' are considered: credit and migrant remittances.

5.1. Spending on Grain

In absolute terms, spending on grain did not vary greatly across household categories, nor were expenditure patterns monotonic. The mildly insecure spent most, at C40,615 (473 kgs) per household, followed by the food secure, who spent C34,393 each (411 kgs), with the severely insecure spending C31,036 each (353 kgs).¹³⁴ But to deduce from these data that production deficits were evenly distributed across households would be erroneous. Because of the positive correlation between household size and wealth, more or less constant outlays across households meant that the severely

¹³⁴. As in 1987/8, the food secure paid less per unit of grain (83.7 cedis/kg) than the other households (86.6 cedis/kg). Partly this is due to economies achieved by bulk purchasing. The food secure bought 3.6 bags/household, the mildly insecure bought 2.0 bags and the severely insecure 0.5 bags.

insecure spent most, and bought most grain, per adult equivalent¹³⁵ - C7,696/AE (88.2 kg/AE), as against C6,222/AE (72.8 kg/AE) and C3,978/AE (35.4 kg/AE) by the mildly insecure and food secure respectively (see Table 5.6).

At first glance, these figures may seem counter-intuitive. Being larger, the rich would surely have needed to buy more grain than the poor - they certainly had more resources to do so - following the 1988 village-wide crisis of underproduction. The explanation reflects a related correlation: between household food security status and the degree of production self-sufficiency. As seen in section 1 above, wealthier households were better protected against the effects of armyworm attacks, with the result that their production deficits were smaller. They bought proportionately less grain than poorer, severely insecure households, because despite being larger, they came closer to achieving production self-sufficiency.¹³⁶ Similarly, in a village study in northern Nigeria, Matlon (1977:243) found that purchases of staple grains in 1975 (a non-drought year) were highest in the two lowest income deciles, at 198 kg/household, almost double the 104 kg/household purchased by the top two income deciles.

Indicative of the differential impact of food purchases on households is spending on grain as a percentage of incomes and of total entitlements. The food secure spent just 6.6% of income earned during 1988/9 on buying grain; the mildly insecure spent a much higher 71.1%, while the severely insecurely spent more than they earned - 172.6%. This provoked a process of disaccumulation among the severely insecure, who sold assets and borrowed to bridge the deficit between earnings and food purchases. In terms of total entitlements (adding value of assets to incomes, not including credit), the severely insecure liquidated 65.6% of their entitlements during 1988/9, while the mildly insecure liquidated 22.4% and the food secure a barely noticeable 3.2%.

¹³⁵. Adult equivalents per household were derived by counting each household member aged 16-60 as 1 AE and all other household members (those aged under 16 or 60+) as 0.5 AE. The 'average' severely insecure household had 4.0 adult equivalents to feed; the mean for mildly insecure households was 6.5, while the average food secure household contained 11.7 adult equivalents.

¹³⁶. Unfortunately, since domestic food production proved impossible to measure or even estimate (for reasons described in Appendix 1), this conclusion is deduced rather than demonstrated.

It is therefore apparent that a comparable level of spending on grain across households conceals considerable differences in the economic impact of food deficits. The rich bought less grain per capita than the poor because they needed to buy less to achieve consumption security; the poor spent marginally less on grain per household because they could afford to spend no more without destituting themselves: they still failed to achieve consumption security despite spending twice as much per adult equivalent.

Table 5.6 reveals that grain purchases by food secure households rose month by month, even during June and July, as calorie requirements for farming peaked. Conversely, grain purchases by both mildly and severely insecure households fell at this crucial point in the seasonal calendar, probably reflecting economic pressures associated with the new farming season - even the poor bought hoes and hired bullocks for farming, leaving less money for food, despite increased energy expenditures at this time.

5.2. Primary Sources of Income for Grain Purchases

According to Table 5.4, the most popular sources of cash for purchasing grain in Pusiga during 1988/9 - crop sales, animal sales, and off-farm incomes - were also 3 of the 4 most popular strategies adopted overall, the fourth being rationing.¹³⁷ (Invariably, as noted elsewhere, grain purchasing and grain rationing were adopted simultaneously, except by the wealthy.) These and other sources of entitlement are disaggregated in Tables 5.7 and 5.8, from which the following conclusions can be drawn.¹³⁸

¹³⁷. Detailed discussion of consumption modifying dietary adjustments is deferred to Chapter 6.

¹³⁸. In Table 5.8, 'incomes' refers to off-farm incomes only; together with 'crop sale' these constitute total income in 1988/9. 'Asset sale' refers to inanimate assets only (bicycles, radios, plough). 'Transfers' includes gifts and *zakat*; 'other' includes betrothed daughter and sold brideprice cow.

Fig 5.2. Spending on Grain/HH, 1988/9

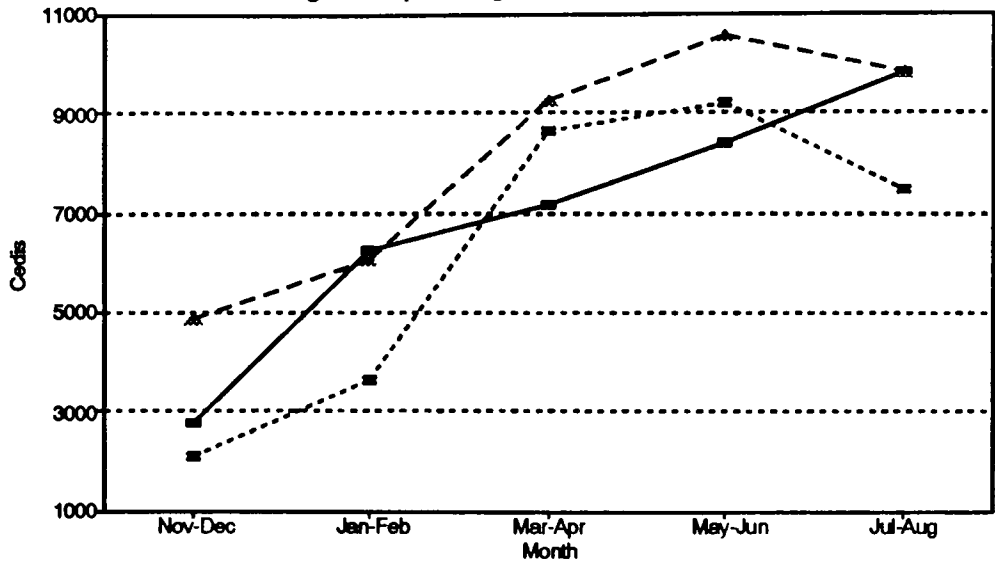


Fig 5.3. Grain Purchases per AE, 1988/9

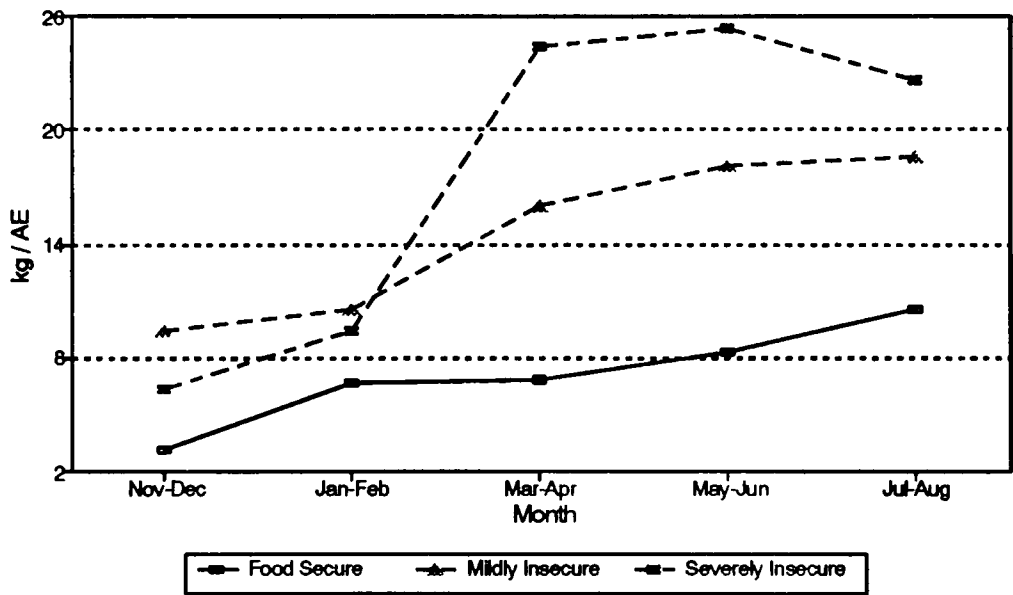


Table 5.6. Spending on Grain by Season and Household Category

	Nov- Dec	Jan- Feb	Mar- Apr	May- Jun	Jul- Aug	Total
<u>Cedis/HH</u> (mean):	3675	5368	8717	9760	9159	36,661
Food Secure	2765	6217	7191	8383	9837	34,393
Mildly Insecure	4855	6062	9290	10541	9867	40,615
Severely Insecure	2079	3617	8635	9217	7488	31,036
<u>Kgs/AE</u> (mean:)	7.3	9.5	17.5	19.1	18.7	72.0
Food Secure	3.1	6.7	6.8	8.3	10.5	35.4
Mildly Insecure	9.4	10.6	16.0	18.1	18.7	72.8
Severely Insecure	6.4	9.4	24.4	25.4	22.5	88.2

First, the proportion of market dependent households rose steadily month by month, but was consistently higher among the consumption insecure than the food secure group. Second, agricultural income provided the first major source of cash for food, in the early dry season months, but faltered after peaking with the harvest and sale of dry season garden crops in March-April.

Third, non-agricultural income was used hardly at all in the immediate post-harvest months, but rose steadily in importance as crop sales tailed off and granary stocks dwindled. In fact, off-farm incomes contributed by far the most cash for food purchases from March through to July 1989, both for those households that achieved consumption security and those that did not. Local revenue-generating activities were supplemented from May onward by remittances from returning migrants, and by the possibility, taken up by many poorer men, to go for by-day agricultural labour.

Fourth, in contrast to crop sales, sales of animals were resorted to by more consumption insecure households each month, but contributed less cash for food in June-July than during April-May, perhaps because animal prices were falling. Fifth, throughout the period, borrowing remained a relatively minor mechanism for raising cash, except for the severely insecure, for whom it contributed over a quarter of 'realised entitlement to food', second only to off-farm incomes. Finally, it seems that non-grain transfers and sales of non-animal assets contributed rather little to food entitlements.

A formula for disaggregating entitlements to food was developed in Appendix 4.1 [equation 4.8]. Adapting this formula to exclude 'direct entitlement' (domestic food production), the data in the final column of Table 5.8 can be used to disaggregate 'realised entitlement' (the proportions of grain purchases financed by various sources, where each row sums to 1).

These equations clearly reveal the positive association between use of off-farm incomes and food security status, and the contrasting negative association for credit and for transfers. Non-monotonic relationships are recorded across household categories for crop sales and for asset sales (here animals and non-animal assets are combined) - the

severely insecure had fewer 'cash crops' and assets to sell than the mildly insecure, who used these entitlement sources relatively more intensively than the consumption secure.

Indirect Entitlement	=	Crop Sales	+ Off-Farm Income	+ Asset Sales	+ Credit	+ Trans -fers	+ Other ('Latent')
Severely Insecure		.139	+ .288	+ .211	+ .260	+ .076	+ .025
Mildly Insecure		.213	+ .368	+ .250	+ .142	+ .025	+ .002
Consumption Secure		.198	+ .426	+ .177	+ .096	+ .018	+ .084

These data can also be used for the construction of a 'household food insecurity ratio'. It is hypothesised that, as a rule, current income (crop sales and off-farm earnings) is preferred as a source of cash for food to wealth depletion (asset sales, borrowing). This reflects the recognition in Chapter 4 that households facing food deficits protect their wealth base. The 'HFIR', as proposed here, expresses the balance between the use of income and wealth for food purchases as a ratio.

$$\text{HFIR} = \frac{\text{wealth depletion for food purchases}}{\text{current income used for food purchases}} = \frac{\text{asset sales} + \text{borrowing}}{\text{crop sales} + \text{off-farm earnings}}$$

Among the food secure, 'current income' and 'wealth depletion' contributed 62.4% and 27.4% of cash towards grain purchases in 1988/9; for the 'mildly insecure', the figures were 58.1% and 39.2%; while current income generated just 42.7% of cash for food among the 'severely insecure', asset sales and borrowing providing 47.1%. These figures produce 'food insecurity indices' of 0.44 for the food secure, 0.67 for the mildly insecure, and 1.10 for the severely insecure. Wealthier households having diversified sources of income were better able to protect their basic holdings of assets and minimise debt acquisition during 1989; while the poor suffered a net erosion of their current and future wealth base (through asset sales, and indebtedness). The total income earned by the severely insecure (@ C18,000/household - see Table 5.1) was inadequate to meet even half the C31,000 each spent on grain during the year (though other claims diverted 26% (C4,685) of total income away from grain purchases (see section 6)).

Fig 5.4. Sources of Cash for Grain

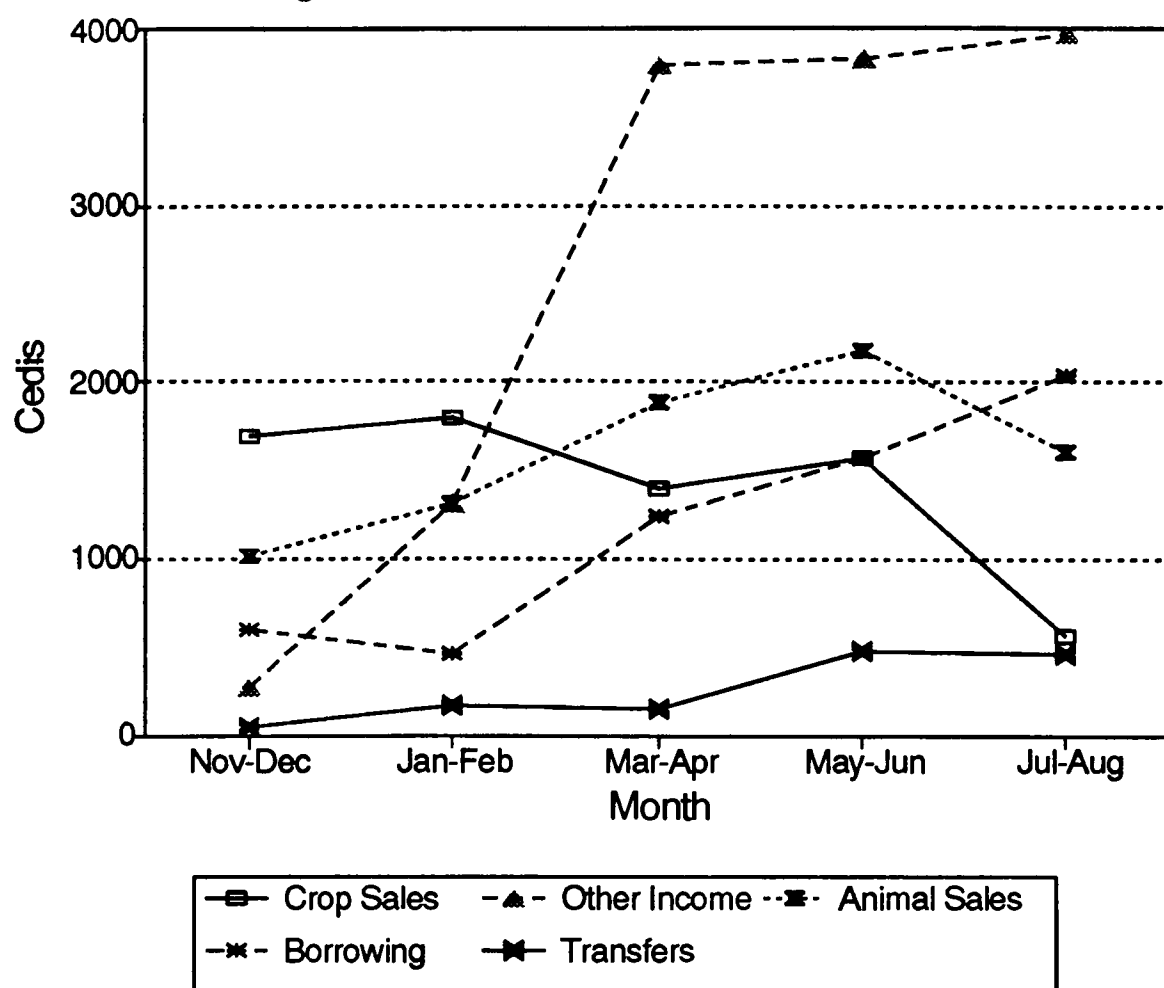


Table 5.7. Seasonal Sources of Income for Grain Purchases
(% of Households)

		Nov- Dec	Jan- Feb	Mar- Apr	May- Jun	Jul- Aug
Bought Grain:	CS	21	42	68	63	79
	SI	39	61	87	97	97
Crop Sales:	CS	5	32	42	21	11
	SI	29	26	29	16	7
Off-farm Income:	CS	5	16	26	42	47
	SI	0	19	23	35	47
Animal Sales:	CS	11	21	21	5	16
	SI	10	13	16	29	47
Borrowing:	CS	5	0	0	5	5
	SI	3	13	26	26	13

CS = Consumption Secure Households (n = 19)
SI = Severely Insecure Households (n = 31)

Table 5.8. Spending on Grain By Household Category, Source of Cash, and Round
(Cedis Per Household)

	Nov- Dec	Jan- Feb	Mar- Apr	May- Jun	Jul Aug	Total	%
<u>Severely Insecure:</u>							
Incomes	0	1052	2278	3044	2588	8962	28.8
Animals	261	445	1609	1635	2377	6327	20.3
Crop sales	1284	686	1641	440	282	4334	13.9
Borrowing	534	589	2043	3588	1320	8074	26.0
Transfers	0	425	459	569	921	2374	7.6
Asset sales	0	0	244	0	0	244	0.8
Other	0	420	361	0	0	781	2.5
Total:	2079	3617	8635	9276	7488	31095	
%:	6.7	11.6	27.8	29.8	24.1		100.0
<u>Mildly Insecure:</u>							
Incomes	109	1318	4905	4000	4626	14957	36.8
Animals	1235	1744	2149	3183	1551	9862	24.3
Crop sales	2545	2260	855	2213	770	8644	21.3
Borrowing	874	577	1304	759	2245	5760	14.2
Transfers	92	102	38	387	391	1009	2.5
Asset sales	0	0	0	0	284	284	0.7
Other	0	61	38	0	0	99	0.2
Total:	4855	6062	9290	10541	9867	40615	
%:	12.0	14.9	22.9	26.0	24.3		100.0
<u>Food Secure:</u>							
Incomes	1043	1652	3152	4504	4283	14635	42.6
Animals	1487	1478	1670	487	706	5828	16.9
Crop sales	235	2174	2370	1591	457	6826	19.8
Borrowing	0	0	0	800	2513	3313	9.6
Transfers	0	0	0	609	0	609	1.8
Asset sales	0	0	0	0	304	304	0.9
Other	0	913	0	391	1574	2878	8.4
Total:	2765	6217	7191	8383	9837	34393	
%:	8.0	18.1	20.9	24.4	28.6		100.0
<u>Total Sample:</u>							
Incomes	275	1313	3788	3834	3974	13184	36.0
Animals	1011	1318	1894	2174	1608	8005	21.9
Crop sales	1699	1794	1398	1578	565	7034	19.2
Borrowing	593	459	1239	1572	2039	5902	16.1
Transfers	46	172	150	485	459	1312	3.6
Asset sales	0	0	69	0	207	275	0.8
Other	0	343	122	83	332	880	2.4
Total:	3624	5399	9660	9726	9184	36593	
%:	9.9	14.8	23.7	26.6	25.1		100.0

One qualification about this ratio is that 'wealth depletion' varies in its implications according to initial wealth levels. The impact of the 1988/9 food production deficit on household wealth is seen in Table 5.9, which summarises asset holdings by household category and asset type at the start (September 1988) and end (August 1989) of the fieldwork period.

The most significant decline, across all households, is registered for smallstock and poultry. Food secure households suffered a net loss of 19 goats and sheep during 1988/9 (a fall of 7.3%), while holdings by the severely insecure fell by 22 (34.9%). This left the food secure holding 10.5 smallstock per household, while the severely insecure were left with just 1.3 smallstock each. So the 'food insecurity ratio' is overstated for food secure households to the extent that asset sales constituted sales of 'surplus' animals (leaving the basic herd intact).

Table 5.9. Asset Ownership per Household by Food Security Category

Asset	Food Secure (n=23)		Mildly Insec. (n=55)		Severe Insec. (n=31)	
	1988	1989	1988	1989	1988	1989
<u>Animals</u>						
Bullocks	2.35	2.26	0.71	0.65	0.13	0.13
Cows	3.78	3.78	0.79	0.75	0.26	0.26
Goats & Sheep	11.35	10.52	4.39	2.72	2.03	1.32
Fowls	19.65	7.70	7.33	3.58	4.94	1.90
<u>Durables</u>						
Motor vehicle	0.30	0.30	0.02	0.02	0.00	0.00
Bicycle	1.35	1.43	0.43	0.60	0.13	0.13
Radio	1.00	1.00	0.27	0.35	0.06	0.00
Wristwatch	1.26	1.26	0.57	0.53	0.16	0.19
<u>Other</u>						
Plough	1.09	1.13	0.39	0.38	0.10	0.10
Cornmill	0.39	0.35	0.00	0.00	0.00	0.00
Zinc rooves	4.35	4.39	0.73	0.84	0.03	0.03
Mango trees	2.09	2.13	1.40	1.38	1.10	1.10

Smaller falls were recorded for bullocks and cows. On the other hand, food secure and mildly insecure households managed to maintain or even increase their holdings of

consumer durables (bicycles and radios). Only 2 severely insecure households owned a radio in 1988; both were sold for grain during 1989. All food secure households owned a plough, some owned more than one; only 1 in 10 severely insecure households owned a plough at all.

If the overall extent of asset depletion during 1988/9 seems rather limited, it must be reiterated that this was the second of two successive production deficit years in Pusiga. Asset holdings had already been depleted to some extent during 1987/8. However, the evidence for asset protection in Table 5.9 reinforces the theoretical argument made in chapter 4 (and for which empirical evidence will be presented in Chapter 6), that consumption rationing is generally preferred, in times of dearth, to wealth depletion.

5.3. Secondary Sources of Income for Grain Purchases

The importance of credit in consumption smoothing was discussed conceptually in Chapter 4. Empirically, consumption loans contributed 16% towards food purchases by the Pusiga sample in 1988/9 (Table 5.8). Here this component of 'secondary entitlement' is examined more closely, as are remittances, a source of cash which is incorporated in 'off-farm incomes' but merits independent consideration.

5.3.1. Borrowing

Table 5.10 reveals that 45% of households in the Pusiga sample took at least one cash loan in 1989. Disaggregating these data by food security category reveals that the heaviest involvement in borrowing occurred among the large 'mildly insecure' group, who took the largest loans (averaging C12,930 each) and acquired the heaviest debt (C24,860 per creditor household). 'Severely insecure' households took more loans (2.2

per household as opposed to 1.9),¹³⁹ but these averaged less than half the value of 'mildly insecure' loans. The relatively small number (less than one-third) of 'food secure' households taking loans suggests that most of these wealthier farmers had little need to borrow; on the contrary, several were major lenders in both 1988 and 1989.¹⁴⁰

Borrowing of groundnut (as seed) contracts dramatically in 1989 over 1988 across all household categories, with only 20 households securing groundnut loans in the second year as compared to 56 in the first. Two effects apply: many farmers could not find loans at all, while others decided to switch out of groundnuts and towards other legumes (cowpeas or soybean). Both factors reflect the disappointing harvest of 1988, which left lenders with severely reduced stocks of seed to lend (not least because of high rates of default by borrowers) and caused farmers to make strategic adjustments to their mix of crops in 1989, against the possibility of a further year of drought.

Table 5.11 shows that over 80% of loans taken in 1988 were for food consumption (to enable the borrower to buy grain), but that this figure fell to 60% in the less critical food deficit year of 1989, when the second most common purpose for borrowing (19% of loans taken) was to contribute to funeral costs.¹⁴¹ Summing loans taken over both years reveals that food purchasing was overwhelmingly the most common reason for borrowing by severely insecure households, but much less so among food secure households, who took as many loans for investment purposes as for grain purchases.

¹³⁹. Although this seems to constitute a significant increase in loans per household in 1989 over 1988, the smaller number of loans recorded for 1988 perhaps reflects a methodological problem, that these data were elicited by recall, while those for 1989 were monitored at five six-week intervals. Since the numbers of households involved in borrowing remains remarkably constant over the two years, it may be that respondents were compressing two or more loans into a single figure when asked to recall their borrowing for 1988.

¹⁴⁰. Respondent sensitivity on this topic precluded asking borrowers to name lenders, and most wealthy farmers flatly denied any involvement in lending. However, the evidence from those respondents who chose to volunteer lenders' names suggests a pyramidal structure to the informal credit market within Terago and Tesnatinga, with a few wealthy farmers and farmer-traders each making loans to several poorer households in the vicinity.

¹⁴¹. This need not imply that the borrower's family performed a funeral themselves during the year. Most households went to at least one funeral during the 1989 dry season, but attending the funeral of even a distant relative is a costly social obligation, often requiring the purchase of several sheep or goats, beer and other items such as tobacco, gunpowder, and hiring a praise-singer.

Table 5.10. Cash and Groundnut Borrowing by Household Category, 1988 and 1989

Borrowing	Severely Insecure (n=31)		Mildly Insecure (n=55)		Food Secure (n=23)		Total Sample (n=109)	
	1988	1989	1988	1989	1988	1989	1988	1989
<u>Cash</u>								
No. of Loans	19	35	33	50	6	10	58	95
No. of HHs	16	16	24	26	6	7	46	49
% of HHs	51.6	51.6	43.6	47.3	26.1	30.4	42.2	45.0
Mean Loan Size	8,800	5,869	10,145	12,928	9,533	9,641	9,641	11,242
Borrowing/HH	10,450	12,840	13,950	24,862	9,533	12,157	12,157	21,796
<u>Groundnuts</u>								
No. of HHs	18	6	34	13	4	1	56	20
% of HHs	58.1	19.4	61.8	23.6	17.4	4.3	51.4	18.3

'Groundnut loans' here refers only to loans of seed for planting (farming) purposes.

Table 5.11. Cash and Food Borrowing by Purpose of Loan, 1988 and 1989

Purpose of Loan	Total Sample				1988 + 1989		
	1988		1989		SI (%)	MI (%)	FS (%)
	No.	%	No.	%			
<u>Consumption:</u>							
Food	55	82.1	62	59.6	81.4	65.6	37.5
Funerals	1	1.5	20	19.2	8.5	14.6	12.5
Other	2	3.0	8	7.7	1.7	7.3	12.5
Sub-total:	58	86.6	90	86.5	91.6	87.5	62.5
<u>Investment:</u>							
Farming	5	7.4	4	3.8	3.4	6.3	6.3
Education	2	3.0	1	1.0	0.0	3.1	0.0
Other	2	3.0	9	8.6	5.1	3.1	31.2
Sub-total:	9	13.4	14	13.4	8.5	12.5	37.5
Total Loans:	67	100%	104	100%	59	96	16

'Cash and Food Borrowing' here includes loans in the form of cash (154 loans), cows or bullocks (3 loans), rice (4 loans), groundnuts (monetised, not planted - 8 loans), millet and sorghum (2 loans). Groundnuts borrowed as seed for planting are not included.

'Other Consumption loans' = borrowing for house-building, buying clothes, 'help' to in-laws and other relatives, petty expenses, unstated 'problems'.

'Other Investment loans' = borrowing for trading capital, to buy bullocks or brideprice cows, and for lorry fare to the south (seasonal migration).

Table 5.12 identifies several characteristics of lenders, and reveals some interesting contrasts between different loan categories. Cash and other non-groundnut loans were given out mainly by men (71% of 171 loans), and by farmers slightly more than by traders; while groundnut lending is more commonly practiced by women (62% of 79 loans), most of whom are traders rather than farmers.¹⁴² This is consistent with the observation in Pusiga that men generally tend to accumulate more wealth and cash savings than women, but that women tend to control trade in produce such as groundnuts and other food crops.

Groundnut lending is more strictly commercial than cash and other credit. The terms of groundnut loans are well-known and universal - 1 basin borrowed at planting is repaid by 1 bag at harvest; 1 bag borrowed owes 2 bags at harvest; defaulters pay double the following year. The terms under which cash loans are taken are less clear and are more easily 'fudged' - a loan can become a 'gift' if the borrower's circumstances fail to improve. This distinction may explain why groundnut traders are less likely to lend to relatives than is the case with other forms of credit. Only a quarter of groundnut borrowers and lenders were related to each other, while 43% of cash and food loans were secured from within the borrower's family (usually a brother, cousin, or in-law, occasionally the borrower's wife).

A final interesting feature of Table 5.12 is the geographical distance between borrowers and lenders. This information was collected on the assumption that the local economic contraction following the drought and armyworms of 1987 and 1988 would reduce the circulation of credit within the village and force people to seek loans further afield. In fact, there proved to be no significant difference in the percentage of cash or food loans derived from within and beyond the village in 1988 and 1989 (the ratio being approximately 3:1 in both years), so this Table simply sums loans across the two years.

¹⁴². In Pusiga, the distinction between farming and trading is rarely absolute, as most traders also farm. In the case of individuals engaging in both, however, men are more likely to regard themselves as primarily farmers while women more frequently list trading as their primary occupation.

Table 5.12. Characteristics of Lenders by Category of Borrowers

Loan Category	Distance of Lender (miles)					Gender		Occupation		Relative	
	< 2	2-8	8-10	10-25	25+	Man	Woman	Farmer	Trader	Yes	No
<u>Cash & Food</u>											
Total Loans	52	74	24	12	9	122	49	89	82	73	98
Percentage	30.4	43.3	14.0	7.0	5.3	71.3	28.7	52.0	48.0	42.7	57.3
<u>Groundnut</u>											
Total Loans	38	37	1	2	1	30	49	28	51	19	60
Percentage	48.1	46.8	1.3	2.5	1.3	38.0	62.0	35.4	64.6	24.1	75.9

Distance in miles:

- < 2 = same section within Pusiga (Tesnatinga or Terago)
- 2-8 = other sections within Pusiga (Dabia, Pialoko, Pusiga town, etc.)
- 8-10 = Bawku town
- 10-25 = other villages in Bawku District (Garu, Bugri, Zebilla, etc.)
- 25+ = southern Ghana, Togo or Côte d'Ivoire

Only 30% of cash and food loans come from within the section of Pusiga where the borrower lives (neighbours or even people within the same compound - brothers, sons, wives); 43% of loans come from other parts of Pusiga (farmers in neighbouring rural sections or traders in Pusiga town itself); 21% from elsewhere within Bawku District (other villages or Bawku town); while only 9 loans (5.3%) were secured from people living in southern Ghana or neighbouring Togo or Côte d'Ivoire (mostly these loans were obtained during a seasonal migrant's period of employment "down south"; in two cases men made the journey specifically to seek "help" from relatives in Kumasi and Accra). Groundnut lending, not surprisingly, is more geographically concentrated, with 95% of lenders living within Pusiga as compared to 74% of cash and food lenders.

5.3.2. Remittances

In Pusiga and throughout West Africa, long distance migration is common among adult males, being motivated by personal reasons as well as economic necessity. Seasonal or circulatory migration increases in poor agricultural years, as poor harvests induce travel in search of compensatory incomes. In northern Côte d'Ivoire, for instance: "The farmer bases his decision whether or not to migrate on the success of last year's crop" (Weekes-Vagliani 1985:37).

Because agricultural production risks are less closely correlated across regions than are farm and non-farm incomes within a region, long distance migration typically offers better prospects for redressing local food deficits than a search for employment within the affected region (Walker and Jodha 1986:18). Migration has been seen as positively associated with "risk diversification" and "alleviation of credit constraints" (Stark, Taylor and Yitzhaki 1986). In Botswana and elsewhere, circulatory migration enables rural households "to compensate for harvest shortfalls and dampen consumption fluctuation" (Lucas and Stark 1985). Even long term or permanent outmigration can raise rural wealth and welfare, if remittances enable those left behind to invest and accumulate (Hoddinott 1989). Other studies in east and southern Africa, however,

condemn the selective emigration of adult males as depriving their families of essential agricultural labour (Wilson 1972, writing on southern Africa; Francis 1991, on Kenya).

All told, around 45 men from the 201 households in Terago and Tesnatinga travelled south after the 1988 harvest to look for work, returning before the new farming season began in May or June 1989.¹⁴³ (This excludes longer term migrants who either did not return or returned having been away for over a year.) When questioned about their reasons for migrating, only 6 of 27 returnees interviewed (22%) gave food shortage or "hunger" as the primary motivation, although 23 (85%) actually bought grain with some of their earnings on their return.¹⁴⁴ 10 respondents (37%) referred more broadly to a lack of remunerative employment opportunities in the north during the dry season ("no work"), and 4 (15%) specified that they needed money for brideprice, debts, or "family problems". Among young, single men, the urge to "travel and see" was frequently mentioned, and to acquire desirable commodities - bicycles, Western clothes.

For these 27 migrants, mean income earned amounted to slightly over C70,000 (£140), of which 55% was brought back, much of the remainder being used for transport, food and accommodation while away. Only a quarter of remitted earnings was used for grain purchases. Many migrants were young, single men from comparatively wealthy families, who felt no obligation to contribute to the household granary after being away for most of the dry season; while poorer migrants whose primary intention was to earn cash for food often had difficulty finding work (see below).

Considerably more (42.2%) was spent on consumer goods (bicycles, clothes) than on grain, while 13 interviewees bought bicycles "down south", 4 of which were resold in Bawku District and the proceeds used to buy grain. Historically, the need for cash to

¹⁴³. The most popular destinations were southern Ghana and Côte d'Ivoire. Although Ghana's Economic Recovery Programme has stimulated the agricultural sector and raised demand for labour in the cocoa-producing regions of Ashanti and Brong-Ahafo, consumer goods remain more readily available in neighbouring francophone countries. Also, the CFA-Cedi exchange rate continues to favour the CFA, though frequent devaluations are bringing the currencies towards parity.

¹⁴⁴. Since the 27 migrants interviewed came from both sampled and non-sampled households, findings here are not presented by household food security category.

buy cows for brideprice obligations has been a prime motivating factor for circulatory migration from northeastern Ghana, and 13% of remittances by these 27 migrants went towards brideprice payments. Minor allocations of remittances were made towards funerals, debt repayment and housing. Some migrants travelled in order to pay off consumption debts incurred during the 1988 hungry season.

Several men from (mainly) poorer households returned to Pusiga empty-handed, having been unable to find work in the south. This raises an issue not considered in the 'coping strategies' literature - costs of failure, which may be defined as the value of resources invested in a strategy which yields no cash or food returns. In the context of seasonal migration, these costs might vary systematically by household category. Although lorry fares and accommodation costs are fixed, for instance, they are proportionately greater for the poor, who have fewer resources to spare and often borrowed to go south in 1988/9. Moreover, richer families had connections with traders (who could offer free rides) and relatives in southern Ghana (who could provide free or subsidised accommodation). Family connections could also ensure that the wealthier migrant found work, while the poor migrant had no such guarantee. Finally, although the demand for cocoa labour was higher in Côte d'Ivoire, as were wages, transport and living costs were higher there than in Ashanti or Brong-Ahafo Regions; the rich were better positioned to take advantage of these opportunities. To summarise, the poor faced three problems in adopting seasonal migration as a response to food deficit:

- investment costs in migration were often higher than for the rich;
- the returns to migration were often lower than for the rich;
- the probability of failure was often higher than for the rich.

Fig 5.5. Use of Remittances by Migrants

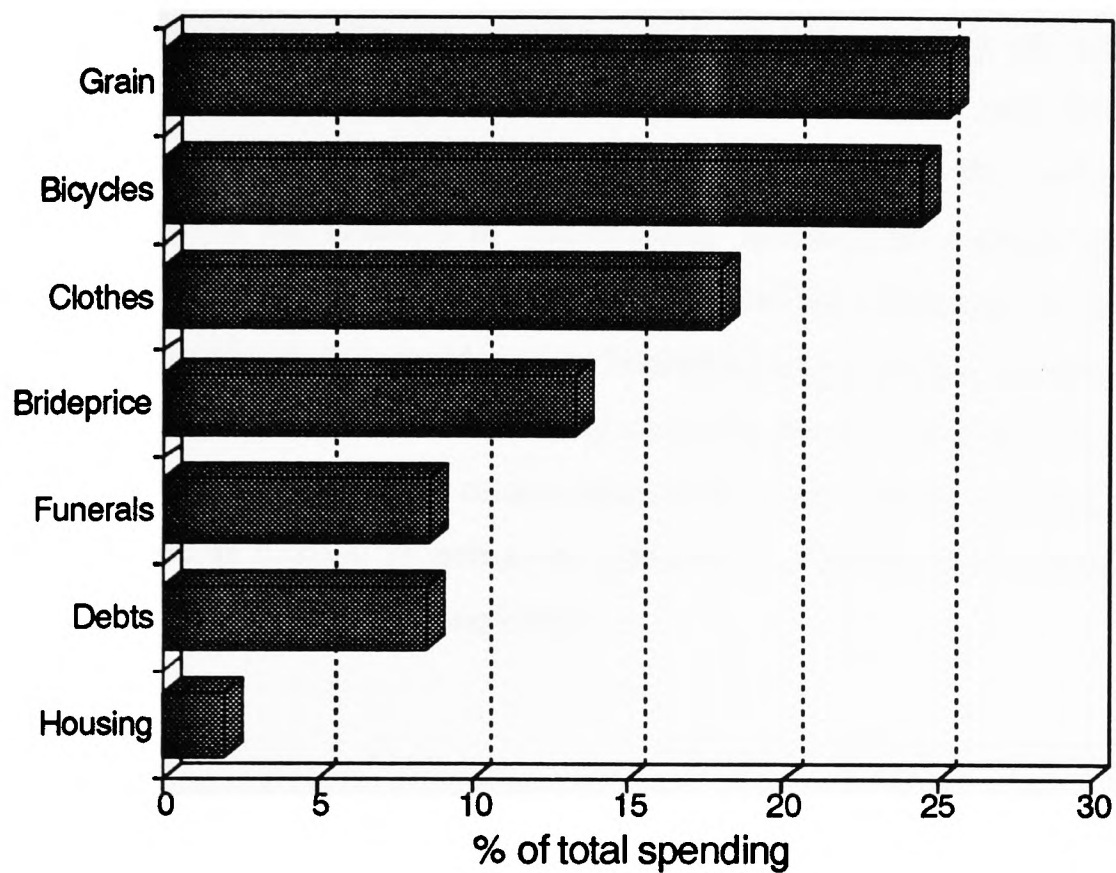


Table 5.13. Migrant Earnings and Expenditures, 1989
(n=27)

	Cedis	% of Total
Mean Earnings		
Earned	70,778	100.0
Remitted	39,117	55.3
Mean Spending		
Grain	9,889	25.3
Bicycles	9,556	24.4
Clothes	7,037	18.0
Brideprice	5,185	13.3
Funerals	3,340	8.5
Debts	3,330	8.5
Housing	780	2.0

6. Impact of Food Deficit on Household Expenditures

The relationship between spending on food and spending on non-food items is indicative of the level of distress faced by each household or each household category. It also provides some indication of the absolute severity of the food deficit facing the poor. Given that cutbacks in 'non-essential' spending are a characteristic response to subsistence threats, the pronounced inter-household differences recorded in spending volumes and patterns provides powerful support for the statistical evidence in Chapter 2 which revealed that this was a highly unequal society. It also reveals little evidence of 'moral economy' transfers on any measurable scale. Below, spending on grain is first expressed in relation to non-grain spending as a whole, then non-grain spending is examined by individual component.

6.1. Food v. Non-Food Spending

Spending on grain was disaggregated by household category in section 5 above, where it was argued that comparable levels of expenditure across households concealed varying levels of distress. The relationship between categories of expenditure further illuminates this argument. The food secure maintained high levels of expenditure on non-grain items such as housing improvements, funerals and brideprice payments throughout 1989, despite having to buy grain. Conversely, the severely insecure drastically curtailed their expenditures on these items. In fact, the proportions spent on grain and major non-grain items are almost exactly reversed in these two household categories - 20:80 among the food secure; 81:19 among the severely insecure (and 60:40 among the mildly insecure).

The seasonal pattern of spending is also interesting. For the food secure, grain purchasing was a constant 25-33% of spending each month except April, when it fell to just 9%. For the severely insecure, grain purchasing started at 52% of expenditures in December and climbed month by month, reaching 71% by April, 96% by May and 99% in July, when virtually all household resources were directed towards meeting

immediate consumption needs. Among the mildly insecure category, more was spent on non-grain purchases until April, but by May grain accounted for 80% of expenditure, peaking at 87% in July.

6.2. Non-Food Expenditures

Table 5.14 disaggregates household spending during 1988/89 on five major categories of non-food expenditure: housing, funerals, brideprice payments (including weddings), health, and clothing. Food purchasing and asset acquisitions are excluded, as are debt repayments and farming investment: the focus here is on 'consumption spending'.¹⁴⁵ The data are tabulated by household category and by round of interviews (at five 6-weekly intervals), so as to capture both seasonal effects and cross-sectional differences within the sample community. Table 5.14 reveals that the 23 food secure households (21% of sample) accounted for almost 65% of spending on these major expenditure categories during 1988/89, while the 31 severely insecure households (28% of sample) spent under 5% of the total.

Spending on housing improvements emerges as the strongest item of expenditure during 1988/9, accounting for 39% of total cash outlays on these five categories. Much of this is attributable to the fact that 7 wealthy households chose this year to 'modernise' their homes (i.e. to convert them from mud and thatch compounds to brick-wall, metal-roof houses, or to replace old corrugated metal roofing with new sheets). Some household heads explained that they had delayed these conversions, because of 'hunger' in 1987, so this spending represents an accumulation of two years planned and actual spending. Nonetheless, the sums involved are high, and illustrate how little affected the local elite were by the problems facing their poorer neighbours. Each of these 7 households spent

¹⁴⁵. Also omitted is spending on ceremonies of various kinds: *samanpiid* (the harvest festival), *ramadan* (among Moslems), and 'outdoorings' (a local tradition akin to christening an infant). Incomplete data were collected on these items, which are comparatively insignificant in terms of cash outlays, though they typically involve the slaughtering of smallstock and poultry. Additionally, consultations with soothsayers, rainmakers and *juju*-men were rarely discussed openly in interviews, so this constitutes another source of underestimation of total spending.

C150,000 or more on housing materials and labour - equivalent to about £300 in early 1989 or, more pertinently, about 16 sacks (1,600 kg) of grain.

Table 5.14. Non-Food Spending per Household by Category, Pusiga 1988/9

Spending Category	Severely Insecure (n=31)	Mildly Insecure (n=55)	Food Secure (n=23)	Total per HH (n=109)
Housing (%) (%)	439 (0.7) (6)	6,709 (10.1) (25)	59,096 (89.2) (43)	66,243 (100) (39)
Funerals (%) (%)	4,413 (9.6) (60)	12,400 (26.9) (46)	29,243 (63.5) (21)	46,056 (100) (27)
Brideprice (%) (%)	0 (0.0) (0)	2,309 (7.1) (9)	30,017 (92.9) (22)	32,326 (100) (19)
Health (%) (%)	1,400 (10.1) (19)	2,217 (15.9) (8)	10,296 (74.0) (8)	13,913 (100) (8)
Clothes (%) (%)	1,135 (9.3) (15)	3,253 (26.5) (12)	7,874 (64.2) (6)	12,262 (100) (7)
Total Cedis (%) (%)	7,387 (4.7) (100)	26,888 (30.5) (100)	136,526 (64.8) (100)	170,801 (100) (100)

Figures outside parentheses are for mean spending per household, in Cedis. Decimalised figures inside parentheses are percentage contributions to spending on each item by household category (reading across rows). Undecimalised figures inside parentheses are percentages spent by each household category on each item (reading down columns).

After housing, the sampled households spent most on performing or (mostly) attending funeral parties (27%). Of the four funerals performed by sampled households, two cost over C100,000 each (£200 in 1989) and two cost over C50,000 (£100). Even attending funerals can be expensive, as noted above, though contributions do vary according to wealth. Funerals are an important item of social expenditure - an investment as much

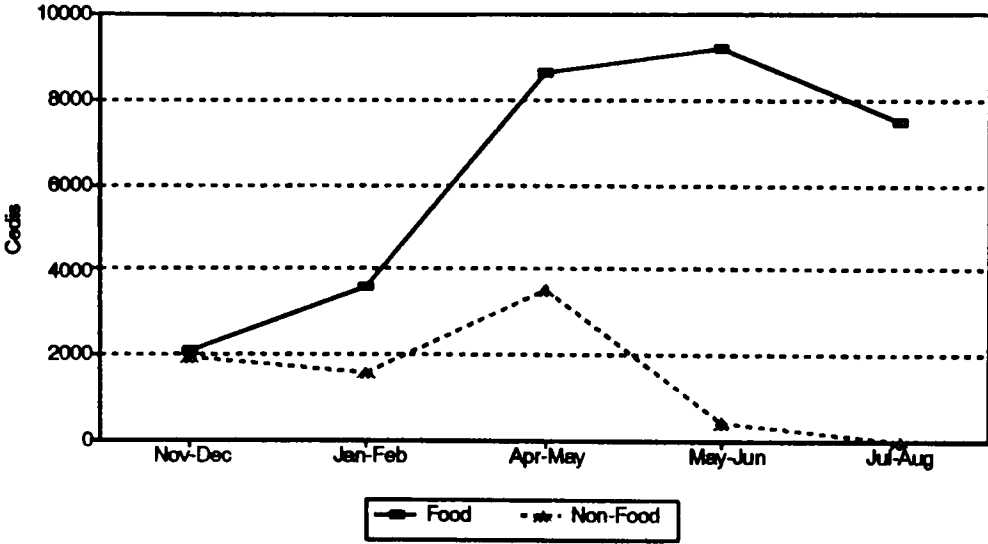
as an obligation - since they provide an indication of the household's integration or marginalisation within the community. It is noteworthy that the severely insecure, despite spending less than 10% on funerals than the food secure, and performing no funerals themselves, spent three times more on attending funerals than on any other category listed here.

Third in the ranking is expenditures on brideprice obligations (19%). Most of this (93%) was spent by the 23 food secure households, which suggests that they were responding to requests for cows which could be monetised by poorer households who needed cash to buy food. This category also includes one wedding (costing C140,000) which was performed in June 1989. Finally, health (8%) and clothes (7%) together account for less than brideprice alone, although in terms of numbers of transactions recorded, health was by far the most frequent category - small amounts being spent by most households every month on consulting herbalists or attending Pusiga health clinic. However, the raising of clinic fees (see Chapter 3) may have contributed to reduced attendance in this difficult year, and compounded the morbidity problems induced by undernutrition.

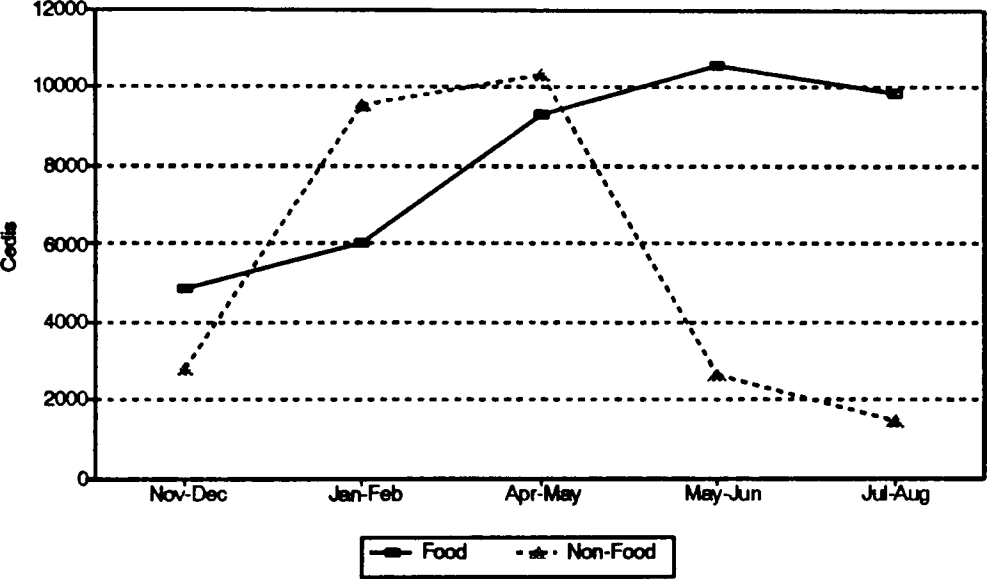
The ranking of categories of spending by household category reveals interesting differences. Among the severely insecure group, funerals is by far the most substantial category (amounting to 60% of their non-food spending), followed by health (19%, mostly on 'traditional' healers) and clothes (15%), with very little being spent on housing improvements (6%) and nothing at all on brideprice payments. Among the food secure, spending on housing improvements (43%) accounts for twice as much as brideprice (22%), with funerals (21%) a close third. Relatively little was spent on health (8%) and clothes (6%). The middle category of households, like the severely insecure, also invested heavily in funerals (46%), with housing improvements (25%) second and clothes (12%), brideprice (9%) and health (8%) of minor significance.

For all categories of household, spending peaks in March or April, expenditures recorded during April amounting to almost half the total (see Table 5.15). During these months, in the heart of the dry season, 3 of the 4 local funerals were performed (the

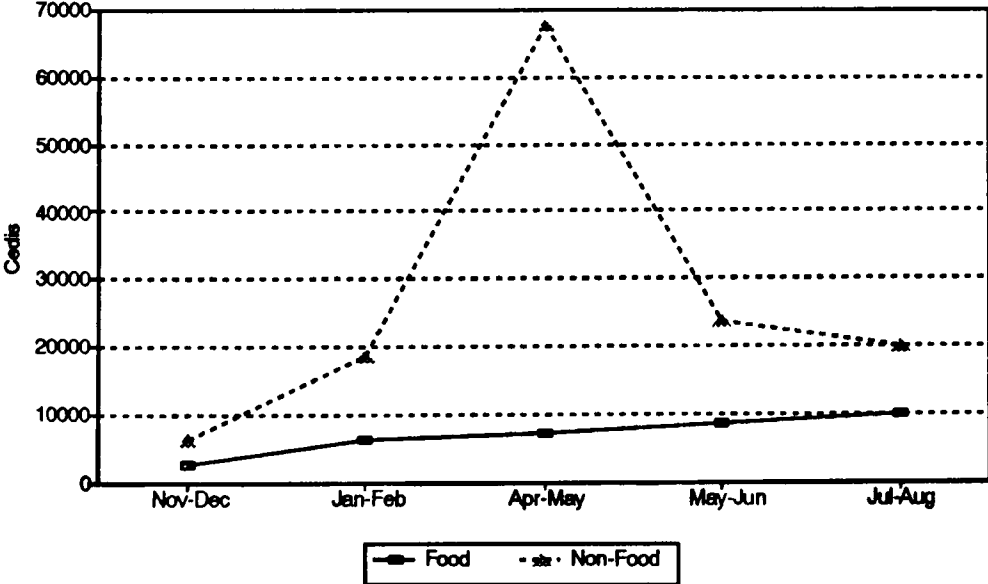
Fig. 5.6. Seasonal Expenditure Patterns
Severely Insecure Households



Mildly Insecure Households



Food Secure Households



fourth was held in February), and most of the housing conversions described above were undertaken. The low total recorded post-harvest may be explained by the fact that this is the time when debts are repaid, and this is the major cash outlay at that time. The low total for July conceals significant spending, at least by wealthier households, on farming costs at the start of the new season. Also, from May to July a sizeable and rising proportion of household income was diverted to food purchasing, as seen above.

Table 5.15. Seasonal Non-Grain Spending per Household, Pusiga 1988/9

Month	Severely Insecure (n=31)	Mildly Insecure (n=55)	Food Secure (n=23)	Total per HH (n=109)
Nov-Dec (%)	1,923 (26)	2,822 (10)	6,400 (5)	11,144 (7)
Jan-Feb (%)	1,581 (21)	9,593 (36)	18,565 (14)	29,739 (17)
Mar-Apr (%)	3,490 (47)	10,375 (39)	67,674 (50)	81,540 (48)
May-Jun (%)	384 (5)	2,624 (10)	23,696 (17)	26,703 (16)
Jul-Aug (%)	10 (0)	1,475 (5)	20,191 (15)	21,676 (13)
Total Cedis (%)	7,387 (100)	26,888 (100)	136,526 (100)	170,801 (100)

7. Responses to Food Deficit and Social Standing

"Hunger is no disgrace but it can compromise a person's honour."
 (African proverb, quoted by Watts (1983:430))

Most theoretical and empirical studies of 'coping strategies' emphasise observable and measurable behaviour - especially market transactions - at the expense of non-market

transfers and 'unquantifiable' behaviour (eg. rationing, which, as we have seen, was virtually overlooked in the African context until the mid-1980s).¹⁴⁶ Watts' concepts of 'reversibility' and 'commitment of domestic resources', for instance, compare the costs of alternative strategies in essentially economic terms. Yet many responses have social consequences as well as economic and/or nutritional implications.

Overlooked in most formulations is the cost of strategies in terms of their impact on social standing. However, this factor is recognised in some south Asian studies. Caldwell *et al.*'s (1986) discussion of Indian respondents' attitudes toward different strategies is as illuminating as their accompanying data on strategy adoption. Rationing of food consumption was almost universal among drought-stricken families, but other strategies were adopted with increasing reluctance.

"most families still regard their ability to weather droughts as being based on savage cutbacks to their living standards, dominated by reducing food to the minimum. The next largest saving, which filled many with deep guilt, was that on festivals, clothing, and entertaining and visiting. The sale of valuables, mostly jewelry, or land is a desperate measure. Only 3% of landowning households sold any land"
(Caldwell *et al.*, 1986:688)

The reference to "deep guilt" suggests that a non-economic and non-nutritional cost is associated with certain behaviours. Postponing religious festivals entails some kind of socio-cultural cost in excess of the nutritional costs of food rationing, though this apparently is not as great as the economic cost of selling major productive assets like land. Extrapolating from this single example would suggest that households prioritise their economic viability, followed by social standing in the community, with short-term nutrition status only third. This is not to suggest that no attention at all is paid to consumption needs, but it does provide further support for the argument throughout this

¹⁴⁶. Although, as seen earlier in this chapter, seasonal hunger had been observed by outsiders in northern Ghana by 1911 (if not before), early and later commentators invariably attributed this to 'food shortage' rather than seeing it as at least partly a reflection of strategic behaviour.

thesis against focusing excessively on immediate food acquisition behaviour, to the neglect of the household's broader and longer-term social and economic objectives.

In northeastern Ghana, some responses to food deficit are perceived as less desirable than others which are less costly in economic (and/or nutritional) terms, because they involve a loss of social standing. Differences between households may confound attempts to correlate coping strategies with economic status or wealth, particularly in the case of (what are here labelled) 'status costs'. A poor man who is widely regarded as a lazy drunkard has less to lose in terms of personal pride and social standing than another equally poor man who is perceived as being honest and hard-working, but unlucky. So the former is more likely to resort to low-status behaviour than the latter, because his 'status costs' are lower.

'Status costs' depend on prior social standing in the community, which is determined by more complex factors than wealth alone. In Pusiga in 1989, middle-income groups seemed to suffer most from 'status costs'. The rich, while having the most to lose in terms of social status, could easily afford to continue dispensing largesse and still buy enough food for their families, so they neither lost face nor went hungry. Conversely, the poorest households were desperate for food from any source, and invested little in social standing during the year. (As seen above, attending (not performing) funerals constituted the highest non-food outlay of severely insecure households, but this 'social investment' amounted to only 14.2% of their spending on food. By contrast, spending by the consumption secure on funerals averaged 85% of their spending on grain.) Middle-income people were squeezed in both directions - they were determined to keep up appearances, though not really in a position to do so. These assertions are well illustrated by the case of funeral parties, either performed or postponed, in 1989.

7.1. Funerals in Pusiga, 1989

"Funerals are one of the contributing causes to hunger."

(Issah Ayanaba, Community Development Officer, Bawku)

A less preferred expenditure-switching strategy in Pusiga in 1989 was to postpone the funeral party of a deceased relative.¹⁴⁷ In terms of Watts' criteria, this strategy has a low direct economic cost and is easily 'reversed' - if the next harvest is good the funeral will simply be performed next year. But performing funerals for close relatives is both a social and a religious imperative for those holding traditional beliefs in northern Ghana. The social pressure to throw lavish funeral parties is proportionate to the social standing of the deceased: "The bigger the man, the bigger the funeral." People with funerals to perform during the dry season of 1988 or 1989 faced a dilemma. Most households were food deficit in both years and could barely afford to feed themselves. Yet postponing the ceremony would mean quite severe social disgrace - while no sanctions would be enforced against the family involved, they would lose whatever respect and social standing they had built up in the community.

Table 5.16 summarises the costs and socioeconomic consequences of the 4 funerals performed in 1989 by families in the Pusiga sample - 2 by wealthy (1 self-sufficient, 1 consumption secure) and 2 by middle-income households. A further 3 households, each of below average wealth, postponed funerals due to be held in 1989 because of poor harvests in 1988. In other words, 42.8% of those who could postpone a funeral did so (Table 5.5) - but no consumption secure household did so, while 3 out of 5 consumption insecure households postponed. (One poor farmer in Terago had already failed to perform his father's funeral for six years.) Table 5.16 shows that, although households spent more or less in line with their relative wealth ranking, spending was disproportionate to wealth. Thus the wealthiest household head in the sample, Azumah Ayariga, spent 3.4 times as much on his father's funeral as Atibilla Assana did on his, but this amounted to just 14.6% of Azumah's total wealth and 48.9% of Atibilla's wealth in 1988.¹⁴⁸ Azumah's household remained the wealthiest in the village despite this expenditure, while Atibilla slumped from a ranking of 67 out of 196 households

¹⁴⁷. In non-Islamicised and non-Christian societies in West Africa, burials and funerals are two distinct events. Funeral parties are customarily performed by the next of kin in the dry season following the deceased person's death and burial; this allows the deceased's spirit to pass over to the next world and (frequently but not always) to acquire 'ancestor' status.

¹⁴⁸. The names of Pusiga residents used in this section, as elsewhere in this thesis, are pseudonyms.

to 141.¹⁴⁹ On this evidence, therefore, performing funerals can be described as a force for downward social mobility, at least temporarily, particularly among middle-income households.

Table 5.16. Four Funerals in Pusiga, 1989

	Azumah Ayariga	Akosi Azure	Atibilla Assana	Atule Abalari
Household Wealth				
1988 (Cedis)	2,248,000	1,259,000	209,100	180,700
1989 (Cedis)	1,734,400	1,107,700	32,300	111,800
Change in wealth (1989-1988)	-513,600	-151,300	-176,800	-68,900
% Change '88-'89	-22.8%	-12.0%	-84.6%	-38.1%
Funeral Costs				
Total Cost	327,200	192,900	102,200	58,800
As % of 1988 wealth	14.6%	15.3%	48.9%	32.5%
As % of change in wealth	63.9%	127.5%	57.8%	85.3%
Wealth Ranking				
1988 (n=196)	1	4	67	80
1989 (n=196)	1	5	141	97

Money for these funerals was raised through sales of animals, cash crops, even a bicycle, also from borrowing and savings. Major items of expenditure were on animals slaughtered for meat, grain, and beer. Praise-singers and violin-players also constituted a heavy cost, both directly (hiring charges) and in 'incentive payments' through the night. (As they perform, family members press C20 notes to their foreheads, to encourage them to sing more favourably of the deceased - and the bereaved!)

The cheapest funeral was performed by the poorest of the four household heads, Atule Abalari, partly because he adopted the unusual cost-cutting strategy of combining his

¹⁴⁹. This ranking exercise separates out the effect of funeral costs from the village-wide hunger, which would be expected to result in a general downward shift in overall wealth holdings, *ceteris paribus*, rather than a change in relative household rankings.

elder brother's funeral with one performed for a woman from a neighbouring relative's compound. Only the two wealthiest households slaughtered some of their own animals to feed the funeral guests. This reflects the significant numbers of cattle, sheep and goats left by these two deceased men, expressly for use at their own funerals. Although Atibilla Assana's father left two bullocks and a cow when he died, they were sold rather than slaughtered. However, most of the cash raised was put towards the funeral - including the purchase of sheep and goats that were slaughtered.

Local reactions to each funeral reflected expectations based on the wealth of the family concerned. Of the four, the Assana funeral was generally agreed to be the best - plenty of good food, beer and music - while the Ayariga funeral was heavily criticised, mainly for Azumah's failure to hire a generator. (As one farmer exclaimed: "That Ayariga family - so much money and no lights even!") Although this perception of frugality is not supported by the figures in Table 5.16, the Ayariga family had acquired a reputation for meanness over the years that no single funeral party, no matter how lavish, could have dispelled. This also suggests that Azumah had little to gain, in terms of cultivating goodwill, from throwing a generous funeral: despite being wealthy, the family enjoyed low status in the village. The old man had hoarded his wealth; he had not used it to dispense patronage and build up affection among his neighbours. More sympathetic observers noted that the Ayariga family was as large as it was wealthy, and that after the funeral Azumah faced difficult negotiations over the division of his father's assets among the 80+ relatives who had come to pay their respects - and to claim their share of the sizeable inheritance.

A final point about funeral parties is that they do not fulfil the function attributed to them by some observers, of providing free food to production deficit households during the hungry season. The 'funeral season' in northern Ghana is January-March; the 'hungry season' peaks in June-July. Eating well at funerals may have reduced the need to buy grain in the early dry season months (hence the sharp rise in grain purchases after March 1989, as recorded in Table 5.3), but even attending funerals cost money and animals, so few resources were conserved in this way for later grain purchasing needs.

7.2. Other 'Status Costs'

Apart from deferring funerals, many other activities with income-generating or expenditure-switching objectives, or which involve acquiring food through unusual sources, are socially frowned upon in northeastern Ghana. A common insult throughout West Africa is to ask: "Didn't I see you buying grain in the market yesterday?" Although considered a 'disgrace' in normal years (because it implies a bad or lazy farmer), little stigma attaches in difficult years, when the impact of exogenous shocks (eg. drought) affects all farmers similarly. Even worse in terms of lost male pride is to depend on women's income for food. Since it is a male responsibility to provide staple grains, any man whose wife/wives help him by buying grain will be derided by his neighbours.

In Bangladesh, sanctions against women working for cash are strong, and a family's dependence on women's income is a 'terminal indicator' of distress: "The involvement of rural women in wage labour seems to be the last step in a series of family adjustments to economic crises that is taken only when the alternative is the effective breakdown of the family unit" (Begum 1985:232, quoted by Jiggins 1986:13). This provides a powerful example of 'cultural norms' (or 'status costs') overriding 'economic rationality'. In polygamous households in Pusiga, women were less likely to offer unconditional 'help' to their husbands than women in monogamous relationships, choosing instead to lend cash or produce to their husbands, often at high rates of interest (rather than donating their resources to a household pool and thereby effectively help to feed rival wives and their children).

Two less conventional sources of 'entitlement to food' - brideprice cows and land rights - raise intriguing questions about processes of commodification and the monetisation of 'social goods' in northeastern Ghana. During 1989, three farmers in the Pusiga sample collected brideprice cows owed to them and sold them for grain.¹⁵⁰ According

¹⁵⁰. Every marriage among the Kusasis involves the transfer of 4 cows from the groom's family to the bride's, but among poorer households this transaction is typically completed in instalments over a period of several years, even decades.

to local custom, a man who is owed brideprice should not demand payment from his son-in-law's family unless he needs these cows for the marriage of a son. As a Kusasi saying has it: "Dowry cows are meant for dowry." Related to this is the local practice known as *pua elinga*, whereby a man betroths his young daughter to a man in another, usually wealthier, household, in order to collect and monetise brideprice for some pressing cash need. As noted in Chapter 4.2, this is sometimes misleadingly referred to by Western observers as "selling" or "pawning" children. In fact, it serves as a way of establishing important social and economic links between poorer and wealthier households, and in the present context can be interpreted as a demographic response to food deficit (redistributing consumers from food insecure to food secure households). Nonetheless, betrothing daughters in times of need, simply to collect brideprice cows (in advance of marriage) and sell them for cash, is a sign of extreme distress.¹⁵¹

As in much of Africa, land in northeastern Ghana is not alienated (see Chapter 3.2). But usufruct rights are increasingly being transferred for cash or a bag of produce. Needless to say, most transfers are from poor households to rich, and this nascent market is an extremely sensitive subject. Data collected in Pusiga on such transfers during 1989 were not systematic, but 4 cases of land right sales for cash to buy food were recorded, and there were certainly more.

Finally, the purchase and consumption of nutritionally inferior foods (such as 'dirty flour' (*zom*) collected from grinding mill floors) is an indicator of economic stress which typically provokes sympathy rather than rebuke from neighbours. Conversely, a man or woman who resorts to begging (or worse, stealing) has lost all pride and risks social marginalisation or ostracism.

Unorthodox means of raising cash such as those described above present the entitlement approach with a challenge. Entitlements in its 'balance sheet' form is predicated on the assumption that all tradeable assets owned by a household can be valued in terms of

¹⁵¹. It is also a robust indicator of social 'class divisions' within the community. In Pusiga in 1989, most large, wealthy households had acquired one or more women as *pua elinga*, mainly from poorer households nearby.

food, so that the ability of the production deficit household to achieve consumption security can be easily quantified (see Appendix 4.1). Yet the discussion here would suggest that a household's 'tradeable assets' should be very broadly defined, to include even unmarried teenage daughters and land which is farmed but not actually owned by the household. The entitlement approach cannot easily incorporate such ambiguities. One possibility might be to treat these unusual sources of cash or food as 'latent entitlements' - sources which are only activated by the household in times of severe food stress or economic crisis.

8. Sequential Adoption of Responses to Food Deficit in Pusiga

A number of reasons for questioning models which generalise about sequences or discrete stages of coping strategy adoption were raised in Chapter 4. This 'linear determinism' was rejected as mechanistic and as reflecting an over-emphasis by most writers on the immediate nutritional and economic problems facing people during food deficits. While the notion of sequencing itself was not dismissed, it was argued that the response ranking is the product of a number of complex calculations - constantly reassessed - concerning the accessibility, relative costs and expected return of each option at each point in time. A formula was developed [equation 4.1] to capture some of these criteria for the case of asset sales.

Several statements made by Pusiga farmers during 1989 pointed to the complicated procedure of selection from among various responses to domestic grain shortage. The relationship between borrowing, animal sales and 'choosing hunger' is indicative. Borrowing at low interest was generally preferred (by those who could secure loans) to selling animals. One farmer borrowed C12,000 from his brother to buy millet, and sold poultry some months later to repay the debt. He owned the fowls all the time, but evaluated the expected return on these assets (which reproduced during the period) as greater than the cost of credit (in this case, zero). Another farmer who borrowed at zero interest from his wealthy brother, instead of selling his sheep and goats, said: "If I couldn't borrow I would have had to sell the animals." The cost-return calculation,

as shown in Chapter 4, is one explanation for this specific sequencing; another is the fact that physical assets cannot be reclaimed once sold, whereas it may be possible to default on a loan.

As with borrowing, several farmers expressed a preference for crop mortgaging over animal sales. One farmer mortgaged 3 bags of groundnuts for C6,000, instead of selling his 2 goats, "because there might be hunger again next year. It is better to borrow and feed, and keep the animals for next year's hunger." In other words, owning tangible assets was preferable to dependence on loans which might be unobtainable.

Only occasionally were reservations expressed about raising money for food through borrowing, and then usually with high-interest loans. Adapting the terminology of equation 4.1, consumption loans generate negative future streams of income, and should therefore be avoided unless an alternative response (eg. selling a plough) costs even more in lost (positive) income. The direct costs of asset sales (in terms of lost wealth) had also to be weighed against the risk of being unable to repay loans. Two farmers in Tesnatinga expressed the dilemma succinctly, both electing to 'choose hunger' rather than risk financial embarrassment: (1) "If I borrow money for millet and the next harvest also is not good, how will I come to repay the debt?" (2) "I didn't borrow, because how to repay? It is better to go hungry and not be in debt."

Table 5.17 tabulates responses to food deficit adopted by one middle-ranking household in Terago between the harvest in November 1988 and the early millet harvest of August 1989. This household deployed a range of strategies throughout the period, some aimed at acquiring food, others at restraining consumption of food and resources. Within each category of strategy, a sequence reflecting intensifying stress is apparent. Crop sales by the household head started with henna and were followed by groundnut seed - the bag set aside after harvest 1988 for planting in 1989. As a consequence of this sale, the household head was unable to plant groundnuts in 1989, having no seeds stored or cash to buy seeds, and finding it impossible to borrow either cash or groundnuts.

In October 1988, this household owned 1 bullock, 2 cows, 6 goats and 1 sheep. By July 1989, this had contracted (through sales for grain) to 1 bullock, 1 cow, 2 goats and 1 sheep. Smallstock (goats) were sold first, livestock (a cow) last. Asked in April why he had not yet sold more animals to buy grain, the household head replied that he was planning to sell them in the rainy season, "when I am working hard and very hungry". Asked in July why he had sold his plough rather than still more animals,¹⁵² he explained that the bullock was needed for ploughing (he had entered into a sharing arrangement with a neighbour who owned a plough and one bullock); that the remaining cow would be needed for brideprice when his 19-year-old son married; and that the sheep and 2 goats were retained as a "basic stock" which he hoped would breed.

Relative preferences are clear between strategies also. Supporting assertions made more generally elsewhere in this thesis, the use of farm income for grain purchasing preceded wealth depletion (sales of animals and inanimate assets). Rationing was initiated as soon as grain purchasing started, intensifying alongside the adoption of other, less common, sources of cash (eg. woman's trading profits). Animals were sold only after attempts to borrow had proved unsuccessful.

A final point to note is the simultaneous adoption of several responses by the household in Table 5.17 - crop sales, asset sales, seasonal migration, rationing - which further confounds any attempt to isolate a single, linear sequence. The diverse and interlocking nature of responses to food deficit, as schematised in Table 4.5 and confirmed by the behaviour of this case study household, was repeated throughout Pusiga during the fieldwork period. A deeper conceptual understanding of the trade-offs decision-makers make between the multiple objectives, costs and returns of alternative strategies would require a more formal analysis, possibly along the lines suggested in Chapter 4.3.

¹⁵². This was the only household (of 201) in Terago or Tesnatinga to sell its plough for grain in 1989.

Table 5.17. Response Sequencing: A Case Study Household in Pusiga, 1988/9

	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Income-Raising Strategies								
Sold crops to buy grain: HHH:	henna groundnut -----							
Wife:	soybeans -----							
Son:	groundnut -----							
Sold assets to buy grain: Animals:	1 goat 3 goats 1 cow -----							
Non-animal assets:	wristwatch plough -----							
Borrowing:	HHH tried to borrow but failed -----							
Wife used her off-farm income to buy grain:	trading profits -----							
Son migrated to Côte d'Ivoire to work as a cocoa sharecropper:	left ----		returned -----		bought grain -----			
Consumption-Modifying Strategies								
Consumption rationing:	adults only whole household -----							
Management of granary stocks (harvested grain):	stocks good -----		stocks low -----		granary empty -----		ate some seeds saved to plant -----	

9. Seasonality and Economic Differentiation

The hungry season of 1989 in Pusiga affected different households in different ways, largely according to their individual wealth and reserves. It also provided opportunities for some households to prosper at the expense of others. This issue is explored here.

The converse of impoverishment is accumulation, and there is some evidence that food crises, far from being a "Malthusian leveller", can accentuate inequality within affected communities. Food crises polarise communities by forcing poor households to reduce

their productive base, by transferring their productive assets to wealthy households at undervalued prices. In Watts' Nigerian study, while poorer households were buying grain, borrowing cash, and selling their labour and land, many wealthier households were selling grain, lending cash, hiring labour and buying land. In Pusiga in 1989, it was local wealthy households who bought up the land rights and other assets, which the poor were selling for grain. Watts (1983:441) concludes that it would be incorrect to regard communities as moving *en masse* through cycles of accumulation and asset disposal from year to year: "rather, during a subsistence crisis epicycles of accumulation and decapitalization can occur simultaneously within a single community, intensifying extant patterns of differentiation and immiseration".

While many empirical studies of 'coping strategies' recognise the differential impact of a food crisis on rich and poor, the idea that some households prosper during hungry seasons and famines is rarely recognised, notably in the African literature. This is a feature of the famine literature more generally, where the focus is on the behaviour of 'victims': beneficiaries are ignored. In effect, relationships between richer and poorer households that are mildly exploitative in normal times become sharply one-sided during crises, because the poor are forced to transfer their productive resources to the rich at a more rapid rate and on more disadvantageous terms than usual.

'Accumulation strategies' during crises should be considered as integral to the process as 'coping strategies'. For every seller of land rights or animals (or labour power), there must be a buyer, and that buyer is, more often than not, a member of the same community. The relationship between two farmers in the Pusiga sample during 1989 illustrates this point.

One effect of the 1989 hunger in Pusiga was to increase the pool of labour available to wealthy households in the new farming season, and to depress real wages (nominal wages rose from an average C150/day in 1987 to C200/day in 1988, but did not rise at all in 1989). By April 1989, Atampuri Akologo, one of the poorest household heads in Tesnatinga, was desperate for cash and food. He approached Alhaji Salifu Agure, one of the wealthiest farmer-traders in Terago, for a consumption loan, which the Alhaji

gave on terms which required Atampuri to work an unspecified number of days clearing and weeding his land in the coming farming season. This practice, which might be described as a form of 'labour mortgaging', is common in northeastern Ghana. Because of Islamic prohibitions on usury, most loans given by wealthy Moslems in Pusiga asked for repayment of interest in the form of "help" with farming, rather than extra cash.¹⁵³ Alternatively, the borrower would be required to "add something small" to the principal, in the form of some groundnuts or other produce after harvest.

In June Atampuri tried to sell some small domestic assets (knives, pots) to Alhaji Salifu, without success. When the rains started, Atampuri claimed to be too weak with hunger to work, so sent three of his young children to weed Alhaji Salifu's fields in his place. (These children joined several other members of poor local households, who neglected their own farms to labour for C200 and a meal each day. Meanwhile, Alhaji Salifu's three sons continued travelling between Pusiga and Accra, trading in kola and cattle, the profits from which paid for these hired labourers.) Atampuri struggled to raise loans of seed to plant his own small plot, which he and his wife hoed by hand because they could not afford to hire a plough. By early August the visible difference between Alhaji Salifu's fields and Atampuri's was striking - neat rows of millet and sorghum, already well over four feet tall, in the former case, and straggly clumps of millet, barely three-foot high, in the latter. The longer term implications of this transfer of agricultural labour from poor to wealthy households, during crucial weeks of the farming season, need no elaboration.

Table 5.18 lists several sources of accumulation in Pusiga during 1989, most of which involved transfers between households within the community. (Kola trading, cattle dealing, salaried employment and other sources of wealth accumulation which derive from links outside the village are not included here.) Three strategies are listed under the heading "profited from crisis" - hoarded grain or groundnuts (to sell for maximum

¹⁵³. The word "help" is used by locals to denote all manner of exchanges between households, from free gifts to usurious loans. Even where an economic transaction is clearly exploitative, as in the case of hired agricultural labour, the relationship is perceived as beneficial by each party: the rich man extracts a surplus from the poor man's labour, but the poor man needs the work.

profit when prices peaked), traded grain (not by traders, but farmers who saw an opportunity to profit from scarcity), and bought land rights or mango trees. (Because of the sensitivity of the land question, this figure may well be underestimated). As Table 5.18 reveals, only households of above average wealth adopted any of these lucrative strategies. (Unfortunately, the numbers of households involved are so small that the chi-square test is invalid.)

Two-thirds of the 23 consumption secure households lent cash, grain or groundnuts to poorer households during 1988/9. Because of the Muslim prohibition on usury, these figures may also be understated. Even so, the difference between household categories is significant at 0.001 confidence.¹⁵⁴

As noted elsewhere, the labour market in Pusiga appears to be in transition, with communal labour (unpaid reciprocal weeding parties) on the wane and hiring of labour for cash on the ascendant. This is to the disadvantage of the poor, who retain some access to communal labour (though increasingly among themselves) but cannot afford to hire labour. 19 of 23 food secure households hired labour during 1989, and more hired labour than participated in communal weeding parties - the reverse of the pattern among food insecure households. As with lending patterns, the difference in labour usage between household categories is significant at 0.001 confidence. The fact that all 4 of the self-sufficient and 15 of 19 'consumption secure' households hired labour in 1988 undoubtedly contributed to their achievement of better than average harvests in a generally bad year.

¹⁵⁴. Although the 4 production self-sufficient households were excluded from the enumeration of responses to food deficit in Table 6.1 above, they are included in the examination of accumulation strategies here. However, because there are only 4 observations in the production self-sufficient category, χ^2 proved to be an invalid test for differences between all four household categories. These 4 'self-sufficient' and the 19 'consumption secure' households were therefore merged into a single category of 23 'food secure' households, and the tests were run again. The chi-square results and their associated probabilities reported in Table 5.18 refer to these three categories.

Table 5.18. Accumulation Strategies in Pusiga, 1988/9

Strategy	% of Sample (n=110)	Severe Insec. (n=31)	Mildly Insec. (n=56)	Consum. Secure (n=23)	Chi- square (χ^2)	Proba- bility (p <)
<u>Profited from crisis:</u>						
Stored grain to sell	5.5	0.0	3.6	17.3	8.52	0.014 **
Stored groundnuts	6.4	0.0	3.6	21.7	11.96	0.003 **
Traded grain	2.7	0.0	1.8	8.7	4.14	0.126 **
Bought land or trees	4.6	0.0	3.6	13.0	5.42	0.066 **
Any of the above	15.4	0.0	10.7	47.8	25.07	0.000 *
<u>Lending:</u>						
Lent groundnuts	18.2	9.7	8.9	52.2	22.59	0.000 *
Lent cash or grain	13.6	3.2	8.9	39.1	16.60	0.000
Lent any of above	27.3	12.9	17.9	69.6	26.47	0.000
<u>Employed farm labour:</u>						
Used communal labour	43.6	25.8	46.4	60.9	6.96	0.031
Used hired labour	38.2	9.7	35.7	82.6	30.04	0.000
Used either or both	62.7	35.5	62.5	100.0	23.50	0.000
<u>Miscellaneous:</u>						
Hired out plough	18.2	6.5	14.3	43.5	13.33	0.001
Gifts to other HHs	17.3	0.0	14.3	47.8	21.84	0.000 **
Global 2000 in 1988	7.3	0.0	0.0	34.8	32.63	0.000
Global 2000 in 1989	16.4	6.5	3.6	47.8	21.84	0.000
Mean No. of strategies:	2.0	0.6	1.5	5.0		

* χ^2 may not be a valid test (expected counts < 5 in 33% of cells)
** χ^2 may not be a valid test (expected counts < 5 in 50% of cells)

Because this fieldwork was undertaken during a single year, it is not possible to deduce from these data alone whether the food crisis of 1989 presented the rich with unusually favourable opportunities to accumulate at the expense of the poor. Clearly, buying up usufruct rights to land was only possible because some households were sufficiently under stress to sell these rights. Hiring out ploughs, by contrast, is a regular feature of the new agricultural season, and it is possible that fewer poor people hired ploughs in 1989 than in previous (better) years, being unable to afford this service.

Finally, the bottom row of Table 5.18 reveals a strong association between household food security status and its participation in a range of wealth-enhancing 'accumulation strategies'. Of 12 strategies listed, food secure households engaged in an average of 5.0, mildly insecure households practised 1.5, and severely insecure households employed just 0.6. Disaggregating the 23 food secure households, the 4 self-sufficient households adopted 7.25 each, and the 19 consumption secure households each adopted 4.5 strategies.

10. Conclusion

The data presented for the Pusiga sample in this chapter confirm that households facing food deficits deploy a remarkable variety of behavioural responses in complex patterns and sequences. Significant differences in behaviour were observed across household categories. Wealthier households were less severely affected by poor harvests (because of their control over the most and best quality land, their prior investment in agriculture and their preferential access to pesticides). They were also better placed to respond by purchasing adequate quantities of grain with little visible economic stress - simply diverting some agricultural and non-agricultural income to grain, without noticeably curtailing their spending on major social events (funerals, brideprice, weddings) or on housing, health and clothes.

Conversely, poor households resorted to a wider range of less lucrative (but often socially damaging) sources of cash and food, in order to buy more grain (per adult

equivalent) than the rich. Nonetheless, these purchases proved insufficient to bridge the gap between production and consumption 'needs', and strict austerity was imposed, including consumption rationing and cutbacks in spending on non-food items.

Off-farm incomes emerged as more significant in this study than in many others. The diversion of earned incomes from ceremonial and non-food consumption purposes to food purchases was generally preferred to disposal of assets. Rationing of grain was also practised by most households, being avoided only by the comparatively wealthy. As a consumption modifying response, rationing is taken up in the next chapter. The focus here has been on consumption protecting behaviour, though the reality is that poor households managed to protect neither their wealth nor their consumption satisfactorily.

Chapter 6. Nutritional Consequences of Food Insecurity in Northeastern Ghana

0. Introduction

This thesis is concerned primarily with the economics of food deficits. A central theme is that the observation of seasonal or chronic hunger rarely reflects an absolute lack of entitlements to food. Rather, it was argued in previous chapters that rationing is a strategic response to production deficits, and is motivated by economic priorities dominating immediate consumption objectives. It follows that some proportion of the undernutrition observed in northeastern Ghana in 1988/9 was the product of strategic decision-making within the household.

This chapter assesses the nutritional performance of sampled households in Pusiga during an unusually severe hungry season, and finds evidence that changes in nutritional status were unevenly distributed across individuals and households, and over time. Specifically, nutritional deficits were concentrated not only seasonally but on poorer households and individuals. Rising levels of nutritional wasting are associated with rising market prices and falling granary stocks, as described in Chapter 3. However, these statistics also reflect inequality more generally, being distributed according to each household's economic positioning and (to a lesser extent) each individual's economic and social power within the household.¹⁵⁵

Evidence is presented to demonstrate that households which bought the most grain during 1988/9 also imposed the severest cutbacks on their grain consumption. They suffered the largest production deficits and were least able to bridge this gap through purchases without destituting themselves. These findings complement evidence

¹⁵⁵. The relationship between nutritional outcomes and their determinants is complex, and inadequate food intake is not the only cause of undernutrition. Although poor health, adverse environmental conditions and incorrect feeding practices are not economically non-selective, food consumption is the focus of attention here; health and other variables are treated as exogenous. Justification for this decision is provided by an analysis of whole-household ICRISAT panel data from south India, which found no significant interseasonal differences in respondents' health status, but "substantial seasonal effects" in nutrient intakes (Behrman and Deolalikar 1989a:74).

presented in previous chapters, which suggested that poorer households suffer the worst seasonal stress and are most disadvantaged, economically as well as nutritionally, by the annual hungry season and episodes of underproduction.

1. Methodology

1.1. Data Collection

From the first random sample of 110 Terago and Tesnatinga households, a sub-sample of 66 households was drawn, again at random, for purposes of nutrition surveillance (see Appendix 1). These households were each visited 5 times at 6-week intervals, between December 1988 and July 1989. The timing of the nutrition surveys coincided with the regular economic surveys, extending from the 1988 harvest to the next rains.

At each visit, every household member present was weighed on two Salter scales,¹⁵⁶ except for infants, who were suspended from a spring-balance scale borrowed from Bawku Hospital for this purpose. Mid-upper arm circumferences were measured for all children under five, using a 'Shakir strip'.¹⁵⁷ In Rounds 1 and 5, every individual was measured for height (or length). For adults, the mean of the two measurements was taken as their average height over the fieldwork period; for children, the difference between the two figures measured total longitudinal growth over the period; heights for the intervening rounds were interpolated exponentially. Ages were elicited in Round 1, and cross-checked in subsequent rounds by various means. 80 of 144 sampled children under five had proof of birthdate (birth certificate, informal (notebook) recording, or

¹⁵⁶. One scale was clinic quality, imported from England; the second was a bathroom scale, purchased in Accra. Both were used for verification purposes; the clinic scale figure was recorded. Before starting a weighing session at each household, the enumerators would check their own weights against readings taken on a flat concrete surface before leaving for work that morning.

¹⁵⁷. Unfortunately, the MUAC data proved insufficiently sensitive to seasonal and socioeconomic variations in child nutrition status, and were discarded from the analysis. Methodological problems in collecting and interpreting MUAC measurements are discussed in McDowell and King (1982).

Morley Card¹⁵⁸). Ages of the remaining children, and of most adults, were estimated by the enumerator in discussion with the respondents, using a local calendar.¹⁵⁹ Finally, in all but the first round, the women of the household were asked about illness, rationing, diets and cooking practices.

The nutrition sample included 144 children under 60 months as of December 1988: 72 boys and 72 girls. In the data analysis, however, 31 incomplete records were dropped (where weights were obtained for four rounds out of five, say) so that the effective sample on which the analysis was based consisted of 58 boys and 55 girls, for a total of 113.¹⁶⁰ The sample of adults (defined as all individuals over 18 years old) was reduced from an initial total of 262 (102 men and 160 women) to 185 (73 men and 112 women) for whom complete records were collected. The reasons for incomplete records included temporary visits of women and children to relatives outside Pusiga; women falling pregnant during the survey period; seasonal migration by men; non-cooperation (which was rare); and inability to catch people at home, despite repeated attempts. Systematic biases in the incidence of migration and other demographic responses to food deficit mean that aggregate levels of malnutrition, as well as cross-sectional differences in nutritional status, as reported below, are likely to be underestimated.

Anthropometric data were taken for entire households, rather than only for under-fives. While children are conventionally assumed to bear the brunt of nutritional risk during periods of food deficit, recent studies have suggested - and the present fieldwork confirms - that adults may ration their own food consumption earlier and more severely than the rationing they impose on their children (Autier 1988). It follows that adult

¹⁵⁸. Morley Cards are records of vaccination and clinic attendance, which are issued to mothers when they first take their children to a health post.

¹⁵⁹. A few elderly adults had ID cards, which were issued to people employed in government services for a period in the 1950s and 1960s. Some others had records of their birth date in notebooks. For the rest, local calendars provided adequate estimates of age, rounded to within 5 years.

¹⁶⁰. Also dropped from the analysis were all records collected for 6-17 year olds, because growth spurts complicate the interpretation of these data. Unless otherwise stated, therefore, 'children' and 'adults' in the discussions which follow refer to those members of the nutrition sample who were aged under 5 and over 18 (respectively) during the entire fieldwork period.

nutrition status might be a more robust indicator of economic stress within the household, even if child nutrition status is a better indicator of nutritional risk.

1.2. Child Anthropometric Indicators

The purpose of collecting anthropometric data is to quantify an individual's welfare in nutritional terms. In the nutrition literature, a measurement is a statistic such as age, weight, or height; an index is a biological concept derived from combinations of measurements (such as height-for-age, or Body Mass Index ($\text{weight}/\text{height}^2$)); and an indicator is a social concept resulting from the application of indices - for instance, a child who falls below 2 standard deviations of the median weight-for-age of a reference population is considered to be malnourished (WHO 1986:930).

Until the early 1970s, weight-for-age was used almost exclusively to assess malnutrition in children. But Waterlow (1973:87) argued that this index "conceals two different conditions - deficit in height-for-age ('stunting') and deficit in weight-for-height ('wasting')". These three indices are now used for different purposes in describing the nutritional status of a sample of children under five years old:

1. **weight-for-height** measures wasting (emaciation: weight loss and/or a failure to gain weight);
2. **height-for-age** measures stunting (slow longitudinal growth over time);
3. **weight-for-age** measures concurrent wasting and stunting (emaciation as well as retarded growth).

While weight-for-age is still used to provide a single statistic for malnourished children, the other two indices are more discriminating. A low weight-for-height is indicative of current and short-term malnutrition (such as seasonal weight loss), while a low height-for-age indicates malnutrition in the past or over a longer time period. Martorell

(1985:22) suggests that wasting is "more predictive of short-term health risks", whereas stunting "might better reflect the child's socioeconomic status".

The nutrition data for Pusiga children were analysed using the CDC nutrition software. This package compares survey data to those for a reference population of randomly sampled American children compiled by the United States National Center for Health Statistics (NCHS), which is widely accepted as providing a 'normative standard' against which nutritional performance can be assessed.⁵⁷ It should be noted that there is little evidence to suggest that growth potentials differ genetically between ethnic groups (except for Orientals), so that the comparison between American and Ghanaian children is not spurious. Several studies have shown that healthy black children, whether living in the United States or in Africa, are as tall, on average, as healthy European children (Martorell 1985:16). Observed differences in nutrition status across populations must therefore be explained in terms of local environmental conditions (economy, diet and health) rather than ethnic determinism (Latham 1987:334).

The difference in standard deviations between an individual's observed weight or height, and the median value of these measurements for children of the same sex and age cohort in the NCHS reference population, is called a Z-score.

$$Z = (M_o - M_e) / SD_e$$

where M_o is the observed height or weight of the individual, M_e is the expected (median) height or weight of the relevant age cohort in the reference population, and SD_e is the standard deviation of the weights or heights of that age cohort in the reference population (Sahn 1990:7). By convention, a child is classified as stunted, wasted or underweight if her/his height-for-age, weight-for-height or weight-for-age

⁵⁷. The NCHS reference population was endorsed by WHO in preference to the previously used Harvard standard in 1977, though the two standards are broadly comparable. At the same time, Z-scores were chosen to replace the previous practice of reporting nutrition status in terms of a percentage of the median of the reference population (the main advantage of the Z-score being that it is age-invariant), and the terms 'wasted' and 'stunted' were preferred to 'acute' and 'chronic' malnutrition (WHO 1986).

(respectively) falls below 2 standard deviations of the median height, weight-for-height or weight of NCHS children in the same age cohort (Carlson and Wardlaw 1990). Severe stunting or wasting is signified by a Z-score below -3. Although these cut-off points are arbitrary, in the sense that they provide a purely statistical separation of 'malnourished' from 'well-nourished' children, the " $Z \leq -2$ " rule does constitute a fairly rigorous definition of malnourishment in terms of the American norms, given that 97.6% of observations in a normal distribution fall within two standard deviations of the median, and that child nutritional status is considered to be normally distributed.

1.3. Adult Anthropometric Indicators

In contrast to the wealth of information on child anthropometry, relatively little has been written about nutritional assessment of adults, and no widely accepted reference population of adult measurements exists for cross-cultural comparison. There is also some confusion over the appropriate way to measure adult malnutrition. Currently preferred is the Body Mass Index (BMI).

$$\text{BMI} = \text{Weight} / \text{Height}^2$$

where weight is measured in kilograms and height in metres. "The BMI is a numerical index which does not in itself relate to any reference. There is, in fact, not very much information about the distribution of BMI in representative age and sex groups of different populations" (WHO 1986:938).

Nor is there any consensus on how to interpret recorded BMI values. "Much remains to be learned concerning the critical levels of BMI/body weight and its implications to health and function" (Henry 1990:333). Recently, James, Ferro-Luzzi and Waterlow (1988) proposed cut-off criteria for "chronic energy deficiency" (CED) in adults, based on the individual's Body Mass Index. Three levels of increasingly severe CED are defined (CED I, II and III), corresponding to BMI values of under 18.5, 17.0 and 16.0 respectively. A BMI in the range 18.5 to 24.9 is considered 'normal' or 'acceptable';

over 25 is considered 'overweight'; while a BMI of 12.0 is seen as the limit below which survival is impossible - at least for men. In a review of data from several studies of starvation (famine victims), voluntary semi-starvation (fasting), and anorexia, Henry (1990) discovers that a mean BMI of 13.0 is invariably fatal in males, but that a few women have survived with BMI values as low as 10.0 or even 9.0. Henry (1990:331) concludes that "men and women respond differently to energy deficits"; in particular, that it seems women can withstand food deprivation more successfully than men. One implication of this finding is that observed anti-female bias in intra-household food distribution under stress may partly reflect a recognition by men and women of this biological difference, though no studies appear to mention this possibility.¹⁶²

2. Child Nutrition in Northeastern Ghana

Three national nutrition surveys have been conducted in Ghana since independence - in 1961/2, 1986, and 1987/8. All three included villages within Bawku District. The first surveyed Binduri, a farming settlement 20 miles southwest of Pusiga, while the second surveyed 7 villages in Bawku, including Koltamse, a section within Pusiga itself, adjacent to Terago. (Village-level information from the 1987 Ghana Living Standards Survey was not available at time of writing.) In addition, two other researchers have collected nutrition data during periods of fieldwork in Bawku District. Gill Gordon, a nutritionist, worked in south Bawku in the early 1970s, while David Cleveland, a demographer, worked just three miles from Bawku town, during the late 1970s. Results from all these surveys will be referred to in the discussion below.

¹⁶². In the context of the present fieldwork, it is interesting that women in Pusiga live longer, on average, than men, but that elderly women also have the worst CED levels of any age cohort (see section 3.2 below). If post-reproductive women are being systematically deprived of food, this apparently is not sufficient to raise their mortality risk.

2.1. Basic Statistics

In 1986, UNICEF-Accra and the Ghanaian Ministry of Health undertook the country's second National Nutrition Survey, covering 14,000 children. (Summary results are presented in Table 6B.3.) The first points to note are that anthropometric data were collected once only, so that no observations about intra-annual trends can be made, and that the date of the survey was November-December 1986 - after harvest, when children are typically at their best nutritionally, so that seasonally-related wasting, in particular, was certainly underestimated. As for data analysis and reporting, Harvard percentiles were used rather than NCHS Z-scores, so these results are not comparable with those reported below for the present study.

Nutritional indicators in the 'Northern Savannah Zone' (as distinguished ecologically from the 'Coastal Zone' and the 'Forest Zone') were uniformly lower than national averages. "The northern savannah zone is in general the worst area nutritionally by all measurement criteria" (UNICEF-Accra 1989:25). Within this zone, Bawku tended to perform worse than other Districts. Both within the Northern Zone and nationally, Bawku registered the highest proportion of low weight-for-age values, with 68.6% of children weighed being classified as underweight. In terms of height-for-age, the highest proportion of under-fives in the low categories was again found in the Northern Savannah Zone, but within the zone there was little inter-district variation. Bawku performed slightly better in respect of weight-for-height, recording the second worst figures in the Northern Zone and the third worst in the country. Based on these data, 46.1% of children under five in Bawku District were classified as wasted, and 54.0% as stunted. Both figures are higher than the national averages (40.3% and 51.5% respectively), though not quite the worst in the country.¹⁶³

On this evidence, nutritional deprivation for children in Bawku appears to be as bad as or worse than anywhere else in Ghana. UNICEF attempts to explain this in Malthusian terms. Bawku District "has one of the highest population densities in the country. It

¹⁶³. The figure for wasting is considerably higher than that recorded for the present study (see below), probably because different cut-off criteria were used.

is, therefore, likely that the carrying capacity of the area has been compromised to the point at which a high environmental resistance has been produced, hence the poor nutritional performance of children in this area" (UNICEF-Accra 1989:26). As argued elsewhere in this thesis, this explanation identifies only one element in a highly complex picture.

Preliminary results from the 1987/8 GLSS anthropometric survey "show a strong regional pattern, with malnutrition increasing roughly from South to North" (Alderman 1990:i). Nationwide, 36.1% of rural children under 5 were found to be stunted, more than double the average of 16.2% recorded at the same time in neighbouring Côte d'Ivoire, though levels of wasting in the two countries were similar (Sahn 1990). Alderman (1990:2) attributes this difference in stunting and other social indicators to differences in economic policies: "the cumulative impact of economic mismanagement since independence" in Ghana. Nonetheless, the GLSS findings do represent an improvement over the UNICEF-Accra data for 1986, which Alderman suggests reflects both Ghana's rapidly improving economic performance since 1983 and the fact that children who suffered nutritionally from the drought and famine of 1983 would mostly have left the under-5 age cohort by 1987/8.

Turning now to the results of the present study, Table 6.1 and Figure 6.1 suggest that the nutritional status of 113 sampled children in Pusiga during 1989 was, predictably, worse than that of children in the NCHS reference population. Under-fives in Pusiga are shorter, and weigh less, than American children of the same age. On average, over five rounds, taking a Z-score of -2 or below as evidence of malnutrition, 46.3% of sampled children were stunted, 44.1% were underweight, and 12.3% were wasted (though wasting reached 16.8% during the hungry season). Setting this in the African context, these figures compare with GLSS estimates for rural Ghana in 1987/8 of 36.1%, 31.4% and 8.0% respectively, and for Africa as a whole of 35.3%, 26.6% and 10.2% (Carlson and Wardlaw 1990:20;90, using identical indices and cut-off points to

those adopted here). So the pattern for child malnutrition in Pusiga appears to be typical of that for rural Africa, if rather exaggerated.¹⁶⁴

It might seem anomalous that stunting emerges as far more significant in Pusiga than wasting, given the extremely seasonal nature of food production, but this can be explained. There are mutually reinforcing interactions between seasonal (or acute) and persistent (or chronic) food deficits. Although seasonality is expected to cause wasting, it also contributes to stunting: "because the repeated seasonal checks to growth imposed on a child become progressively less reversible with age, this ratcheting effect is an important device that results in an accumulation of growth deficits throughout the whole of childhood" (Payne 1989:25).

Gordon (1973:292) concluded from her survey of 492 children in ten villages in south Bawku District that there is "a high degree of nutritional dwarfing in the Bawku area. Growth in both weight and height is retarded, with the result that the weight-height ratio is normal, but the individual is of small stature." The fact that low weight/age percentages are almost as high in Pusiga as those of height/age confirms that the effects of long-term nutrition deficits (as reflected in stunting) dominate over short-term episodes of nutrition deprivation (seasonal wasting).

Table 9A.1 reveals a high level of stunting among children under 24 months in the Pusiga sample. This suggests that parents were unable effectively to protect their infants against the severe food deficits of 1987 and 1988. Slightly older children performed rather better, which is consistent with better harvests in the 1985-87 years. Since most long term nutrition deficits are accumulated in the first 2-3 years of life (Martorell 1985), 3-5 year-olds would have experienced rationing in 1987/8 in the form of seasonal wasting more than stunting.

¹⁶⁴. Valid objections have been raised to studies which purport to summarise malnutrition at national or even sub-continental levels in terms of anthropometric aggregates. For a review of these debates, see Svedberg (1991), who notes that estimates for the incidence of undernourishment in sub-Saharan Africa range from 5% to 44%, depending on what indicators and cut-off criteria are employed. The listing of summary statistics here is for broad comparative purposes only.

Fig 6.1. Malnourished Children
in Pusiga, Ghana and Africa

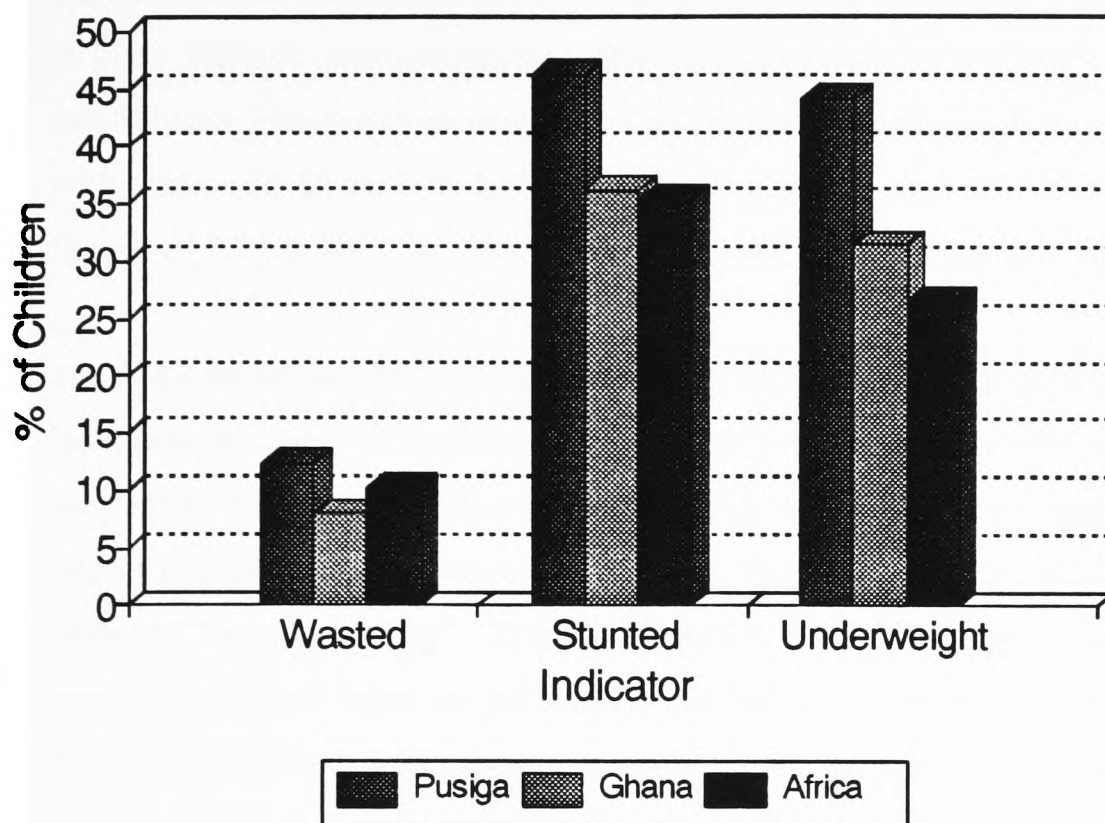


Table 6.1. Malnourished Children in Pusiga, Ghana and Africa (%)

Indicator	Pusiga 1988/9	Ghana 1987/8	Africa 1980s
Wasted	12.2	8.0	10.2
Stunted	46.3	36.1	35.3
Underweight	44.1	31.4	26.6

Sources:

Pusiga - survey data, 1988/9: 113 individuals averaged over five rounds = 565 observations

Ghana (rural) - Carlson and Wardlaw (1990:90): data from the Living Standards Measurement Survey (GLSS) of 1987/8

Africa - Carlson and Wardlaw (1990:20): data from nutrition surveys in 30 sub-Saharan Africa countries during the 1980s

2.2. Child Malnutrition by Gender

Intra-household discrimination in favour of boys in the allocation of food and resources is often inferred demographically, from female-male ratios (FMR). The FMR for sub-Saharan Africa was estimated at 1.02 in 1986, which compares not unfavourably with a ratio of 1.05 for both Europe and North America, and is considerably better than figures of 0.93 to 0.95 for West Asia, China and India (Drèze and Sen 1989:52).

The FMR measures gender differences in life expectancy and mortality levels. But the 'adaptationist' view of nutrition (see also section 2.3 below) would suggest that quite substantial food intake differentials can exist without any observable demographic impact (Messer 1986). Girls might grow up "small but healthy" (stunted) while boys grow up "big and healthy". It is also arguable that differences in boy-girl mortality rates are affected more by differences in access to health services than to food. Reviewing the South Asian literature, where female mortality in the younger age groups is much higher than male mortality, Harriss (1987) found strong evidence for parental neglect of girls and anti-female discrimination in the provision of health care, but no clear evidence that boys are favoured in the intra-household distribution of food.

Turning to Africa, Lipton (1983) cites 1960s studies from Kenya and Tanzania, which found no significant differences in relative weight-for-age between boys and girls (if anything, any observed bias was against boys). As for adults, aggregating the results of 26 African village surveys, Lipton found that men averaged 89% of weight and height norms, while women achieved 94%. More recently, Drèze and Sen (1989:81) conclude their comprehensive review of the literature with the encouraging observation that, "in sub-Saharan Africa, there is no evidence of widespread discrimination against girls in comparison with boys, in the field of nutrition".

These findings may reflect the control women in Africa have over the preparation of meals. When about a dozen men and women in Pusiga were casually asked who eats better in local households, most replied: "Women, of course, because they/we do the cooking." Also, in northeastern Ghana (in contrast to much of south Asia), there are

no economic reasons for parents to prefer sons to daughters. Sons are valued for their labour power and income-earning potential, but daughters earn brideprice, which fathers need to pay for the marriage of their sons. Most adults in Pusiga expressed a desire for large families, with equal numbers of sons and daughters.

Table 9.B2 presents sex ratios for the Upper East Region in 1984. A curious trend is evident, with almost equal numbers of under-5s, but many more 6-14 year-old boys than girls. Between 15 and 55 years of age, women dominate men numerically at all ages, but this almost certainly reflects the effects of male seasonal and longer term migration.

In terms of boy-girl differentials in nutrition status, the results of the present study (58 boys and 55 girls) conform broadly to those obtained for Northern Ghana by UNICEF's 1986 National Nutrition Survey. No significant gender differences were found in either study for average weight-for-age or weight-for-height. In the UNICEF study, though, female children consistently outperformed males in terms of height-for-age: more boys were classified as stunted than girls (UNICEF-Accra 1989:19). Conversely, in the present study, and in support of Gordon, rather more girls emerged as stunted than boys (48.7% against 44.1%). Yet more boys (14.8%) were wasted during 1989 than girls (9.5%), though this difference is not statistically significant (Table 6A.2a). Table 6A.2b presents these gendered data in the form of average Z-scores for each indicator.¹⁶⁵

2.3. Child Malnutrition by Season

There is an unresolved debate between the 'adaptability model' and the 'genetic potential model' of malnutrition (Osmani 1987), concerning the functional consequences of malnutrition. In terms of seasonality, 'adaptationists' would argue that the regular fluctuations in bodyweight that result from intra-annual food intake variability have no biological costs in terms of shortened life expectancy or permanent disability: "even if seasonal episodes of food shortage contribute to short children, this represents a healthy

¹⁶⁵. Mean Z-scores summarise the nutritional performance of the sample as a whole, rather than simply the proportions classified as malnourished in terms of an essentially arbitrary cut-off criterion.

adaptive process that has no serious functional consequences" (Payne 1989:25). The opposing camp argues instead that wasting and stunting impair an individual's physical and intellectual performance, reducing their quality of life. At the very least, seasonal hunger concentrates the risk of morbidity and even mortality for vulnerable groups at certain times of year. When individuals who are already malnourished face severe intra-annual fluctuations in their food intake, "the bounds of homeostatic adaptation are likelier to be exceeded" (Lipton 1983:56).

To some extent the argument revolves around 'cut-off points' and the definition of 'nutritional risk'. At what level of nutrition deprivation do functional consequences occur? At what point does rationing become life-threatening? Cut-off points are indeterminate: food intake requirements vary between individuals, undermining the concept of 'subsistence food requirements' or generalisable RDAs ('recommended daily allowance'). Requirements also vary intra-individually - according to the person's age, energy expenditure, morbidity status and other constantly changing factors.

While this debate is important among nutritionists, it is not of primary concern here. More pertinent is the relationship between 'nutritional risk', as perceived by household decision-makers, and their decisions over the allocation of food and other resources (such as whether to spend scarce cash on treatment for a sick child). As suggested in Chapter 4, the cost-benefit evaluation facing parents in responding to food deficits between rationing (a 'continuous' response with uncertain consequences) and asset sales for food (a 'discrete' response with measurable consequences), may be one of the most complex trade-offs decision-makers within the household have to make. The fact that better nourished children in Pusiga tend to belong to wealthier households (see section 5 below) is of itself an argument for treating malnutrition in northeastern Ghana as at least normatively undesirable, even if it is not physiologically dysfunctional.

UNICEF (1985:10) estimated that 53% of Ghanaian children were malnourished in mid-1983, and noted that this already high figure was compounded by "sharp seasonal variations in malnutrition". Monthly data collected by the Catholic Relief Services at health posts throughout Ghana also reveal intra-annual variations (see Table 6B.1),

despite the fact that data from the south of the country (the forest and coastal belts) would not be expected to follow the same seasonal trend as the northern savannah regions. It is noticeable that seasonal variability is less marked in 1980-1982 than in 1983 - a disastrous year for the Ghanaian economy generally and for agriculture in particular. This suggests that, in nutritional terms, the brunt of the 1983 crisis was borne by children - or at least, that children were not adequately protected.

Table 6.2 presents Z-scores for child anthropometry in Pusiga which reveal, most notably, sharp seasonal variations in the incidence of wasting. A steadily deteriorating average weight-for-height Z-score for the sample (n=113), from -0.44 in December 1988 to -1.08 the following July (significant at 0.001), is associated with a near-doubling in the percentage of children classified as wasted, from 8.8% to 16.8%, over the same period (see also Table 6.A3). Assuming that this pattern is repeated each year, such that the prevalence of wasting would have fallen back to the December 1988 level by December 1989, it can be deduced that, intra-annually, child nutrition in northeastern Ghana is at its best following the main annual harvest in November, and worsens steadily during the dry season (February to May) as grain stocks are consumed, reaching its nadir when the heavy rains arrive in July and August.

Levels of stunting also rose slightly during 1989, but by proportionately much less. It is worth noting that the nutritional status of most children fell even as household spending on food steadily increased (Chapter 5.5). Partly this was a price effect, but kilograms of grain purchased per capita rose along with prices. One explanation is the diversion of food away from children and towards adults as the farming season started (section 4 below); another is that grain purchases did not completely replace dwindling granary stocks, so that total cereal availability (and consumption) at the household level (production + purchases) fell month by month. Apart from staple grains, supplementary foods (groundnut, mangoes, garden vegetables) were also available more in the early months of 1989 than mid-year. Finally, the quality of snacks and stews (which are important sources of protein, vitamins and minerals) also declined over this period, mainly because of economic pressures on women (section 5.2.3 below).

Fig 6.2. Z-Scores, Under-5s, by Round

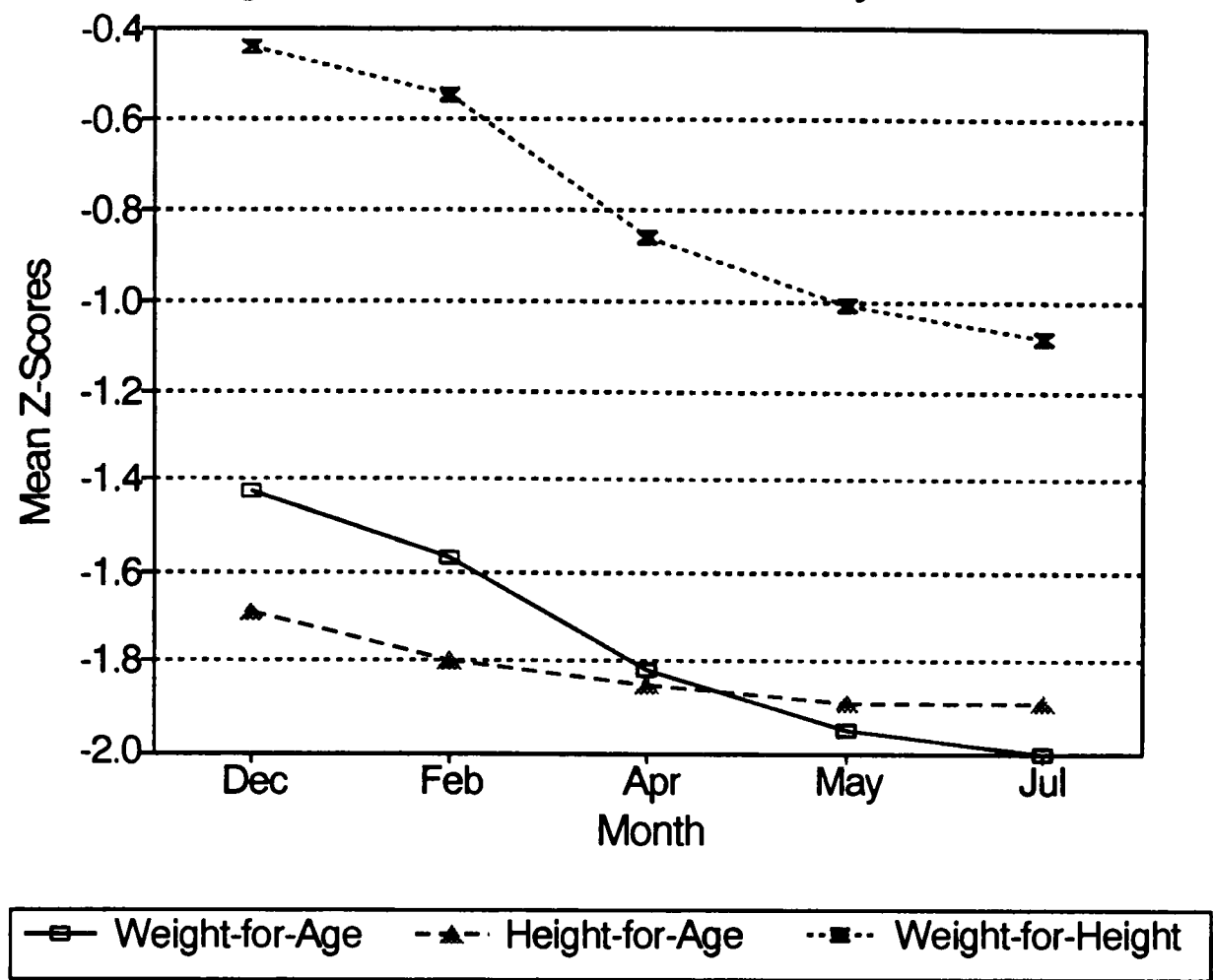


Table 6.2. Mean Z-scores, Under-Fives, by Interview Round

Index	Month					Signi- ficance level
	Dec	Feb	Apr	May	Jul	
Wt/Ht	-0.44 (1.16)	-0.55 (1.19)	-0.86 (1.04)	-1.01 (1.03)	-1.08 (1.00)	0.0001
Ht/Age	-1.69 (1.69)	-1.80 (1.57)	-1.85 (1.52)	-1.89 (1.51)	-1.89 (1.51)	N/S
Wt/Age	-1.42 (1.24)	-1.57 (1.20)	-1.82 (1.18)	-1.95 (1.15)	-2.00 (1.09)	0.001

(n=113 each Round; standard deviations in parentheses)

Seasonal hunger in Pusiga is a reflection of dwindling supplies not only of staple cereals, but also of supplementary foods and snacks, and the hungry season can be interpreted as one of those episodes which result in the "accumulation of growth deficits" for children and produce "nutritional dwarfing" for the population of northeastern Ghana as a whole.

3. Adult Nutrition in Pusiga

The main purpose of collecting adult weights and heights in Pusiga was to examine seasonal trends in adult wasting during 1989 by gender and age cohort. These data will also be compared to trends in child nutritional performance over the same period, in order to comment on intra-household differentials in the impact of food deficits.

3.1. Adult Nutrition by Season and Gender

Before considering the results for adults of the Pusiga nutrition survey, a further discussion of the 'hungry season' or *soudure* in seasonal agricultural communities is needed. An important distinction between adults and children in this respect is the fact that the energy expenditure of young children is more or less constant all year round, while adults engaged in farming experience sharp seasonal fluctuations in their activity rates and energy requirements. This complicates the analysis of seasonality with respect to adult nutrition. The inference that declining nutritional performance from harvest to hungry season is associated primarily with rationed food consumption is less valid for adults than children, since an observed fall in adult bodyweights could be caused by increased energy expenditure despite constant or even rising food intake.

The 'hungry season' has been defined by Ogbu (1973:317) as "a period of the year when members of a population feel they eat less than they normally would and that what they eat is not what they regard as a good diet, i.e. it does not meet their nutritional standard." The advantage of this "cultural rather than biophysical" definition (Ogbu 1973:331) is in locating the perception of hunger or nutritional inadequacy on

the people who suffer it, rather than on some 'objective' criterion of calorie deficits (such as the FAO's 1952 norm for Africa of 2,400 calories per day).¹⁶⁶

Throughout sub-Saharan Africa, consumption during post-harvest feasting (festivals and funeral parties), when farmers have little work, tends to be higher than during planting and weeding - the months of peak energy expenditure. Summarising 25 village surveys, Schofield (1974:23) found a significant difference between adult food consumption in the dry season (post-harvest) and the wet season (farming), at 2,102 and 1,885 kcal/day respectively. Against this, a study of women farmers in the Gambia estimated their energy expenditure levels at more than 300 kcal/day higher during the early rainy season months of June and July than during the dry season months of February and March (Lawrence *et al.* 1989). This mismatch between food intake and energy output results in much of the observed seasonal fluctuations in adult bodyweights.

Reviewing several West African food intake studies, Longhurst and Payne (1981:49) identify a "stereotype West African situation", whereby energy intakes are highest in the November-December post-harvest period and lowest in July and August. From a classic longitudinal study in the Gambia in the late 1940s, Haswell (1981:39) reports: "Lowest food intakes were found in the July-August pre-harvest 'hungry season' during the period of intensive agricultural work." This was associated with a "pronounced" seasonal weight loss among adults (Platt 1954:100). Bodyweights partly recovered following the early millet harvest, before the main harvest late in the year. So food consumption in the semi-arid tropics closely follows the agricultural production cycle. Calorie intakes appear to be positively related to granary stocks (self-production) and negatively correlated to market food prices (purchases).

Like many others, Ogbu (1973:331) assumes that the cause of seasonal hunger is simply an inability to secure sufficient food - "the resources available do not permit people to satisfy their hunger". This removes any consideration of strategic decision-making from the analysis. As demonstrated in Chapter 4, households might find it economically

¹⁶⁶. Recent attempts by the World Health Organisation and others to disaggregate this 'norm' by gender, age cohort and/or energy expenditure category seem only to refine this simplification.

rational to exhaust granary stocks first (minimising storage losses) before buying food, even if this delay incurs terms of trade losses (exchange entitlement declines). The optimal pattern of grain storage, consumption and purchasing depends on, *inter alia*, the magnitude of interseasonal fluctuations in entitlements to food (market prices, expected returns on assets) and in granary stocks (storage, 'social' and 'snacking' losses).

Economic considerations aside, Dugdale and Payne (1986) demonstrate by means of a simulation model that the "stereotype West African" pattern of consumption could be nutritionally optimal. Unless storage losses are zero, it results in a higher aggregate level of food intake than a strategy of maintaining energy equilibrium and constant bodyweight (by eating relatively little after the harvest and most immediately before the next harvest). Since least energy is expended during the dry season, post-harvest feasting builds up a stock of body fat and ensures that adult bodyweights are high when the rains (and hard labour) begin again.

Other studies argue that productivity is adversely affected by inadequate food intake during the farming season. The problem, that "peak agricultural labour inputs coincide with reduced caloric intakes" (Schofield 1974:24), might be insufficiently compensated for by body fat accumulated after the harvest. Evidence for this 'efficiency wage hypothesis' is provided by Kumar (1987a, 1988), in a Zambian survey, and by Behrman and Deolalikar (1989b:117), who found that rising food consumption by adult males in south India had "an immediate productivity impact".

Empirical evidence on nutrition seasonality for northeastern Ghana seems to conform to the "West African stereotype". In 1961/2, a nutrition survey conducted in Binduri, Bawku District, found comparatively high energy intakes (2,199 kcal) during May-June, falling by 32% to 1,666 kcal in September-October, immediately pre-harvest, and rising again to 2,112 kcal just after the harvest in November-December.

Apart from three evenings spent recording food preparation and consumption in two non-sampled households (results not reported here), no attempt to assess food intake

was made during the fieldwork in Pusiga.¹⁶⁷ Nor were activities monitored or energy expenditures estimated. Instead, as for children, anthropometric measurements of adults (height and weight) were taken, from which indicators of nutrition status and changes in nutrition status could be derived. Basic demographic and nutritional characteristics of the adult sample are summarised in Table 6.3.

Table 6.3. Summary Demographic and Nutritional Characteristics of Adults in the Pusiga Nutrition Sample, by Gender

Indicator	Men (n=73)		Women (n=112)		Total (n=185)	
	Mean	(sd)	Mean	(sd)	Mean	(sd)
Age (years)	44.6	(14.2)	39.4	(15.7)	41.5	(15.3)
Weight (kg)	57.6	(8.9)	50.7	(8.0)	53.4	(9.0)
Height (cm)	171.4	(7.4)	160.7	(6.6)	164.9	(8.7)
BMI (kg/m*m)	19.5	(1.8)	19.6	(2.7)	19.6	(2.4)
Weight loss 12/88-7/89	-4.3%	(4.0)	-3.6%	(4.5)	-3.9%	(4.3)

Note: Results averaged over five rounds (925 observations: 560 female, 365 male).

The Body Mass Index was calculated for all 185 adults in the Pusiga sample for whom complete records were obtained. Women exceeded men by some 53% because of male absenteeism (seasonal or long term migration), and consequent high female-male ratios in most 16+ age cohorts. The mean BMI for the full sample, averaged over 5 rounds, was 19.6 ± 3.9 kg/m² (at 95% confidence). This figure compares with a representative average for industrialised Western countries of 25.0 ± 2.5 kg/m² (WHO 1986:938).

Table 6.4 plots changes in Body Mass Index by gender and interview round. There is a consistent but statistically not significant drop in mean BMI for both women (n=112) and men (n=73) month by month, which corresponds to a fall in mean bodyweights of

¹⁶⁷. Although a good deal of dietary composition and food preparation data was collected during this fieldwork, space limitations preclude detailed discussion of this largely descriptive information.

3.6% (1.8 kg) and 4.3% (2.4 kg) respectively, over the 8-month period from December to July (Table 6.3). The fact that men fared slightly worse, relative to women, might be explained by the new farming season in rounds 4 and 5 of the survey, when male energy expenditures were higher than those of women (see also Figure 6.6 below). Female activity rates are less dramatically seasonal than those of (mainly male) farmers.

Other West African studies confirm the absence of significant gender differences in nutrition status and, by inference, in nutrient allocation, among active adults. An anthropometric study in central Mali similarly found that, on average, "women are slightly better off than men" in terms of weight/height norms (Hilderbrand 1985:268).

Table 6.4. Adult Body Mass Index by Gender and Interview Round

BMI	Month					Mean (five rounds)
	Dec	Feb	Apr	May	Jul	
Sample (n=185)	19.91 (2.3)	19.79 (2.4)	19.60 (2.5)	19.37 (2.4)	19.15 (2.5)	19.56 (2.4)
Women (n=112)	19.98 (2.7)	19.80 (2.7)	19.56 (2.7)	19.40 (2.7)	19.26 (2.8)	19.60 (2.7)
Males (n=73)	19.81 (1.7)	19.76 (1.9)	19.66 (1.9)	19.33 (2.0)	18.98 (1.9)	19.51 (1.8)

(standard deviations in parentheses)

3.2. Adult Nutrition by Age Cohort

A growing literature examines the evidence for intra-household discrimination against certain categories of household members in the allocation of food (and in spending on health, which also contributes to nutrition status), particularly in the context of low

levels of income or food availability.¹⁶⁸ Intra-household 'ageism' in the distribution of food could be directed by those with decision-making power against either elderly or young dependants. Here the relative position of the elderly within Pusiga households is examined, followed by a discussion (in section 4) of that of children.

Figure 6.3 disaggregates men and women into three age cohorts: 18-35 year-olds, 36-49 year-olds, and people over 50 (see also Table 6A.4). Disregarding gender differences for the moment, there is a clear correlation between BMI and age: the mean BMI over five rounds is 20.4 for young adults (n=79), 19.6 for the middle-aged (n=51), and 18.3 for those aged 50+ (n=55). In the youngest cohort, women achieve marginally higher BMIs than men, but this is reversed among older people, becoming quite pronounced among the over-50s. Elderly women are clearly the most nutritionally disadvantaged age-sex cohort in the adult sample. This conclusion is reinforced by age-sex specific figures for adults with Chronic Energy Deficiency (as defined above, in terms of BMI cut-off points). There is little to choose between the proportions of men and women with CED in the young and middle-aged cohorts, but 65% of women and 42% of men over 50 recorded average BMI values below 18.5 over the 5 rounds of the survey (Figure 6.4 and Table 6A.6). In July 1989, the actual numbers of over-50s with CED were 20 out of 27 women and 14 of 28 men.

However, as James *et al.* point out, the BMI should be related to physical activity levels before a diagnosis of chronic energy deficiency can be made with confidence. The poor BMI performance of many elderly women in Pusiga is partly explained by their relative inactivity. Adams (1992:103) suggests that the prevalence of CED among women of post-reproductive age in her anthropometric study in central Mali "may represent the outcome of years of child-bearing and demanding physical labour".

¹⁶⁸. See, among recent additions to this genre, Abdullah (1989); Behrman (1986, 1987); Haaga and Mason (1987); Harriss (1987).

Fig 6.3. Adult BMI by Gender, Age Cohort and Round

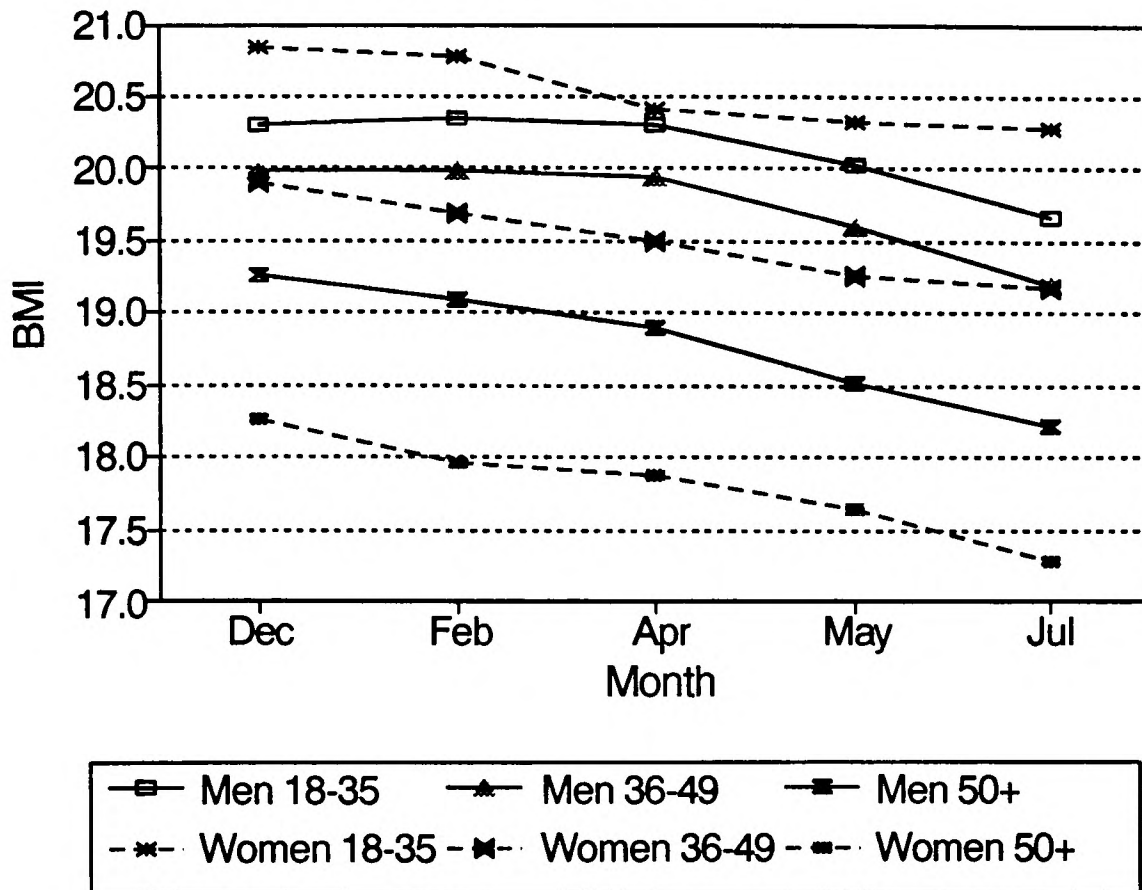
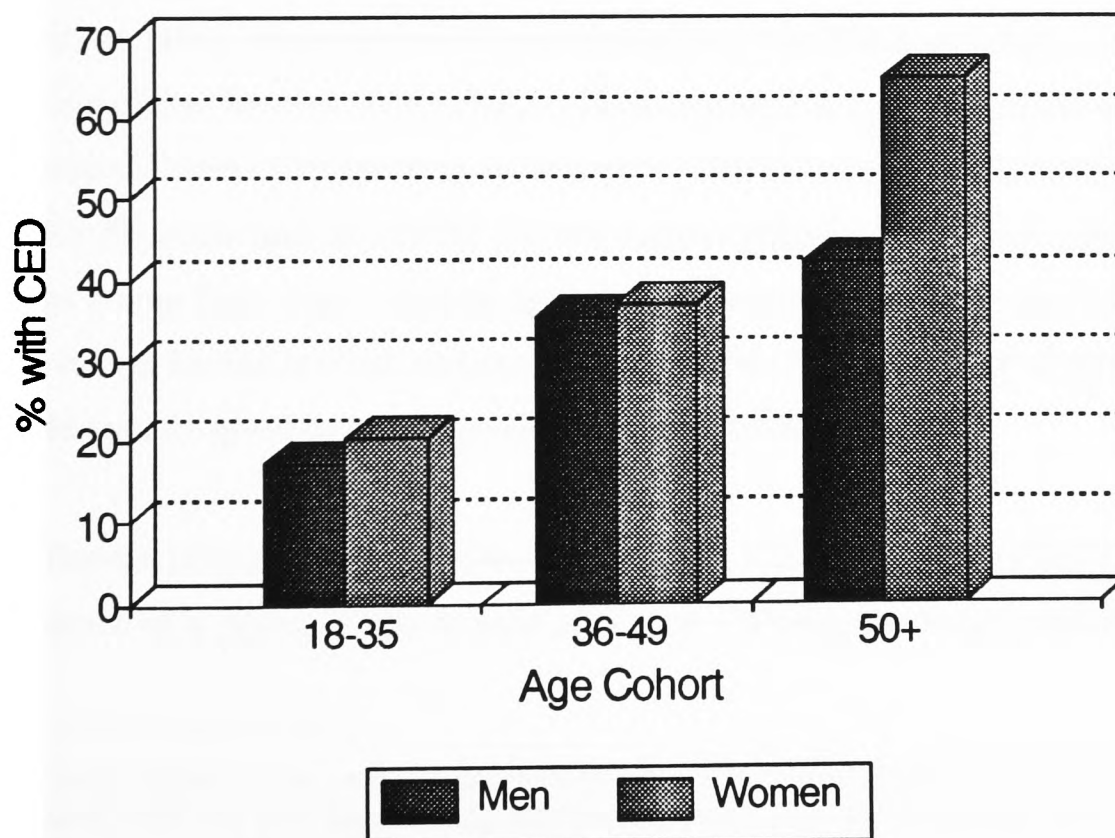


Fig 6.4. Adults with Chronic Energy Deficiency, by Gender and Age Cohort



Another factor explaining the observed differences in nutritional status between elderly men and women is the low social status of widows in northeastern Ghana. Widows have few claims on the land, labour or food of the household to which they belong (which is often headed by a stepson, not a natural son), and once infirm they depend on nothing more concrete than the affection or sense of responsibility of their families for survival. Widows are frequently resented for the burden they are seen as imposing on scarce resources, and occasionally they are ejected from the compound and left to fend for themselves, or a separate dwelling is built for them nearby. This symbolic separation also implies a breaking of reciprocal responsibilities, and thus threatens the widow's access to food. No longer a recognised member of the household, she no longer has even a tenuous claim to a share of the contents of the granary.

4. Intra-Household Differences in Nutrition Status: Adults and Children

Seasonality adds to the nutritional problems of both the old and the young. During the farming season, energy expenditure (and hence calorie requirements) is likely to be higher for active adults than at any other time of year, and certainly higher than that of their young children and aged dependants.¹⁶⁹ This seems to provide a rationale for adults to ration consumption of 'non-productive' household members, at least during these months. In West Africa, little evidence for such discrimination exists, at least not against children. Commenting on Simmons' (1976) study in northern Nigeria, Lipton (1983:39) notes that the results "do not suggest selective child deprivation at meals". Even during food crises, children appear to be protected against severe hunger. During the 1984/5 famine in Chad, observers noted that "the food remaining in the families was preferentially given to young children" (Autier 1988:71).

In Bawku District, only 12 miles from Pusiga, Cleveland (1980:220) found similar evidence of a pro-child bias in food allocation. "During the hungry season in Kusaok

¹⁶⁹. 'Young children' here refers to under-fives. In much of rural Africa, and certainly in northern Ghana, boys and girls start farming and domestic work at a very young age, and are considered "net producers" by the age of ten (Netting *et al.* 1980:292).

older children and adults are generally stoic, while sometimes becoming grumpy or uncommunicative. Young children, however, express their hunger by crying, and if there is only a little food it will be given to them." Cleveland's anecdotal evidence is supported by comments made by parents in Pusiga: "If your child is hungry she will cry, but if an adult is hungry she will not cry. So we always feed our children first." Confirmation also comes from data on reported rationing within households. Over the entire larger sample, adult rationing was reported in 65% of 111 households, and child rationing in 52% (see Table 6A.7).¹⁷⁰

Figures 6.5a and 6.5b show reported rationing and numbers of meals per day, for adults and children, by season. After the poor harvest of 1988 there was a steep rise in the number of households where rationing was imposed on both adults and children, corresponding to a general recognition that this would be a tough dry season, though this translated into only a marginal drop in average meals per day, which suggests that 'belt-tightening' took the less drastic form of smaller portions, rather than skipped meals. Throughout the 8-month period of the survey, there were some households where adults rationed their consumption but children were not rationed, which explains why the trend line for rationing is consistently higher for adults than children. Adult rationing in 1989 peaked during March-April, and fell in June-July, as their food consumption apparently rose, in line with increased energy requirements. Conversely, children experienced an increase in food rationing and a second drop in their average meals per day at this time.

Two important conclusions are suggested by these figures. First, it seems that most people in Pusiga over-compensated for the poor harvest at the start of the dry season. Their expectations were that grain prices would rise much higher, and asset prices fall much lower, than actually was the case. (Dire predictions about impending famine were common among local farmers and Ministry of Agriculture officials around this time.)

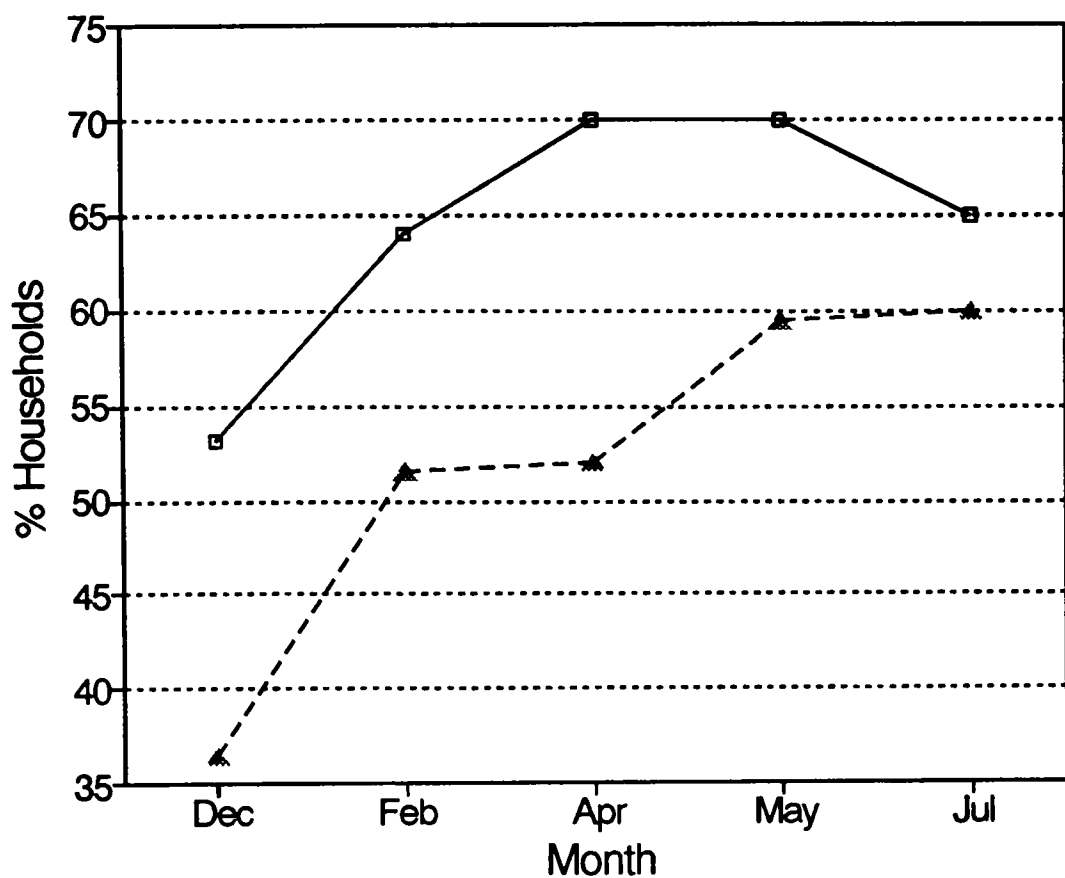
¹⁷⁰. This was reported by adult respondents rather than objectively observed through food intake assessment, but the results are consistent with the nutrition data and can be cross-checked: "Reported Rationing" (Figure 6.5a) was obtained by questioning male household heads, while "Meals per Day" (Figure 6.5b) derived from a different (female) enumerator questioning women, and these two sets of data, being (visually) virtual mirror images, clearly support each other.

The reasons for this excessive pessimism have been discussed elsewhere. The fact that Pusiga was suffering a second consecutive bad year meant that traders were better prepared to bring grain into local markets, and the government played its role in keeping prices down by providing cheap rice through its parastatal, the Ghana Food Distribution Corporation. Consequently, exchange entitlement declines were less than people planned for, and this may have allowed them to ease up on food rationing after the initial shock.

Second, it is interesting that meals consumed and reported rationing for adults and children follow each other for the first three rounds, after which they move in opposite directions - adults eating more than before, children less. This reversal corresponds to the start of the new farming season. It appears that austerity was introduced into Pusiga households with some 'positive discrimination' in favour of children, but that a minor reallocation of food was made in favour of adults when the 1989 farming season raised their energy needs, both absolutely and relative to the energy requirements of their dependants.

It is, of course, impossible to deduce from these data that either children or adults suffered more, in nutritional terms, during the 1989 hungry season. But Table 6.5 makes some comparisons through adopting a rather unorthodox procedure: calculating Body Mass Index data for under-fives (using the same weight and height measurements as for the earlier discussion of child anthropometry), and setting these alongside those of adults. BMI is not generally used as an indicator of child anthropometry, and its function here is purely comparative. Table 6.5 shows a clear trend of falling BMI for each gender and generation within sampled households. Everybody, it seems, became progressively worse off in nutritional terms during 1989. The only unknown is the relative incidence of declining nutrition status - who suffered most in a context of household-wide austerity? With this question in mind, Figure 6.6 charts the percentage change in BMI for each of the four age-sex categories, round by round.

Fig 6.5. Seasonal Food Consumption
(a) Rationing (%): Adults & Children



(b) Meals per Day: Adults & Children

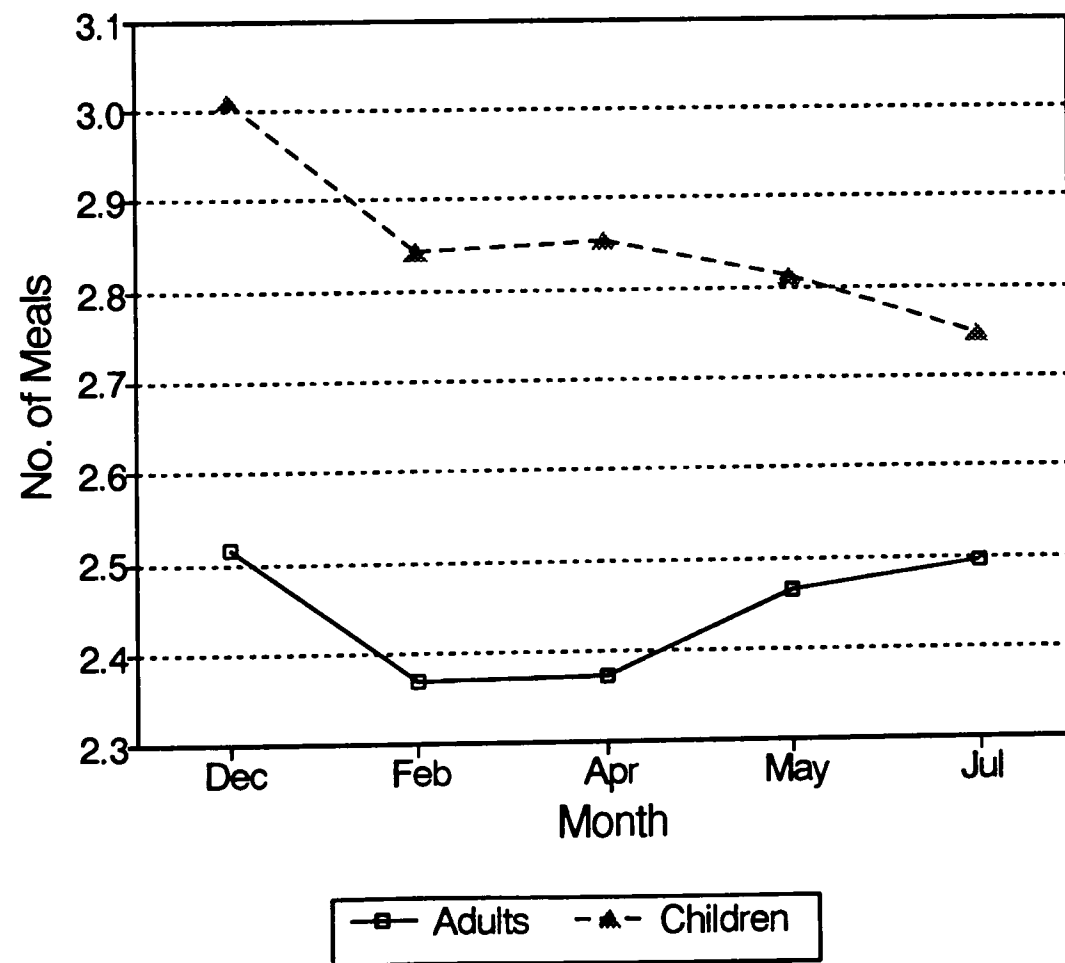


Figure 6.6 shows that the largest drop in average BMI for women, boys and girls (in that order, and quite alarmingly for girls) was between rounds 2 and 3 (February-April 1989), after which this indicator, while remaining negative, fell by less in both April-May and May-July. The only exception to this pattern is for adult males, who suffered larger proportionate drops in BMI every round than in the previous round. The increase in men's food consumption - as signified in Figure 6.5 above by a narrowing gap in reported rationing and meals per day between adults (net producers) and young children (net consumers) during the rainy season - was not sufficient to compensate for their increased workload and energy output, and they suffered continually rising levels of nutritional stress.¹⁷¹ The fact that the nutritional status of under-fives did not fall as strikingly as that of adult men (admittedly, following a severe shock earlier in the dry season) during the 'hungry season' months suggests that children were still relatively protected in terms of the intra-household allocation of scarce food.¹⁷²

As noted above, a considerable amount of theoretical and empirical research has been undertaken on the topic of intra-household food distribution, mostly focusing on systematic discrimination against specific household members (such as young girls and old women). The evidence presented here suggests instead that the determinants of intra-household allocation change as both relative needs and food availability to the household change. While systematic biases may or may not exist, the allocation of food is also being constantly re-negotiated.

¹⁷¹. A similar pattern was found in analyses of Bangladeshi anthropometric data by Abdullah (1989), and Pitt, Rosenzweig and Hassan (1990), who conclude that, despite receiving significant "calorie reinforcement" during the season of peak energy expenditure, the nutrition status of adult males declined so substantially as to suggest "some discrimination against males by the household".

¹⁷². Had the nutrition surveillance component of this fieldwork collected child anthropometric data only, these subtle shifts in inter-generational nutrition status would have been overlooked, and the standard conclusion of such studies would have been obtained - that children in seasonal farming regions suffer monotonically intensifying levels of food deprivation in the post-harvest months.

Fig 6.6. BMI: Adults & Children
% Change by Interview Round

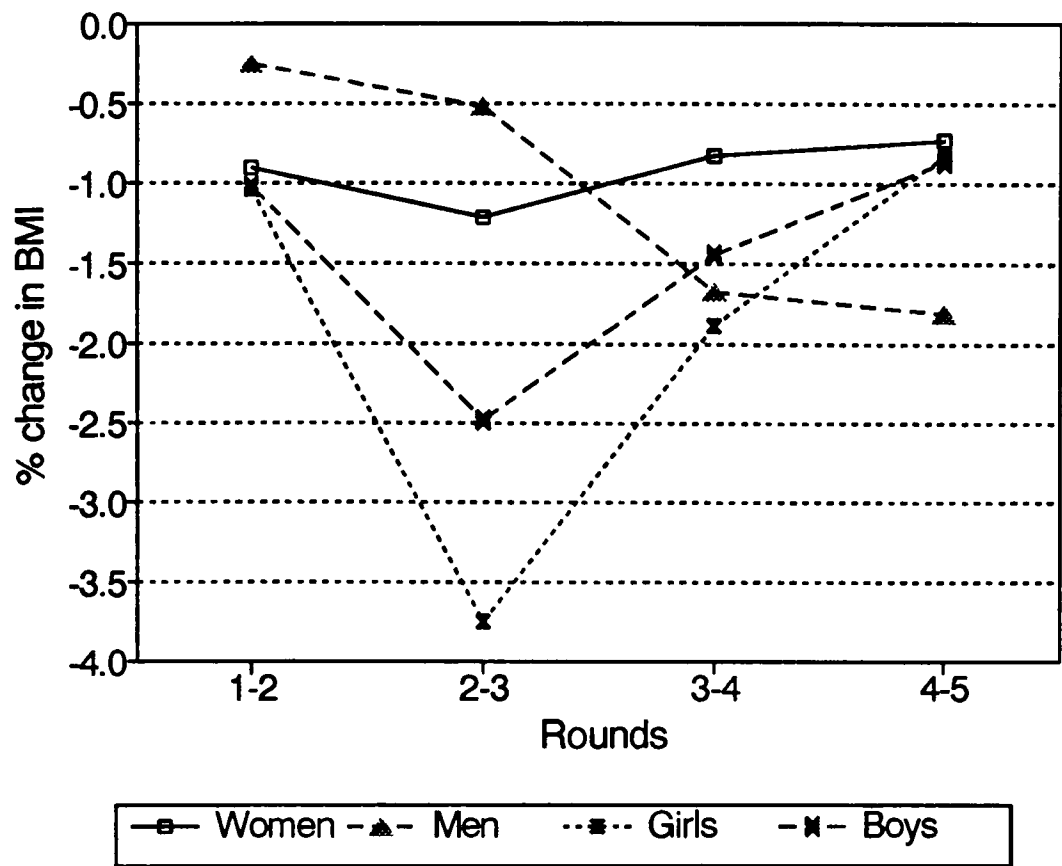


Table 6.5. Body Mass Index: Adults and Children, by Gender and Interview Round

	Month					5-Round Mean or Total
	Dec	Feb	Apr	May	Jul	
Women (112) % change	19.98 -	19.80 -0.90	19.56 -1.21	19.40 -0.82	19.26 -0.72	19.60 -3.65
Men (73) % change	19.81 -	19.76 -0.25	19.66 -0.51	19.33 -1.68	18.98 -1.81	19.51 -4.25
Adults (185) % change	19.91 -	19.79 -0.60	19.60 -0.96	19.37 -1.17	19.15 -1.14	19.56 -3.87
Girls (55) % change	15.61 -	15.45 -1.02	14.87 -3.75	14.59 -1.88	14.47 -0.82	15.00 -7.48
Boys (58) % change	15.89 -	15.73 -1.01	15.34 -2.48	15.12 -1.43	14.99 -0.86	15.41 -5.78
Under-5s (113) % change	15.75 -	15.59 -1.02	15.11 -3.14	14.86 -1.65	14.74 -0.81	15.21 -6.62

5. Inter-Household Factors: The Economics of Nutrition

The distinction between households where only adults were reported as rationing and those where both adults and children were rationed seems to correspond to a perception by decision-makers within each household as to the severity of their specific food deficit. This perception in turn was a function of the household's ability to deal with the deficit, so in part reflects differentials in household wealth and entitlements. This factor will now be addressed.

Village-level or community-level nutrition data, such as those presented above, almost certainly disguise wide discrepancies in food intake and nutrition outcomes, between as well as within households. For instance, Schofield (1974:25) reports a study by Usha in Bangladesh in 1964, which revealed a clear association between food intake and income. When households were classified into five groups by income level, their percentage fulfilment of daily calorie requirements was, from poorest to richest quintile: 75; 91; 108; 102; 120.

Comparable figures were found in Gordon's food intake assessment of 14 children from 4 south Bawku compounds during 1972: 41; 56; 58; 81 (Table 6B.4). This study also revealed that seasonal consumption levels and variability were inversely related to the household's relative wealth. In the richest compound, food consumption was highest and showed no significant seasonal fluctuations, but in the poorer compounds calorie intakes were "lowest in April, during the hungry season, and highest in January, in the post-harvest season", with large swings from one season to the next (Gordon 1973:202).

More generally, the rationale for extending a discussion of anthropometric data to considerations of inter-household inequality is that these data provide evidence of the harsh consequences of socioeconomic differentiation. Within as well as between communities, McLean (1984:26) argues, "the incidence of malnutrition is not randomly or equally distributed but occurs in association with conditions of poverty". In terms of one of the central arguments of this thesis, any evidence that observed differences in nutrition status between households are correlated with wealth or entitlements to food

must be interpreted as an undesirable (and avoidable) consequence of poverty and inequality, rather than an inevitable by-product of seasonality.

5.1. Inequality, Seasonality, and Malnutrition

Seasonal patterns of agricultural production and of diseases are inadequate predictors of individual nutrition status. Even if anthropometric outcomes in agrarian communities were a function only of food production, differences in food intake would be observed according to each household's annual harvest. But entitlements to food are provided from several sources, and consumption is determined not only by production levels, but also by wealth and incomes, and (as argued earlier) by decisions about their disposal.

Habicht, Mason and Martorell (1983:3) compared several nutrition studies from both industrialised and developing countries, and concluded that socioeconomic environment is "the overwhelming influence" on child growth, being 4 to 5 times more significant than genetic or climatic factors in explaining differences in growth performance. Differences in mean weight and height were much narrower between children from high socioeconomic status families across ethnic groups than between children from the same ethnic group living in different socioeconomic circumstances.

In trying to explain observed differences in nutrition and other welfare outcomes, economists typically choose household income (variously defined) as a proxy for economic status. During the 1980s, however, a debate developed concerning the relationship between incomes and nutrition. Many studies challenged the previously unquestioned assumption that rising household wealth automatically produced improved nutritional outcomes - at least within small communities.¹⁷³ A Gambian study found "no evidence that rich households were better nourished than poor ones" (Phillips, Coles and Seaman 1983:7). Household income as a determinant of nutrition status was

¹⁷³. Habicht, Mason and Martorell's conclusion - that significant wealth and nutrition differentials can be identified across communities and countries - is not challenged by community-level studies which fail to detect such a correlation within a much narrower range of wealth and income levels.

described as "overrated" by writers such as Wolfe and Behrman (1983). Expenditure surveys among Bangladeshi, Indonesian and Indian households defined as living below the 'poverty line' (where the hypothetical Engel's curve is steepest) found income elasticities of demand for calories as low as 0.35, 0.39 and 0.44 respectively.¹⁷⁴ Other studies cited by Lipton (1983) revealed that, among the 'ultra-poor' in northern Nigeria and India, marginal spending on food per person apparently does not fall as incomes start to rise - a finding which contravenes Engel's Law.

Many econometricians have subsequently developed quasi-reduced-form household models in which income is only one of a number of variables explaining nutritional outcomes.¹⁷⁵ Other variables used typically include: each parent's education, height, age, and income; household size, number of adult women in the household; dependency ratio; size of landholding; source of water; incidence of local diseases (malaria, dysentery, measles); distance to nearest health clinic or hospital. But McLean (1984:54) notes that even complex multivariate analyses designed to explain nutritional outcomes rarely produce correlation coefficients above 0.3.

In Ghana's case, results from the GLSS study of 1987/8 found "no clear pattern" of nutritional status when children were ranked and grouped into expenditure deciles (either per household or per capita) - a result which Alderman (1990:7) describes as "somewhat surprising". As expenditure rises, there was only a slight fall in the incidence of stunting and no trend at all in wasting. For adults, by contrast, rising expenditure levels were associated with rising Body Mass Indices (though this relationship is not monotonic), confirming the existence of a link between current incomes (as proxied by expenditure) and current nutritional status.

¹⁷⁴. Knudsen and Scandizzo (1982), cited by Lipton (1983:40).

¹⁷⁵. See Pitt and Rosenzweig (1985); Ravallion (1990); Sahn (1990); Strauss (1990); among others.

5.2. Inequality and Malnutrition in Pusiga

The preceding discussion suggests that significant variations in nutrition status will probably be found within a sample of children from households which are economically stratified. In the case of the Pusiga sample, the high Gini coefficients discussed in Chapter 2 lead to the prediction that malnutrition will be similarly unequally distributed, with relatively well-nourished children living in wealthier compounds, and severe malnutrition being confined to those compounds where absolute poverty constrains the household's ability adequately to meet its food requirements, given the many competing demands on its scarce resources. But on what criteria should children be allocated to socioeconomic categories? Several alternatives are discussed below.

5.2.1. Food Security Status, Wealth Quartiles and Household Entitlements

In Chapter 5, sampled households in Pusiga were classified into 4 categories in order to observe inter-household differences in behavioural responses to food deficit. Table 6.6 summarises the nutritional performance of under-fives in these households during 1988/9.¹⁷⁶

Mean Z-scores for each child (over 5 rounds) for height-for-age and weight-for-age show little clear pattern across household categories. Weight-for-height figures differ significantly and in the predicted direction, from 'severely insecure' to 'self-sufficient' households. Children in self-sufficient households performed better in terms of seasonal wasting than all other children. The two intermediate categories are indistinguishable

¹⁷⁶. Cell sizes in Table 6.6 are very unbalanced. Fewer children are found in severely food insecure households (food security status and household size are positively correlated) and in self-sufficient households (only 4 sampled households achieved production self-sufficiency in 1988/9). There are also fewer households (n=44) here than in the Chapter 5 analysis, because: (1) a smaller sample was used for nutrition surveillance; (2) many households had no under-fives in 1988/9; (3) some observations were discarded because of incomplete records.

in terms of weight-for-height outcomes.¹⁷⁷ The failure of this criterion to predict the incidence of stunted or underweight children is not entirely unexpected. Wasting measures a transitory food deficit - current food insecurity, while stunting, as previously discussed, represents an accumulation of growth deficits over a longer period.¹⁷⁸ Households classified as food secure or food insecure in 1988/9 might have been differently classified in 1986 or 1990. In households which fluctuate between food security and insecurity from year to year, a lag in nutritional outcomes such as levels of stunting is likely.

Table 6.6. Child Anthropometry: Households Ranked by Food Security Category

Food Security Status	Severely Insecure	Mildly Insecure	Consump. Secure	Self-Suffic.
Households	8	19	13	4
Under-Fives	11	45	43	14
Household Size	6.6	9.7	17.9	17.5
<u>Mean Z-scores</u>				
Height/Age	-2.45	-1.34	-2.01	-2.35
Weight/Age	-2.16	-1.48	-1.87	-1.94
Weight/Height	-0.98	-0.79	-0.81	-0.57

Many alternative ways of disaggregating the Pusiga sample into categories which reflect economic inequality were also considered (see discussion of household classifications in Appendix 1.4). The first method adopted was simply to rank households by value of assets and divide them into 'wealth quartiles' (equal household numbers in each category). Here again, the correlation between household wealth and household size causes the number of children in wealthier households greatly to exceed the number in poorer households. (From poorest to richest quartile, the number of under-fives is

¹⁷⁷. As discussed in Chapter 2, sub-dividing the large middle group of households proved an intractable problem whatever classification criteria were applied. The 'rich and food secure' households were easily identified, as were the 'poor and severely food insecure', but the majority of households fell between these two extremes, and were not clearly differentiated among themselves.

¹⁷⁸. Stunting statistics are also more likely to embody economically non-selective determinants of anthropometric outcomes - local environmental conditions, water supplies, morbidity patterns.

12, 8, 34 and 59.) Despite this and other difficulties, this stratifying criterion permits the observation of some interesting correlations (Figure 6.7).

While approximately 60% of children in the poorest two quartiles (n=20) were stunted, just over 40% were stunted in the two wealthiest quartiles (n=93). Despite unbalanced cell sizes, the difference between the four quartiles is significant at 0.0001 (Table 6A.8). Similar figures apply to underweight children (significant at 0.001); while the proportion suffering from wasting is 16.7% in the poorest quartile and 9.5% in the richest (significant at 0.05). In this case, the stronger correlation of stunting than wasting with wealth supports the argument that retarded growth is indicative of chronic undernutrition - a cumulative effect of persistent nutrient deficits, which is strongly correlated to household wealth - while seasonal weight loss is affected by a variety of factors in addition to household wealth.

For adults the association between nutrition status and wealth is equally clear. Mean BMI (over five rounds) rose from 18.3 in the poorest quartile (n=33) to 20.5 in the richest (n=82). Figure 6.8 illustrates that adults in the former category lost, on average, 5.9% of their bodyweight during the survey period, while those in the latter category lost only half as much, at 2.9% (Table 6A.9). These nutritional outcomes reflect food intake differentials across wealth quartiles too. Figures 6.8a and 6.8b show that the percentage of households which rationed consumption in 1989 fell, and the average number of meals consumed per day rose, by wealth quartile (Table 6A.10).

As discussed above, adults in Pusiga insisted that they protected child food consumption during 1989, by rationing their own consumption disproportionately. While this may be true in terms of the comparative severity of rationing endured by each generation (the evidence is inconclusive), there were few households where the incidence of rationing, once introduced, was not extended to children. Comparing the wealthiest and poorest quartiles, adults rationed consumption in 20% of rich households, but children were rationed in 11.2% of rich households. In 94.8% of poorest quartile households adults rationed their food consumption, while the figure for children was only slightly lower, at 88.5%.

Fig 6.7. Malnourished Children by Wealth Quartile

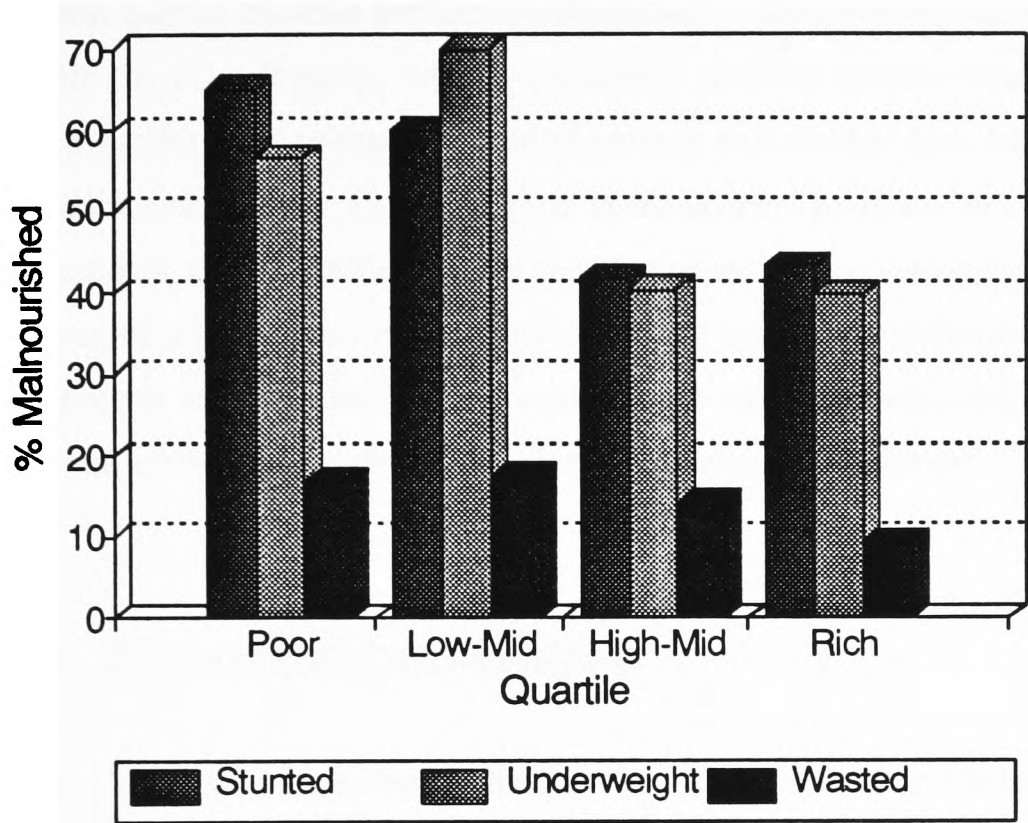
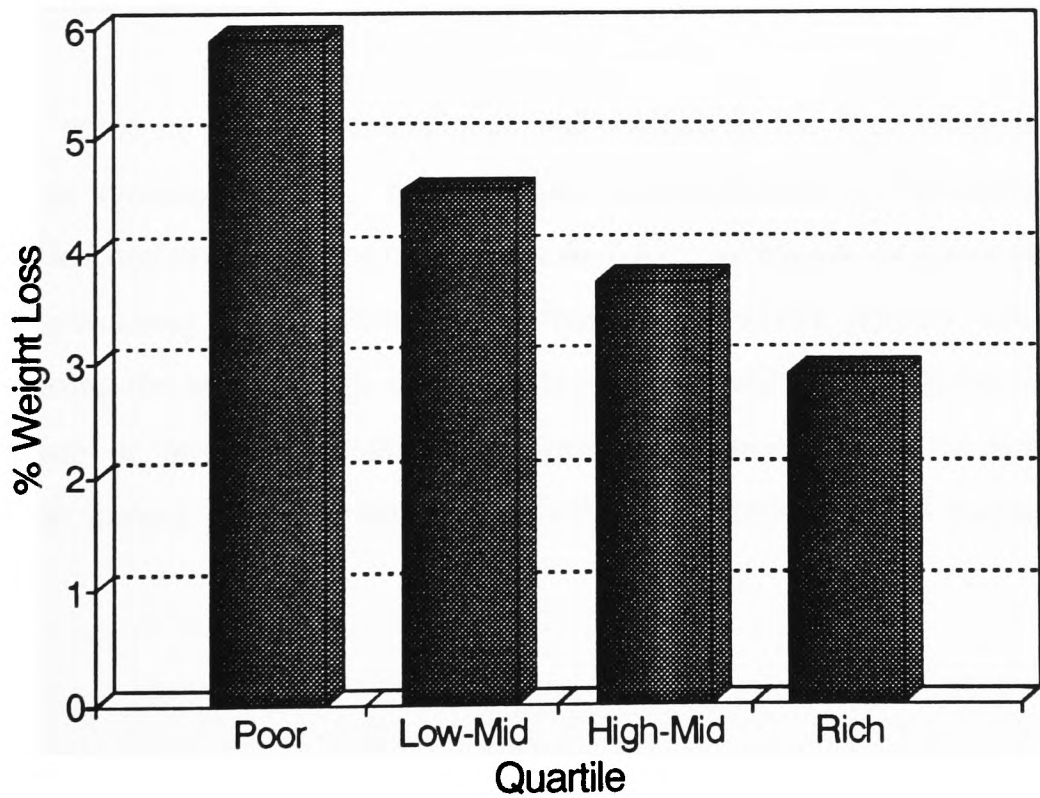


Fig 6.8. Mean Adult Bodyweight Loss, Rounds 1 to 5, by Wealth Quartile



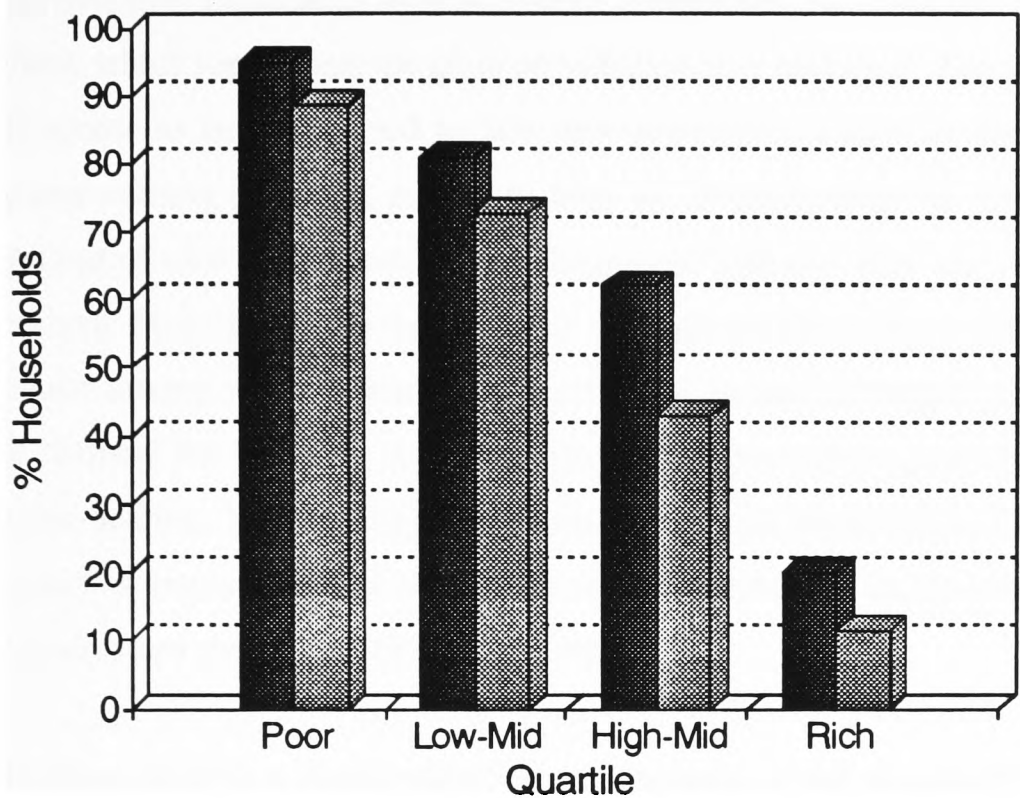
Two further stratification criteria - entitlement per household and entitlement per adult equivalent - revealed no monotonic pattern for mean Z-scores in either case, except that poorest quartile children performed substantially worse than wealthiest quartile children (Table 6A.11). Broadly, though, all criteria produce similar trends. Height-for-age Z-scores (the most robust indicator of poverty and chronic food insecurity among the three indicators) are invariably highest in the poorest quartile or severely food insecure households, though children in the next to poorest category sometimes emerge as least stunted of all. In terms of seasonal wasting, a monotonic relationship is typical, with the poorest and most food insecure households suffering most, and the wealthy and/or self-sufficient households least, whatever criterion is considered.

5.2.2. Mother's Income and Expenditure

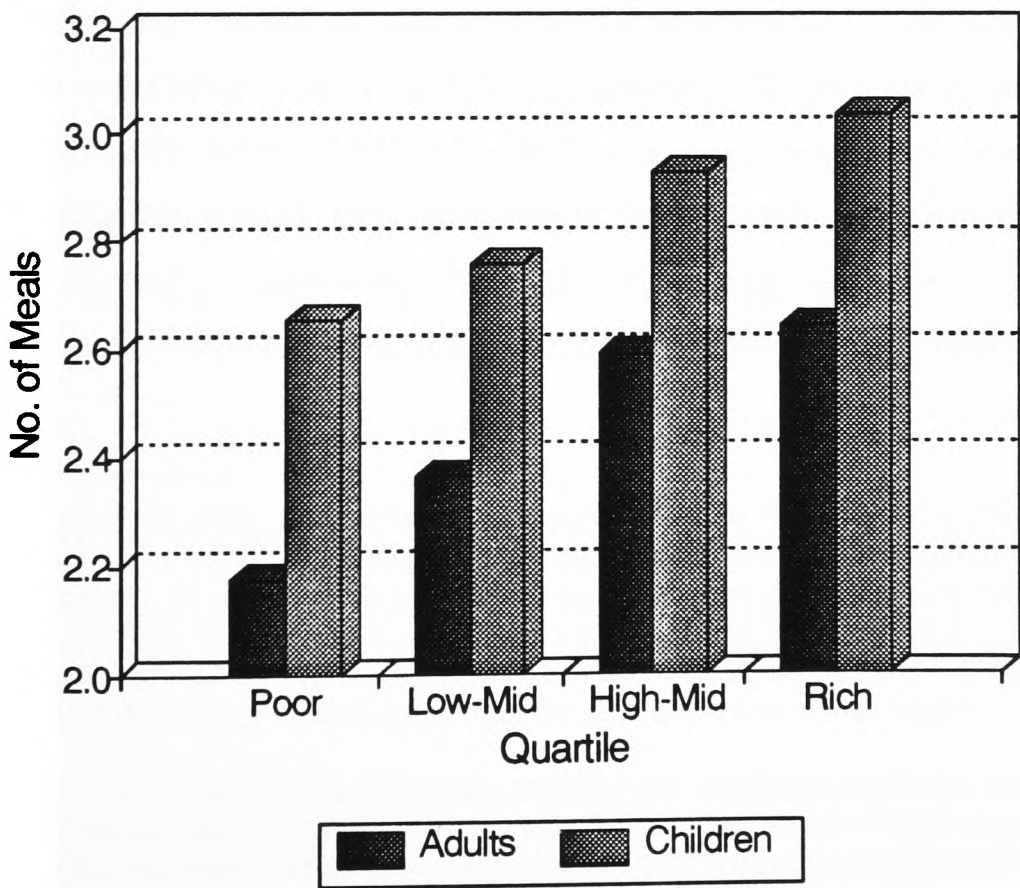
Many 'household responses to food deficit' centre on the reallocation of male assets and incomes towards food purchases, following their failure to achieve production self-sufficiency. But women also play an important independent role in household food strategies. This section argues that women's specific responses to food deficit are modified by their differential involvement in food production, food preparation and income generation.

As noted in earlier chapters, men and women in the West African semi-arid tropics have entirely separate incomes and responsibilities. Agricultural production is male-dominated. Men are responsible for acquiring staple grain (through production or purchase) and distributing it to their wives, whose primary role in the process of feeding the household is to cook this grain and add a 'stew' (otherwise described as a 'soup' or 'relish'). "Feeding the family" is thus articulated as the responsibility of men, with women providing secondary foods and dominating food preparation.

Fig 6.9. Consumption by Wealth Quartile
(a) Rationing (%): Adults & Children



(b) Meals per Day: Adults & Children



In reality, women are central to both domestic reproduction and the wider food economy. As discussed in Chapter 3.1, most women have garden plots, where they cultivate stew ingredients (spinach plants, vegetables) but many also farm cereals and pulses, which supplement the grain provided by their husbands. For women who cannot get access to land, the need to buy stew ingredients motivates their involvement in income-earning activities, many of which are directly related to food - such as local retailing of stew ingredients; the production and sale of a diversity of snack foods and sorghum beer; food processing; even agricultural labouring, which is increasingly popular among younger women as a source of income during the rainy season, when the demand for women's craftwork (clay pots, spun cotton, grass mats) and services (water-bearing, hairdressing) is weakest.¹⁷⁹ If male incomes are inadequate and the granary is empty, some of this female income might also be diverted to the purchase of grain from the market (Bryceson 1989).

The stew itself is a highly significant component of the household diet. While the quality of staple grains is more or less constant across households (even if poorer households consume smaller portions), the quality of the accompanying stew varies dramatically from day to day and household to household, depending on its ingredients. The enhanced nutritional status of wealthier households is in no small part attributable to the rich variety of leafy vegetables, pulses and oils (shea-butter, groundnut paste) in the stew they consume, and to the addition of dried fish (an ever-present ingredient in wealthier households, used occasionally by the poor) and even meat (guinea-fowl, chicken, mutton or goatmeat).¹⁸⁰ In terms of 'coping' with food deficits, the stew can become the main source of nutrition for the household when staple grain is in short

¹⁷⁹. In September 1988, 223 of 270 women questioned in 201 Terago and Tesnatinga households were economically active outside their homes; only 47 said they had no non-agricultural extra-household occupation. 57 women were engaged in food preparation and sale; 44 were petty traders; 37 made shea-butter (a cooking oil made from sheanuts); 28 manufactured clay pots; 25 spun cotton; 21 prepared malt for beer brewers; 5 were beer-brewers; 3 carried water to beer-houses and snack stalls in the market; 2 made grass mats for sale; and 1 was a hairdresser.

¹⁸⁰. This is not to imply that a stew made entirely from 'secondary foodcrops' such as spinach plants and cowpeas must be nutritionally inadequate. The importance of leafy vegetables in providing essential micronutrients such as vitamins A and C, iron and calcium is well documented in Ghana (Appiah-Kubi 1986; Abbiw 1989), and pulses contain significant proportions of protein.

supply, being sometimes a complete meal in itself. The ability of women to provide a nutritious stew becomes the overriding determinant of household nutrition as the male role in food provision is marginalised.¹⁸¹

Apart from stews and (less commonly) foodgrains, women produce and buy many kinds of snack foods, which are important not only as supplementary foods between meals, particularly for children, but also as substitutes for meals when staple grains are rationed. Predictably, though, the correlation between household wealth and household food consumption is strong, so that children in wealthier households tend to consume more snack foods even though they are also enjoying 3 or 4 full meals each day. The extent to which poorer women are able to counter declining grain provision from their husbands with increased provision of grain and non-grain foods from their own resources is restricted by their severely limited incomes. Nonetheless, there is some indication of women compensating for grain deficits in this way, notably among lower-middle income households. So it is clear not only that women play a significant role in food provision in 'normal times', but that their contribution to household consumption can be vital in grain deficit years.

In a study in a north Ghanaian district adjacent to Bawku, Tripp (1981) found that children of female traders were better nourished on average than children living in wealthier compounds whose mothers were not traders. 'Mother's income' was a more significant determinant of child nutrition than 'household income', even though women's income-earning activities are typically less lucrative than men's.

Women whose income derives from food processing, retailing, or preparation and sale enjoy a year-round source of cash which is more or less constant. As market prices of retail products or snack ingredients rise, demand contracts but women charge more and generally maintain a steady and only slightly reduced cash inflow. Stew ingredients are

¹⁸¹. As Longhurst (1989:287) has more generally argued: "Secondary food crops play a role in farmers' strategies to reduce fluctuations in the food supply that is much larger than their share in food energy production." Appiah-Kubi (1986:4) claims that edible leaves provided a "life-saving supplement" to the diets of many Ghanaian families during the 1983 famine.

purchased all year, so every market day provides an opportunity for women to earn small amounts of cash through buying in one market, walking to another, and selling again at a margin.

A second source of covariance is that between women's incomes and the seasonal cycle, so that for instance stew ingredients, like staple grains, cost most in the early rainy season. Women who had the same amount of cash to spend all year round on stew ingredients complained that they were getting less for their cedis at this time than during the dry season, and were having to cut down on expensive ingredients such as dried fish and meat. Many women also switched to cheaper vegetable bases, and diets became more monotonous in poorer households as economic constraints restricted choice. This observation supports evidence from many other studies that switching to less preferred foods is a common response to seasonal hunger (Messer 1989). It could also explain the weak empirical correlation often recorded in poor communities between household incomes or expenditures and caloric acquisition or levels of malnutrition (Bouis 1992).

To test these conclusions, and the hypothesis that mother's income is a more robust indicator of child nutrition and general welfare than father's (or 'household') income, the contribution of women to household food consumption is considered by household food security category and season.¹⁸² The relationship between child nutrition and household food security status having been established above, these nutrition data are not repeated here. In the absence of detailed income data for each individual woman, spending by women (from their own resources) on stew ingredients and supplementary foods serves as a proxy for women's incomes.

For the sample as a whole (117 women in 61 households for which complete data were obtained), spending on stew ingredients remained remarkably constant across the three

¹⁸². These data were collected as part of the nutrition survey, from the sub-sample of 66 households. Since Round 1 (December 1988) of the nutrition survey included the time-consuming tasks of compiling accurate demographic lists and verifying individual ages, questions relating to diet and consumption were deferred until Round 2 (February 1989), while detailed data on expenditures on stew ingredients were not collected until Round 3 (April 1989).

rounds for which data were collected: C219 per woman buying ingredients in April (dry season), C218 in May (first rains), and C227 in July (rainy season). Deflating these figures by the numbers of adult equivalent household members being fed (where children under 16 count as 1/2 adults) mirrors this invariance: C64.0, C66.1 and C70.5. However, these averages conceal wide disparities between households, to be discussed below. For example, the mean spending by 117 women of C227.1 in July has an associated standard deviation of C123.1, and ranges from C40 per woman in one of the poorest households to C712 in one of the wealthiest.

Despite maintaining expenditure, the transition from the dry season to the rains is seen to be a period of dramatic deterioration in terms of both the quality of diets and the range and quantity of supplementary and nutrition-enhancing foods consumed by the average household. One reason is the general rise in prices of most stew ingredients, which, while less marked than that of grain, nonetheless reduces the purchasing power of women's incomes. The seasonal constancy of women's spending on stew ingredients probably conceals either a falling volume of purchases or a substitution of nutritionally or culturally inferior for preferred ingredients. Indicative of this is the number of snacks procured by women month by month, which holds steady in the range 2.5 to 3.0 between February and May, but collapses to a reported 1.45 in July.

A simple scoring system proxying for meat and fish consumption¹⁸³ confirms the existence of a parallel process: this indicator fell from 3.4 in May to 1.3 in July over the 61 sampled households. Adding together 'number of snack foods consumed' and the indicator for 'nutritionally enhanced stews' as a proxy for quality of diet produces figures of 5.3, 6.3 and 2.8 for April, May and July 1989 respectively. If nothing else, these results at least suggest an order of magnitude for the deteriorating quality of non-grain food consumption in the 1989 dry and early rainy seasons. In a study of food

¹⁸³. If meat was regularly added to the stew this scored 3; if (in the absence of meat) dried fish was always included this scored 2; if fish was occasionally included this scored 1. The range of possible scores for 'nutritionally enhanced' stews was therefore 0 to 5. Justification for this simple proxy measure is provided by evidence that dietary diversity generally implies enhanced nutrition status. According to Messer (1989:171): "Dietary complexity scores might be used seasonally as a way to screen households within communities known to be food-short."

consumption in Cameroon, Guyer (1989:141) describes a similar seasonal change in dietary components as a transition from a "culturally adequate diet when cash incomes were high" to "an impoverished vegetarian diet when cash incomes were low".¹⁸⁴

Table 6.7 disaggregates these data by household category, based on the 'food security' criteria described elsewhere. Food insecure households tend to have fewer women: 21 in the 20 severely insecure and 40 in the 24 mildly insecure households, as against 56 in the 17 consumption secure households. As with many other sets of data collected in Pusiga during 1988/9, these figures reveal clear trends, both seasonal (intra-household over time) and socioeconomic (inter-household within the village).

Seasonal: In terms of snacks and supplementary foods, the number procured generally rises between February and April, holds steady or drops slightly in May, and falls steeply in July. Similarly, meat and fish consumption rises between April and May, as granary reserves came under increasing strain, but drops sharply in July. The 'proxy for diet enhancement' (which simply sums these two scores) halves across all household categories between May and July. At the same time, spending on stew ingredients rose marginally, but this probably reflects the rising cost of basic ingredients, prices of which peak annually at this time. (Spending on basic stew ingredients is less easily cut in times of austerity than is spending on 'luxuries' like meat, fish and snack foods.) These trends suggest that women in food deficit households supported their husbands or compensated for grain rationing by enhancing the quality of stews and amount of snacks they provided - but only until June or July, when resources were concentrated on farming and the food intake of labouring adults took temporary precedence over that of children.

Socioeconomic: The 45 women in the 'production deficit but consumption secure' category spent more than twice as much on stew ingredients (both absolutely and per household member being fed) than the 21 women cooking in 'severely food insecure' households. These 45 women also spent more than the 11 women in 'production

¹⁸⁴. Even though this vegetarian diet may be 'technically' or 'biologically' adequate, Guyer maintains that it is "culturally inadequate", citing one man who complained: "We eat like goats".

self-sufficient' households, and provided more snacks in May and more meat and fish in July, suggesting that both men and women from wealthier households spend more on food of all types in years of grain deficit than when granary stocks are adequate. These nuances aside, the dominance in all indicators of food secure households over mildly insecure and (in turn) severely insecure households distinctly suggests that most women were economically constrained in their ability to compensate for production deficits through market purchases of stew ingredients, snacks, or meat and fish.

Finally, it must be noted that, despite visible differences in means between categories, the small numbers of households in two of the four categories, together with high variances within categories, means that these differences at the household level are not statistically significant, at least not in cross-sectional terms. An *F*-test on each of the 17 indicators listed in Table 6.7 produced *F*-values (with 3,57 degrees of freedom) in the range 1.08 to 1.71, which are not significant at the 5% level. Merging the self-sufficient and consumption secure categories into a single 'food secure' category of 17 households did not sufficiently improve the *F*-values to produce significance.

Table 6.7. Women and Food Expenditures in Pusiga, 1989

	Severely insecure (n=21)	Mildly insecure (n=40)	Consump. secure (n=45)	Self- sufficient (n=11)
Women cooking per household	1.05	1.67	3.46	2.75
Spending on stew ingredients/woman				
April	145	221	305	288
May	147	217	316	263
July	156	223	325	290
Spending on stew ingredients/AE*				
April	43	64	91	79
May	44	68	94	72
July	46	71	100	94
Meat and fish**				
April	1.30	2.25	3.77	4.25
May	1.95	3.71	4.69	5.00
July	1.00	1.17	2.33	1.75
Number of snacks				
February	1.89	2.67	2.69	3.75
April	2.10	2.88	3.62	4.25
May	2.10	2.79	3.85	3.50
July	0.90	1.42	2.17	2.25
Proxy for 'diet enhancement'***				
April	3.40	5.13	7.38	8.50
May	4.05	6.50	8.54	8.50
July	1.90	2.58	4.50	4.00

* AE = Adult Equivalents (number of adults + number of children/2)

** Meat and fish: Meat added regularly to stew = 3 points;
Fish added regularly to stew = 2 points;
Fish added occasionally to stew = 1 point.

*** Proxy for 'diet enhancement' = Number of snacks + Meat and fish score

6. Conclusion

Schofield (1974:25) identifies three sources of nutritional risk: poverty, seasonality, and intra-household discrimination. Following Schofield, this chapter examined the incidence and distribution of rationing in Pusiga during 1989 from three perspectives: cross-sectional, inter-seasonal, and intra-household. As far as intra-household rationing is concerned, a complex picture emerged. The most significant observations were:

1. that elderly women displayed the worst nutritional status, on average, and may have been the only age-sex cohort to experience systematic intra-household discrimination in food allocation;
2. that girls under five suffered the sharpest drop in nutritional status, following the extension of rationing to children in many households after February or March 1989;
3. that adult men were under the most severe nutritional stress during the hungry season months of June and July 1989, but that this effect was attributable to increased energy expenditures on farming, rather than to shifts in intra-household food allocation.

Inter-seasonally, the observation of steadily declining nutritional status from December 1988 to July 1989 - across all age-sex cohorts - is consistent with the assertion in Chapter 4 that consumption rationing intensifies as granary stocks dwindle, and as other mechanisms for acquiring food are adopted and exhausted in turn. Women were mostly unable to offset this deterioration in their children's nutrition through enhanced provision of secondary foods during the 1989 hungry season.

These arguments apply also to the cross-sectional evidence of greatest seasonal weight loss (by adults as well as children) in poorer quartiles or 'severely insecure' households. These households imposed rationing most stringently during 1989. In the terminology of Figure 4.6, they moved furthest and fastest down the 'nutritional strategies' path.

However, Chapter 5 demonstrated that severely insecure households raised cash for food from the widest range of sources (Table 5.4), and that they purchased the most grain per capita (Table 5.6). Taken together, these facts suggest that the severely insecure faced the heaviest production deficits in 1988 (for reasons discussed in Chapter 3), so that the 'food gap' between their grain purchases and grain consumption was widest.

To summarise, the high incidence of rationing and hunger recorded among the poorest families and individuals in Pusiga during 1989 is further evidence of the difficult trade-offs poor people are often required to make, between strategies that protect economic viability by rationing consumption, on the one hand, and strategies that protect consumption but undermine economic viability, on the other.

Appendix 6A. Tables of Nutrition Data from Pusiga Survey

Table 6A.1. Children Falling below Standard Anthropometric Cut-off Points, by Age Cohort (%)

Degree of mal-nutrition	Age Cohort in Months					Total under 5 years old (n=520)
	0-11 (n=66)	12-23 (n=100)	24-35 (n=99)	36-47 (n=179)	48-60 (n=76)	
<u>Wt/Ht</u>						
None	66.7	24.0	7.1	16.8	15.8	22.5
Mild	24.2	63.0	80.8	69.8	78.9	66.2
Moderate	9.1	11.0	10.1	12.8	3.9	10.2
Severe	0.0	2.0	2.0	0.6	1.3	1.2
Moderate + Severe	9.1	13.0	12.1	13.4	5.2	11.4
<u>Ht/Age</u>						
None	7.6	7.0	15.2	14.5	11.8	11.9
Mild	34.8	38.0	46.5	37.4	60.5	42.3
Moderate	33.3	31.0	22.2	25.7	7.9	24.4
Severe	24.2	24.0	16.2	22.3	19.7	21.3
Moderate + Severe	57.5	55.0	38.4	48.0	27.6	45.7
<u>Wt/Age</u>						
None	13.6	8.0	6.1	6.7	5.3	7.5
Mild	53.0	44.0	48.5	44.7	64.5	49.2
Moderate	25.8	36.0	27.3	33.5	23.7	30.4
Severe	7.6	12.0	18.2	15.1	6.6	12.9
Moderate + Severe	33.4	48.0	45.5	48.6	30.3	43.3

Notes:

- Degree of malnutrition:
None: ≥ 0 SDVs above NCHS median
Mild: -0.01 to -1.99 SDVs below median
Moderate: -2 to -2.99 SDVs below median
Severe: ≤ -3 SDVs below median
Moderate + Severe: ≤ -2 SDVs below median
(= malnourished)
- The skewness of the age distribution partly reflects the fact that all incomplete records (children born after November 1988 or children who grew older than 60 months during the period of the survey) were excluded from these calculations. This also explains why the sample size here is 104, not 113. Observations total 520 because 5 sets of measurements were recorded for each child.

Table 6A.2a. Children Falling below Standard Anthropometric Cut-off Points, by Gender (%)

Degree of mal-nutrition	Weight/Height				Height/Age				Weight/Age			
	Male (58)	Female (55)	Total (113)	Ratio (M/F)	Male (58)	Female (55)	Total (113)	Ratio (M/F)	Male (58)	Female (55)	Total (113)	Ratio (M/F)
None	22.1	20.7	21.4	1.07	10.0	13.8	11.9	0.72	6.2	7.6	6.9	0.82
Mild	63.1	69.8	66.4	0.90	45.9	37.5	41.8	1.22	50.7	47.3	49.0	1.07
Moderate	13.1	9.1	11.1	1.44	25.2	23.6	24.4	1.07	32.1	28.7	30.4	1.12
Severe	1.7	0.4	1.1	-	19.0	25.1	21.9	0.76	11.0	16.4	13.6	0.67
Moderate + Severe	14.8	9.5	12.2	1.56	44.2	48.7	46.3	0.91	43.1	45.1	44.1	0.96

Table 6A.2b. Mean Z-scores, Under-Fives, by Gender

Index	Sample (n=113)	Males (n=58)	Females (n=55)
Weight-for-height	-0.79 (1.11)	-0.86 (1.08)	-0.72 (1.14)
Height-for-age	-1.83 (1.56)	-1.73 (1.55)	-1.93 (1.56)
Weight-for-age	-1.75 (1.19)	-1.71 (1.20)	-1.79 (1.17)

Notes: - averaged over five rounds (565 observations);
 - standard deviations in parentheses;
 - differences between genders are not
 statistically significant

Table 6A.3. Malnourished Children by Interview Round (%)

Indicator	Month				
	Dec	Feb	Apr	May	Jul
Wasted	8.8	8.0	12.4	16.8	16.8
Stunted	47.8	46.0	43.4	46.0	48.7
Underweight	33.6	35.4	46.0	52.2	53.1

Table 6A.4. Adult Body Mass Index by Gender, Age Cohort and Interview Round

Age Cohort	Month					Mean (five rounds)
	Dec	Feb	Apr	May	Jul	
<u>Age 18-35</u>						
Men (24)	20.31	20.36	20.31	20.03	19.67	20.13
Women (55)	20.85	20.77	20.42	20.33	20.28	20.53
Total (79)	20.69	20.64	20.39	20.24	20.09	20.41
<u>Age 36-50</u>						
Men (21)	19.99	19.99	19.94	19.60	19.20	19.74
Women (30)	19.91	19.69	19.50	19.27	19.18	19.51
Total (51)	19.59	19.42	19.29	19.00	18.74	19.60
<u>Age 50+</u>						
Men (28)	19.26	19.08	18.90	18.52	18.21	18.79
Women (27)	18.26	17.97	17.88	17.63	17.28	17.80
Total (55)	18.77	18.53	18.40	18.08	17.76	18.31

Table 6A.5. Adults with Chronic Energy Deficiency, by Interview Round (%)

Level of CED	Month					Mean (five rounds)
	Dec	Feb	Apr	May	Jul	
None	76.2	67.6	64.3	62.7	58.4	64.3
Level I	14.6	22.7	23.8	24.3	24.3	26.5
Level II	7.0	8.1	7.6	7.0	10.8	5.4
Level III	2.2	1.6	4.3	5.9	6.5	3.8
I+II+III	23.8	32.4	35.7	37.2	41.6	35.7

Level of CED: None: BMI ≥ 18.5
 Level I (Mild): 17 ≤ BMI < 18.5
 Level II (Moderate): 16 ≤ BMI < 17
 Level III (Severe): BMI < 16

Table 6A.6. Adults with Chronic Energy Deficiency,
by Gender, Age Cohort and Interview Round (%)

Age Cohort	Month					Mean (five rounds)
	Dec	Feb	Apr	May	Jul	
<u>Age 18-35</u>						
Men (24)	12.5	12.5	20.9	16.7	25.0	17.5
Women (55)	14.5	20.0	21.8	20.0	25.5	20.4
<u>Age 36-49</u>						
Men (21)	19.0	23.8	33.3	42.9	57.2	35.2
Women (30)	26.7	33.4	43.4	43.4	36.7	36.7
<u>Age 50+</u>						
Men (28)	25.0	42.8	42.8	50.0	50.0	42.1
Women (27)	51.8	70.3	62.9	66.7	74.0	65.1

Table 6A.7. Reported Rationing and Meals per Day,
by Interview Round

		House- holds	Rationed (percent)	Mean Meals per Day
Full Sample:				
All Adults		111	65.0	2.44
All Children		97	51.9	2.85
By Round:				
Adults:	Dec 88	109	53.2	2.51
	Feb 89	111	64.0	2.37
	Apr 89	110	70.0	2.37
	May 89	110	70.0	2.46
	Jul 89	109	65.0	2.50
Children:	Dec 88	96	36.5	3.01
	Feb 89	97	51.5	2.85
	Apr 89	96	52.1	2.85
	May 89	96	59.4	2.81
	Jul 89	95	60.0	2.75

Note:

"Rationed (percent)" gives the mean percentage of households who were rationing in each round ("by round"), and the average proportion who rationed throughout the year ("full sample").

Table 6A.8. Malnourished Children by Wealth Quartile

Indicator	Quartile				Signi- ficance level
	1 (n=12)	2 (n=8)	3 (n=34)	4 (n=59)	
Wasted	16.7	17.5	14.1	9.5	0.05
Stunted	65.0	60.0	41.8	43.4	0.0001
Underweight	56.7	70.0	40.6	40.0	0.001

Note: These figures are averaged over 5 Rounds (565 observations)

Table 6A.9. Adult Nutrition Data by Wealth Quartile

Indicator	Quartile				Mean (n=182)
	1 (n=33)	2 (n=19)	3 (n=48)	4 (n=82)	
Body Mass Index	18.34	17.93	19.53	20.46	19.56
BMI % Change, Rounds 1 to 5	-7.91	-4.00	-3.19	-2.55	-3.66
% Change in Bodyweight, Rounds 1 to 5	-5.90	-4.52	-3.71	-2.90	-3.86

Note: These figures are averaged over 5 Rounds (910 observations)

Table 6A.10. Reported Rationing and Meals per Day,
by Wealth Quartile

	HHs in Category	Rationed (percent)	Mean Meals per Day
<u>Full Sample:</u>			
All Adults	111	65.0	2.44
All Children	97	51.9	2.85
<u>By Wealth Quartile:</u>			
Adults: Group 1	27	94.8	2.18
Group 2	28	81.0	2.37
Group 3	27	62.2	2.59
Group 4	27	20.0	2.65
Children: Group 1	21	88.5	2.65
Group 2	24	72.7	2.76
Group 3	26	43.1	2.93
Group 4	25	11.2	3.04

- Notes: 1. "Group 1" = poorest quartile households;
 "Group 4" = richest quartile households.
2. "Rationed (percent)" = the mean percentage of households which were rationing in each round

Table 6A.11. Child Anthropometry: Households Ranked by
Value of Entitlements

		Quartile (of Under-Fives)			
		Poor	LoMi	UpMi	Rich
<u>Entitlement / HH</u>					
Households		18	10	9	7
Under-Fives		28	26	29	30
Household Size		6.5	9.6	13.4	22.3
<u>Mean Z-scores:</u>					
Height/Age		-2.28	-1.01	-2.03	-1.92
Weight/Age		-2.09	-1.34	-1.89	-1.51
Weight/Height		-0.95	-0.81	-0.80	-0.56
<u>Entitlement / AE</u>					
Households		16	11	9	8
Under-Fives		26	30	28	29
Household Size		7.9	9.0	12.7	12.1
<u>Mean Z-scores:</u>					
Height/Age		-2.34	-1.07	-2.05	-1.76
Weight/Age		-2.14	-1.25	-2.04	-1.51
Weight/Height		-0.98	-0.63	-0.98	-0.56

Appendix 6B. Tables of Non-Survey Data

Table 6B.1. Malnutrition among under-5s in Ghana, 1980-84 (%)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1980	35	34	34	35	35	36	35	35	34	34	34	33
1981	33	34	34	35	36	37	36	35	32	35	36	37
1982	39	35	41	43	42	44	43	44	44	40	42	40
1983	41	41	41	45	48	51	51	48	48	46	45	46
1984	44	45	44	45	45	45	45	48	44	42	44	-

Source: Catholic Relief Services, Ghana, cited in UNICEF-Accra (1988:105)

Note: These data are based on children attending health posts. Children are classified as malnourished if their weight-for-age falls below the third percentile of the Harvard standard. "The measure is almost identical to the more commonly used cutoff (80 percent of the median value for weight for age in the Harvard population)."

Table 6B.2. Male/Female Ratios, Upper East Region, Ghana, 1984

Age group (Years)	MFR	Total
0-1	0.97	20,202
1-2	0.99	25,272
2-3	0.99	26,299
3-4	1.00	31,940
4-5	1.00	30,462
Under-5s:	0.99	134,175
5-6	1.05	30,064
6-7	1.09	31,531
7-8	1.08	26,126
8-9	1.08	23,996
9-10	1.20	30,704
5-9	1.10	142,421
10-14	1.21	69,126
15-19	0.97	61,734
20-24	0.62	54,941
25-29	0.67	59,000
30-34	0.67	45,910
35-39	0.74	44,575
40-44	0.70	33,954
45-49	0.83	34,737
50-54	0.92	24,785
55-59	1.07	17,200
60+	1.05	50,181
All ages	0.91	772,744

Source: Calculated from 1984 Population Census (Republic of Ghana 1987c), Upper East Region, Tables 1a and 1c.

Table 6B.3. Selected Summary Anthropometric Results of Ghana's National Nutrition Survey, 1986

	Number of Children	Median & +1SD			-1SD			-2SD & Below		
		M	F	Total	M	F	Total	M	F	Total
<u>Weight-for-age</u> Koltamse (Pusiga)	267	14.0	16.8	15.4	20.6	19.8	20.2	65.4	63.3	64.4
Bawku District	1275	11.6	13.4	12.5	17.1	20.7	18.9	71.3	65.9	68.6
Northern Zone	4792	13.1	17.2	15.2	20.1	20.9	20.5	66.8	61.9	64.4
National	14243	19.8	23.3	18.1	23.8	23.8	23.6	23.8	56.4	58.4
<u>Weight-for-height</u> Koltamse (Pusiga)	267	29.4	30.5	30.0	33.8	37.4	35.6	36.8	32.1	34.5
Bawku District	1272	18.4	21.3	19.8	32.0	36.2	34.0	49.6	42.6	46.2
Northern Zone	4778	21.8	23.8	22.8	32.1	30.8	31.5	46.1	45.4	45.7
National	14163	27.8	29.7	28.7	31.3	30.8	31.0	41.0	39.6	40.3
<u>Height-for-age</u> Koltamse (Pusiga)	267	13.2	15.3	14.3	21.3	23.7	22.5	65.4	61.0	63.2
Bawku District	1271	16.7	18.8	24.1	23.0	25.8	21.9	60.3	55.4	54.0
Northern Zone	4780	21.5	26.7	24.1	20.7	23.1	21.9	57.8	50.2	54.0
National	14187	24.0	28.7	26.3	21.7	22.6	22.2	54.3	48.8	51.5

Source: Compiled from UNICEF 1988

Notes: The obvious inconsistencies within this Table (which was compiled from several Tables in the UNICEF document), probably reflect the fact that this was a draft report, not a final version.

Koltamse, like Terago and Tesnatinga, is a section within Pusiga, adjacent to Terago.

**Table 6B.4. Calorie Intake by Children in 4 Compounds
in Bawku District, 1972**

Compound	N	% of Recommended Daily Allowances			
		Annual	Sept	Jan	April
Richest	2	81	79	78	87
Second	2	58	36	68	69
Third	2	56	55	70	44
Poorest	2	41	37	54	33
Mean	8	59	52	68	58

Source: Compiled from Gordon (1973:206-208)

Chapter 7. Conclusion

This thesis examined the responses adopted by rural households in northeastern Ghana to grain production deficits in 1988/9. The theoretical context was recent advances in famine theory and empirical studies of household 'coping strategies'. Two sets of issues are addressed in this brief concluding chapter: theoretical and empirical findings, and implications of each for further research and for possible policy interventions.

1. Theoretical Observations

This thesis opened by referring to two debates in the famine and 'coping strategies' literatures. The first concerned the respective roles of (generalised) supply and (household-specific) demand failure in contributing to food insecurity. The evidence presented for Pusiga has suggested that a supply shock affected the poor more than the rich, who were better protected and better placed to react effectively. A production deficit in an agriculturally-based community has very different welfare implications across and within affected households, according to the prior economic, nutritional and social status of each. Different sources, levels and reliability of entitlement to food endow households and individuals with differential abilities to 'cope'.

The second debate concerned the reconciliation of apparently contradictory strategies - food purchasing, to maintain consumption levels following a production decline, and food rationing, which modifies consumption. By comparing two parallel data sets, for household economic behaviour and associated nutritional outcomes, it was demonstrated that strategies to maintain or protect consumption are adopted alongside austerity strategies that require consumption to be rationed or otherwise modified. As with other responses to food deficit, these are both sequential and parallel processes. A food production deficit triggers successive 'waves' of responses, which are initiated (and abandoned) at different times. Most responses are carried through with increasing intensity, rather than adopted and rapidly exhausted in turn.

This general recognition is that economic, nutritional, 'social' and demographic strategies are adopted simultaneously rather than (or as well as) sequentially. This was argued theoretically in Chapter 4 and demonstrated by case study evidence in Chapter 5, which illustrated the diversity and complexity of household behaviour even in times of austerity and narrowed horizons.

Response adoption is the product of a combination of factors, some exogenous and some endogenous to the household. The calendar year in agrarian communities is punctuated by opportunities and imperatives; responses to production deficit are organised around these events and expectations. Endogenous determinants of response behaviour include wealth holdings and household composition. Both sets of factors together determine the unique set of options available to each food deficit household; its actual behaviour reflects choices made from within that set of options, which is typically more constrained for poorer than wealthier households.

Modelling these options can greatly illuminate household behaviour. A strictly limited model, as presented in Chapter 4, helped to generate a plausible explanation for the frequently noted 'paradox' of delayed liquidation of assets at low livestock/grain price ratios. The explanation lies beyond the terms of trade decline on which observers focus. Early buying of grain runs the risk of losses (to social claims and snacking, not only 'storage losses') while early livestock sale would forgo gains from reproduction.

The privileging of food acquisition strategies by many case studies and conceptual models is refuted in this thesis both empirically and theoretically. Evidence is presented in Chapter 6 of severe rationing in Pusiga households holding non-zero entitlements to food (which they did not convert into food during 1988/9). Consumption rationing is conceptualised here as a nutritional adaptation motivated by economic priorities. These objectives may be perceived cynically, as a selfish preference for retaining private wealth; or as foresight and prudence - the privileging of longer term viability over immediate consumption. Evidence for both views comes not only from the literature and theoretical modelling, but from comments made by farmers in Pusiga themselves.

2. Empirical Findings

"You always have to think of two things: making money and feeding your family. So I always worry about farming first and trading only second." This statement, by a wealthy farmer and cattle dealer, succinctly expresses the fundamental dilemma of household reproduction and accumulation in northeastern Ghana. Agriculture is risky. So is market dependence.

The essential distinction between 'food secure' and 'severely consumption insecure' households in northeastern Ghana, and throughout much of rural sub-Saharan Africa, lies in the relative diversity of their economic activities. Food secure households simply have more options. They enjoy preferential access to productivity-enhancing inputs, and are favourably positioned in a range of factor and product markets (credit, employment, grain and cash crops). Poor households in Pusiga are unable to offset shrinking land holdings and the decline of fallowing by intensification, because they cannot afford fertilisers or bullocks and ploughs. Many are losing rights over land to wealthier farmers, through informal credit and plough-hiring arrangements. They also cede control over their own labour and agricultural produce when hunger and cash constraints impel them into labour or crop mortgaging relationships with wealthier neighbours.

But agriculture remains undercapitalised, and off-farm income-earning activities have emerged as more important for household food security in contemporary Pusiga than agriculture itself. The most lucrative occupations are restricted to those individuals with sufficient working capital, surplus labour, education, and/or social connections, while access to certain activities is further mediated by ethnicity, religion and gender. While the food secure accumulate wealth through investing in income-enhancing farming methods and (crucially) diversifying into off-farm occupations, the food insecure are restricted to risk-minimising devices and have few opportunities to accumulate.

At the village level, these and other developments have accelerated economic differentiation, fuelled social inequality and eroded 'community spirit'. This is evident in the gradual ascendancy of impersonal monetised transactions over more egalitarian

institutional arrangements: hired labour is replacing communal labour parties, land rights are bought and sold which were previously allocated according to need by village 'earth priests'. In terms of household food security, the net effect may be described as an improvement in the position of some households at the expense of others who are marginalised or exploited by these changes. This latter group of small, impoverished households is extremely vulnerable to seasonal and chronic food insecurity. They are in danger of being marginalised by government and donors as well, since villages like Pusiga, with their visibly wealthy farmer-traders, are perceived as being comparatively affluent within Bawku District.

It would be an exaggeration to conclude that traditional social structures in northeastern Ghana are breaking down, but they are certainly more fluid and under more stress than ever before. This reflects a rapid evolution of these village communities from a position of isolation and autarky early this century to their current (still partial) incorporation, on several levels, into a wider national and regional political economy. The ethos of collective (household) self-sufficiency remains powerful, but is threatened as much by the lure of private profit as the unreliability of climate and harvests.

3. Implications for Further Research

This fieldwork identified a number of responses to food deficit that are not listed in comparable studies. Many of these were labelled 'latent entitlements'. (For example, betrothing a daughter and collecting brideprice cows to sell for grain.) The importance of these unusual responses lies precisely in providing alternatives when normal sources of entitlement fail. Investigation into these secondary sources of entitlement is needed. Where traditional 'famine foods' are becoming commoditised or extinct, as in northern Ghana for instance, the aggregate economic impact (at community level) may be minimal, but the effect on food deficit households in difficult years might be severe.

Chapter 4 identified a number of criteria which were suggested as being invoked by households making decisions about the allocation of their scarce resources under stress.

Some progress was made on modelling these criteria. For instance, a dynamic formulation of the entitlements produced by different assets (and not just the immediate 'entitlement to food' embodied in their market values) was presented to explain how decision-makers select and sequence alternative means of raising cash for food. Fieldwork data in Chapter 5 provided support for some of the arguments. Further theorising and data are needed on intertemporal behavioural variables.

The findings in Chapter 6, that adults rationed consumption before imposing rationing on their children as well, and that adult males might have incurred the most severe nutritional deficits during 1989, sheds new light on the 'early warning' debate over whether nutrition status is an early or late indicator of distress. The implication is that nutritional surveillance should extend to adults as well as under-fives, if households suffering economic and nutritional stress are to be identified and assisted. However, this is a tentative conclusion which would benefit from further investigation in a variety of cultural and geographical contexts.

4. Implications for Policy

This thesis was motivated as much by a concern with 'real-world' problems of poverty and food insecurity in sub-Saharan Africa as by an academic interest in famine theory and models of household responses to food shortage. Policy implications do not flow easily from the preceding analysis. There are no "quick fixes" to the "African food crisis", and what is required in one village in northern Ghana may not be applicable elsewhere. Nonetheless, tentative policy prescriptions can be extrapolated from conclusions drawn about the nature of food insecurity in this case study community.

First, diversification has emerged as central to household economic prospects (in the long term) and food security status (in the short term). This implies diversification of agronomic practices (to reduce yield risk or output fluctuations), of incomes (to spread risk among non-correlated sources of food and cash), and of assets (as savings which can be divested for food when needed). It also implies temporal diversification of

income-earning opportunities: dry season migration, trading, weaving and other off-farm activities provide important secondary sources of income in a unimodal climate which provides only five months of agricultural employment each year. However, given the poverty of the local economy, prospects both for accumulation and for avoidance of 'derived destitution' depend on gaining access to incomes beyond the village.

Seasonality was identified in Chapter 3 as imposing severe constraints and pressures on households who depend either on rain-fed agriculture or on grain and other markets for their subsistence. Solutions to seasonality lie in smoothing intra-annual irregularities in rainfall, grain prices and employment opportunities. This would provide alternative sources of entitlement to food, in years and in households where self-provisioning fails.

Providing support for market gardening could fulfil a number of objectives. Building small dams or wells would offer dry season employment locally for those households who are precluded by age, gender, poverty or domestic commitments from seasonal migration or long distance trading. Dams would allow market gardeners to tap into an as yet unsatiated demand for vegetables in southern Ghana, as seen in Chapter 3.

The construction of feeder roads would facilitate marketing of produce and, in difficult years, delivery of relief aid. This might be accomplished through public works projects which offered low-paid but dependable employment during the dry season. Public works schemes along the lines of the Employment Guarantee Scheme in India would be self-targeting, because the rich already have access to lucrative off-farm incomes. Building up transport and communications infrastructure also assists market integration and reduces famine vulnerability, as demonstrated in Chapter 2.

A further set of policy implications follows from the observation that vulnerability is a function of household demographic as much as economic characteristics. Larger households enjoy economies of scale, are able to insure their members against specific risks, and can specialise in a variety of non-correlated activities, raising mean household income above that of small farming households. In turn, small households attempt to form relationships with their wealthier neighbours through interlinked credit, labour and

produce transactions, as insurance against bad years, but the costs of these links are high (eg. in the case of wage labouring which competes with domestic labour needs).

Recognising these additional problems faced by small households implies alleviating labour and cash flow bottlenecks, for instance by providing credit at the start of the farming season (eg. fertiliser and seed loans, as Global 2000 does). The significant positive correlation between household wealth and household size in this community also implies that interventions should discriminate in favour of small households. Distributing assistance by household size (such that complex and nuclear households receive the same aid *per capita*), as happened with food aid in 1988, seems egalitarian but fails to reach the neediest with the most aid. These leakages could have been avoided with better targeting rules.

Finally, the implication that people's responses to food deficits might send signals about the severity of those deficits has encouraging implications for effective anti-hunger interventions in sub-Saharan Africa. Donors and governments could conceivably monitor 'coping' behaviour and incorporate it into 'early warning systems'. Steps in this direction have already been undertaken in some African early warning systems.¹⁸⁵

However, caution is required. Households adopt a range of behavioural responses to food deficit. Which specific responses are chosen, in what sequence and to what intensity, depend on the (multiple) objectives of household members - economic and social as well as nutritional - on each household's unique circumstances (its resources, relationships, demographic composition), and on community-wide opportunities and constraints (seasonality of markets, environmental and other local conditions). Universal sequences or 'discrete stages' of strategy adoption are not supported by detailed empirical scrutiny of communities affected by food shortage. It follows that the efficacy of such studies in terms of famine early warning or targeting vulnerable households is limited to the extent that observed behaviour is mediated by personal, household- or community-specific characteristics.

¹⁸⁵. See Devres (1987), McCorkle (1987), Cekan (1990), Davies and Buchanan-Smith (1991); also de Waal (1990) on socio-economic indicators.

BIBLIOGRAPHY

Abaka-Quansah, K. Economic Panorama: Notes on Ghana's Recovery Programme. Nsamankow Press. Accra. 1987.

Abarigah, F.A. The Problems of Groundnut Production in Bawku District of the Upper East Region. B.Sc. Thesis. Faculty of Social Sciences, University of Science and Technology. Kumasi. 1985.

Abbiw, D.K. Useful Plants of Ghana. Intermediate Technology Publications. London. 1989.

Abdullah, M. "The Effect of Seasonality on Intrahousehold Food Distribution and Nutrition in Bangladesh." Chapter 4 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.

Abudu, A. and Ascroft, J. "The Story of URADEP." The Ghana Farmer, 18(1). October 1978.

Abudulai, M.S. "Land Tenure Among the Dagomba of Northern Ghana: Empirical Evidence." Cambridge Anthropology, 11(3). 1986.

Abukyi, A.E. The Impact of Existing Agricultural Credit Schemes on Cash Crop Production in the Bawku District. B.Sc. Thesis. Faculty of Agriculture, University of Science and Technology. Kumasi. 1984.

Acquaah, M. The Role of the Agricultural Development Bank in Ghana over the Past Five Years (1979-1984). B.Sc. Thesis. Faculty of Social Sciences, University of Science and Technology. Kumasi. 1985.

Adams, A. Seasonal Food Insecurity in the Sahel: Nutritional, Social and Economic Risk among Bamana Agriculturalists in Mali. Ph.D Thesis. London School of Hygiene and Tropical Medicine, University of London. March 1992.

Adarkwa, K. "Spatial Analysis of Rural Development Policies in the Upper Region of Ghana." Rural Africana, 17. Fall 1983.

Adu, S.V. Soils of the Navrongo-Bawku Area, Upper Region, Ghana. Memoir No. 5. Soil Research Institute. Kumasi. 1969.

Adu, S.V. "Eroded Savanna Soils of the Navrongo-Bawku Area, Northern Ghana." Ghana Journal of Agricultural Sciences, 5. 1972.

Akerlof, G. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." Quarterly Journal of Economics, 84(3). August 1970.

- Alderman, H. "Nutritional Status in Ghana and its Determinants." Social Dimensions of Adjustment in Sub-Saharan Africa: Working Paper No. 3. World Bank. Washington DC. 1990.
- Alderman, H. and Sahn, D. "Understanding the Seasonality of Employment, Wages, and Income." Chapter 6 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.
- Alderman, H. and Shiveley, G. "Prices and Markets in Ghana." Working Paper 10. Cornell Food and Nutrition Policy Program. Cornell University. Ithaca, New York. May 1991.
- Allen, C. and Williams, G. (editors). Sociology of "Developing Societies": Sub-Saharan Africa. Macmillan. London. 1982.
- Anand, S. Inequality and Poverty in Malaysia: Measurement and Decomposition. Oxford University Press. Washington DC. 1983.
- Anthony, K., Johnston, B., Jones, W. and Uchendu, V. Agricultural Change in Tropical Africa. Cornell University Press. Ithaca. 1979.
- Appiah-Kubi, K. You Are What You Eat: Edible Leaves for Human Diet. ISSER Discussion Paper No. 21. Institute of Social, Economic and Statistical Research. University of Ghana. Legon. February 1986.
- Ardayfio-Schandorf, E. Rural Development Strategies in Northern Ghana: Problems and Prospects for Reaching the Small Farmer. Occasional Paper No. 18. Centre for Development Studies. University College of Swansea. 1982.
- Arhin, K. Traditional Rule in Ghana: Past and Present. Sedco. Accra. 1985.
- Aryeetey, E. Decentralizing Regional Planning in Ghana. Institut fur Raumplanung, Universitat Dortmund. Dortmund. 1985.
- Aryeetey, E., Asante, Y., Gockel, F. and Kyei, A. "Mobilizing Domestic Savings for African Development and Diversification: A Ghanaian Case-Study." Research Report. Queen Elizabeth House, University of Oxford. July 1990.
- , Austin, D. Politics in Ghana 1946-1960. Oxford University Press. London. 1964.
- Autier, P. "Nutrition Assessment Through the use of a Nutritional Scoring System." Disasters, 12(1). 1988.
- Ayamba, P.A. An Investigation into the Causes of the Failure of Farmers to Adopt Soybeans as one of the Major Crops in the Nakpanduri Agricultural Zone, Northern Region. Dissertation for Diploma in Agricultural Extension and Farm Management. Faculty of Agriculture, University of Science and Technology. Kumasi. 1986a.

- Banks, A. (editor). The Development of Tropical and Sub-Tropical Countries: with particular reference to Africa. Edward Arnold. London. 1954.
- Bardhan, P. (editor). The Economic Theory of Agrarian Institutions. Clarendon Press. Oxford. 1989.
- Barker, P. Peoples, Languages, and Religion in Northern Ghana. Ghana Evangelism Committee. Accra. 1986.
- Bates, R. Markets and States in Tropical Africa. University of California Press. Berkeley. 1981.
- Beck, T. "Survival Strategies and Power amongst the Poorest in a West Bengal Village." IDS Bulletin, 20(2). 1988.
- Beckman, B. "Ghana, 1951-78: the Agrarian Basis of the Post-colonial State." In Heyer, J., Roberts, P. and Williams, G. (editors). Rural Development in Tropical Africa. Macmillan. London. 1981.
- Behrman, J. "Intrahousehold Allocation of Nutrients in Rural India: Are Boys Favored? Do Parents Exhibit Inequality Aversion?" Mimeo. University of Pennsylvania. November 1986.
- Behrman, J. "Intrahousehold Allocation of Nutrients and Gender Effects." Paper prepared for the Conference on Poverty, Undernutrition and Living Standards. World Institute for Development Economics Research. Helsinki. July 1987.
- Behrman, J. and Deolalikar, A. "Seasonal Demands for Nutrient Intakes and Health Status in Rural South India." Chapter 5 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989a.
- Behrman, J. and Deolalikar, A. "Agricultural Wages in India: The Role of Health, Nutrition, and Seasonality." Chapter 7 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989b.
- Ben-Porath, Y. "The F-Connection: Families, Friends, and Firms and the Organization of Exchange." Population and Development Review, 6. 1979.
- Bening, R.B. "The Regional Boundaries of Ghana 1874-1972." Research Review, 9(1). Institute of African Studies. University of Ghana. Legon. 1973.
- Benneh, G. "The Attitudes of the Kusasi Farmer of the Upper Region of Ghana to his Physical Environment." Research Review, 6(3). Institute of African Studies. University of Ghana. Legon. 1970.

- Benneh, G. "Bawku, une ville marché du Ghana du Nord." Les Cahiers d'Outre-Mer, 106. Bordeaux. 1974.
- Benneh, G. "Types of Farm Labour in Northern Ghana." Research Review, New Series 4(1). Institute of African Studies. University of Ghana. Legon. 1988.
- Bennett, A. and Schork, W. Studies Toward a Sustainable Agriculture in Northern Ghana. Research Centre for International Agrarian Development. Heidelberg. 1979.
- Bequele, A. "Stagnation and Inequality in Ghana." Chapter 8 in Ghai, D. and Radwan, S. (editors). Agrarian Policies and Rural Poverty in Africa. International Labour Office. Geneva. 1983.
- Bernstein, H. "Notes on capital and peasantry." Review of African Political Economy, 10. 1977.
- Berry, S. "The Food Crisis and Agrarian Change in Africa: A Review Essay." African Studies Review, 27(2). 1984.
- Berry, S. "Social Science Perspectives on Food in Africa." In Hansen, A. and McMillan, D. (editors). Food in Sub-Saharan Africa. Lynne Rienner. Boulder. 1986.
- Bhaduri, A. "Forced Commerce and Agrarian Growth." World Development, 14(2). 1986.
- Binswanger, H. "Attitudes toward Risk: Experimental Measurement in Rural India." American Journal of Agricultural Economics. August 1980.
- Binswanger, H., McIntire, J. and Udry, C. "Production Relations in Semi-arid African Agriculture." Chapter 6 in Bardhan, P. (editor). The Economic Theory of Agrarian Institutions. Clarendon Press. Oxford. 1989.
- Blaxter, K. and Waterlow, J. (editors). Nutritional Adaptation in Man. John Libbey. London. 1985.
- Boateng, E. A Geography of Ghana. Cambridge University Press. Cambridge. 1966.
- Bohle, H., Cannon, T., Hugo, G. and Ibrahim, F. (editors). Famine and Food Security in Africa and Asia: Indigenous Response and External Intervention to Avoid Hunger. Bayreuth Geowissenschaftliche Arbeiten. Bayreuth. 1991.
- Bouis, H. "Food Consumption Surveys: How Random are Measurement Errors?" Paper for the IFPRI Workshop on Data Needs for Food Policy in Developing Countries: Directions for Household Surveys. Washington DC. September 1992.
- Bourgoin, H. and Guilhaume, P. Côte d'Ivoire: Economie et Société. Stock. Paris. 1979.

- Brown, C.K. (Editor). Rural Development in Ghana. Ghana Universities Press. Accra. 1986.
- Bryceson, D. "Nutrition and the Commoditization of Food in Sub-Saharan Africa." Social Science and Medicine, 28(5). 1989.
- Bryson, J. "Women and Agriculture in Sub-Saharan Africa: Implications for Development (an Exploratory Study)." Journal of Development Studies, 17(3). April 1981.
- Buah, F.K. A History of Ghana. Macmillan. London. 1980.
- Caldwell, J. African Rural-Urban Migration: The Movement to Ghana's Towns. Australian National University Press. Canberra. 1969.
- Caldwell, J., Reddy, P. and Caldwell, P. "Periodic High Risk as a Cause of Fertility Decline in a Changing Rural Environment: Survival Strategies in the 1980-1983 South Indian Drought." Economic Development and Cultural Change, 34(4). July 1986.
- Campbell, D. and Trechter, D. "Strategies for Coping with Food Consumption Shortage in the Mandara Mountains Region of North Cameroon." Social Science and Medicine, 16. 1982.
- Campbell, C. Household Responses to Crop Failure. M.Sc. Dissertation in Agricultural Economics. University of Oxford. Oxford. September 1991.
- Cardinall, A. Tales Told in Togoland. Oxford University Press. Oxford. 1931.
- Carlson, B. and Wardlaw, T. "A Global, Regional and Country Assessment of Child Malnutrition." Staff Working Papers Number 7. UNICEF. New York. 1990.
- Cassels, C., Wijga, A., Pant, M. and Nabarro, D. "Coping Strategies of East Nepal Farmers: Can Development Initiatives Help?" Second Report on the Impact of the Kosi Hill Area Rural Development Programme. Liverpool School of Tropical Medicine. October 1987.
- Cekan, J. Traditional Coping Strategies during the Process of Famine in Sub-Saharan Africa. Tufts University. Medford, MA. 1990.
- Cekan, J. "Seasonal Coping Strategies in Central Mali: Five Villages During the 'Soudure'." Disasters, 16(1). 1992.
- Chambers, R. Rural Development: Putting the Last First. Longman. London. 1983.
- Chambers, R., Longhurst, R. and Pacey, A. (editors). Seasonal Dimensions to Rural Poverty. Frances Pinter. London. 1981.
- Cheal, D. "Strategies of Resource Management in Household Economies: Moral Economy or Political Economy?" Chapter 2 in Wilk, R. (editor), The Household

- Economy: Reconsidering the Domestic Mode of Reproduction. Westview Press. Boulder. 1989.
- Cheshire, P. "Land Use, Agricultural Production, Land Tenure and Administration." CSIR North East Ghana Savannah Research Projects: Socio-Economic and Land Use Sub-Project. Land Administration Research Centre. Kumasi. October 1977.
- Christensen, G. Determinants of Private Investment in Rural Burkina Faso. Ph.D. Thesis. Cornell University. 1989.
- Clark, G. and Manuh, T. "Women Traders in Ghana and the Structural Adjustment Program." Chapter 9 in Gladwin, C. (editor), Structural Adjustment and African Women Farmers. University of Florida Press. Gainesville. 1991.
- Cleveland, D. The Population Dynamics of Subsistence Agriculture in the West African Savanna: A Village in Northeast Ghana. Ph.D Thesis. University of Arizona. 1980.
- Cline, W. "Distribution and Development: A Survey of Literature." Journal of Development Economics. 1975.
- Clough, P. "Rural Exchange Relationships and the Structure of the Grain Trade." Mimeo. Oxford. January 1977.
- Clough, P. "Farmers and Traders in Hausaland." Development and Change, 12. 1981.
- Collier, P. and Lal, D. Labour and Poverty in Kenya, 1900-1980. Clarendon Press. Oxford. 1986.
- Collier, P., Radwan, S. and Wangwe, S. Labour and Poverty in Rural Tanzania. Clarendon Press. Oxford. 1986.
- Commings, S., Lofchie, M. and Payne, R. (editors). Africa's Agrarian Crisis: The Roots of Famine. Rienner. Boulder, Colorado. 1986.
- Conti, A. Production and Reproduction in the Political Economy of Upper Volta. Masters Thesis in Development Studies. Institute of Social Studies. The Hague. August 1979.
- Corbett, J. "Famine and Household Coping Strategies." World Development, 16(9). September 1988.
- Cornia, G., Jolly, R. and Stewart, F. (editors). Adjustment With a Human Face: Volume I. Protecting the Vulnerable and Promoting Growth. Clarendon Press. Oxford. 1987.
- Cornia, G., Jolly, R. and Stewart, F. (editors). Adjustment With a Human Face: Volume II. Country Case Studies. Clarendon Press. Oxford. 1988.

Cornia, G. and Stewart, F. "Country Experience with Adjustment." Chapter 5 in Cornia, G., Jolly, R. and Stewart, F. (editors). Adjustment With a Human Face: Volume I. Clarendon Press. Oxford. 1987.

Crowder, M. West Africa Under Colonial Rule. Hutchinson. London. 1968.

Curry, J., Huss-Ashmore, R., Grenoble, D. and Gama, D. "Seasonality of Vegetable Use and Production on Swazi Nation Land: Problems and Interventions." Chapter 10 in Huss-Ashmore, R. and Katz, S. (editors). African Food Systems in Crisis: Part Two: Contending with Change. Gordon and Breach. New York. 1990.

Cutler, P. "Famine forecasting: Prices and peasant behaviour in Northern Ethiopia." Disasters, 8(1). 1984.

Cutler, P. "The response to drought of Beja famine refugees in Sudan." Disasters, 10(3). 1986.

Dalby, D., Church, R. and Bezzaz, F. (editors). Drought in Africa 2. International African Institute. London. 1977.

Davies, S., Buchanan-Smith, M. and Lambert, R. "Early Warning in the Sahel and Horn of Africa: The State of the Art: A Review of the Literature." IDS Research Report No. 20. Institute of Development Studies, University of Sussex. December 1991.

de Garine, I. "Seasonal Food Shortage, Famine, and Socio-Economic Change Among the Massa and Mussey of Northern Cameroon." Chapter 4 in Bohle, H. *et al.* (editors). Famine and Food Security in Africa and Asia. Bayreuth Geowissenschaftliche Arbeiten. Bayreuth. 1991.

de Janvry, A. The Agrarian Question and Reformism in Latin America. Johns Hopkins University Press. Baltimore. 1981.

de Waal, A. Famine that Kills: Darfur, Sudan, 1984-1985. Clarendon Press. Oxford. 1989.

de Waal, A. and el Amin, M. Survival in Northern Darfur 1985-1986. Save the Children Fund. Nyala, Sudan. 1986.

Deaton, A. "On risk, insurance, and intra-village consumption smoothing." Preliminary Draft. Research Program in Development Studies. Woodrow Wilson School of Public and International Affairs. Princeton University. November 1990.

Deaton, A. "Household Savings in LDC's: Credit Markets, Insurance, and Welfare." Discussion Paper No. 153. Research Program in Development Studies. Woodrow Wilson School of Public and International Affairs. Princeton University. August 1991.

Deaton, A. and Muellbauer, J. Economics and Consumer Behaviour. Cambridge University Press. Cambridge. 1980.

Der, B.G. "Agricultural Policy in Northern Ghana During the Colonial Era." Universitas, Vol. 8. University of Ghana. Legon. n.d.

Dercon, S. Household Strategies to Cope with Income Fluctuations: An Analysis of the Effects of Producer Price and Asset Market Interventions on Cotton Producers in Tanzania. D.Phil. Thesis. University of Oxford. 1992.

Dessalegn Rahmato. Peasant Survival Strategies. Addis Ababa University. 1988.

Devereux, S. "Entitlements, Availability and Famine: A Revisionist View of Wollo, 1972-74." Food Policy. August 1988.

Devereux, S. Food Security, Seasonality and Resource Allocation in Northeastern Ghana. ESCOR Report R4481. Overseas Development Administration, London. 1989.

Devereux, S. "'Observers Are Worried': Learning the language and counting the people in northeast Ghana." Chapter 3 in Devereux, S. and Hoddinott, J. (editors), Fieldwork in Developing Countries. Harvester Wheatsheaf. London. September 1992.

Devereux, S. and Hoddinott, J. (editors). Fieldwork in Developing Countries. Harvester Wheatsheaf (London, UK) and Lynne Rienner (Boulder, USA). September 1992.

DEVRES. "The Role of Coping Mechanisms as Socioeconomic Indicators in Famine Early Warning Systems." Washington DC. 1987.

Dey, J. "Gambian Women: Unequal Partners in Rice Development Projects?" Journal of Development Studies, 17(3). April 1981.

Dey, J. Women in Food Production and Food Security in Africa. Food and Agricultural Organisation. Rome. 1984.

Dickson, K. A Historical Geography of Ghana. Cambridge University Press. Cambridge. 1969.

Dickson, K. "Dynamics of Agricultural Innovation in Northern Ghana." Ghana Social Science Journal, 2(2). 1973.

Dowden, R. "Ghana rides the IMF bus away from revolutionary hubris." The Independent. London. 2 April 1987.

Downing, T., Gitu, K. and Kamau, C. (editors). Coping with Drought in Kenya: Local and National Strategies. Lynne Rienner. Boulder, Colorado. 1989.

- Drèze, J. Famine Prevention in India. Development Economics Paper No. 3. London School of Economics. January 1988.
- Drèze, J. and Sen A. Hunger and Public Action. Clarendon Press. Oxford. 1989.
- Drèze, J. and Sen A. (editors). The Political Economy of Hunger, Vol. III: Endemic Hunger. Clarendon Press. Oxford. 1991.
- Dugdale, A. and Payne, P. "A Model of Seasonal Changes in Energy Balance." Mimeo. London School of Hygiene and Tropical Medicine. 1986.
- Dumor, E. "Women in Rural Development in Ghana." Rural Africana, 17. Fall 1983.
- Ellsworth, L. and Shapiro, K. "Seasonality in Burkina Faso Grain Marketing: Farmer Strategies and Government Policy." Chapter 12 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.
- Engmann, E.V.T. "Migration and Population Pressure in Northern Ghana: A Note on Methodology." Bulletin of the Ghana Geographical Association, 17. 1975.
- Ewusi, K. The Dynamics of Rural Poverty in Ghana and its Alleviation. WCARRD Follow-Up Programme. In-depth Studies Series No. 8. Food and Agricultural Organisation. 1983.
- Ewusi, K. Government Food Policies from the Colonial to the Post-Independence Period. ISSER Discussion Paper No. 16. Institute of Social, Statistical and Economic Research. University of Ghana. Legon. July 1985.
- Ewusi, K. Structural Adjustment and Stabilization Policies in Developing Countries: A Case Study of Ghana's Experience in 1983-1986. Ghana Publishing Corporation. Tema. 1987.
- Faulkingham. R. "Ecologic Constraints and Subsistence Strategies: The Impact of Drought in a Hausa Village, A Case Study from Niger." In Dalby, D., Church, R. and Bezzaz, F. (editors). Drought in Africa. International African Institute. London. 1977.
- Fei, J. and Ranis, G. Development of the Labour Surplus Economy: Theory and Policy. Irwin. Homewood, Illinois. 1964.
- Fleuret, A. "Indigenous Responses to Drought in Sub-Saharan Africa." Disasters, 10(3). 1986.
- Folbre, N. "Hearts and Spades: Paradigms of Household Economics." World Development, 14(2). 1986.
- Food and Agricultural Organisation. Production Yearbooks. FAO. Rome. 1980-1985.

Food and Agricultural Organisation. Trade Yearbook. FAO. Rome. 1980.

Food and Agricultural Organisation. "Women in African Food Production and Food Security." Chapter 7 in Gittinger, J., Leslie, J. and Hoisington, C. (editors). Food Policy: Integrating Supply, Distribution, and Consumption. Johns Hopkins University Press. Baltimore. 1987.

Food and Agricultural Organisation. Grain Marketing and Storage in Ghana. FAO. Rome. October 1989.

Francis, E. Migration and Social Change in Koguta, Western Kenya. D.Phil Thesis. University of Oxford. 1991.

Francis, E. and Hoddinott, J. "Migration and Differentiation in Western Kenya: A Tale of Two Sub-Locations." Mimeo. Oxford. 1992.

Ghai, D. and Radwan, S. (editors). Agrarian Policies and Rural Poverty in Africa. International Labour Office. Geneva. 1983.

Ghanaian-German Agricultural Development Project, Northern and Upper Regions of Ghana (GGADP). Agricultural Extension Handbook. Tamale. 1980.

Gill, G. Seasonality and Agriculture in the Developing World: A Problem of the Poor and Powerless. Cambridge University Press. Cambridge. 1991.

Girdner, J., Olorunsola, V., Froning, M. and Hansen, E. "Ghana's Agricultural Food Policy: Operation Feed Yourself." Food Policy. February 1980.

Gittinger, J., Leslie, J. and Hoisington, C. (editors). Food Policy: Integrating Supply, Distribution, and Consumption. Johns Hopkins University Press. Baltimore. 1987.

Gladwin, C. (editor). Structural Adjustment and African Women Farmers. University of Florida Press. Gainesville. 1991.

Glantz, M. (editor). Drought and Hunger in Africa: Denying Famine a Future. Cambridge University Press. Cambridge. 1987.

Glewwe, P. and Twum-Baah, K. "The Distribution of Welfare in Ghana, 1987-88." Living Standards Measurement Study: Working Paper No. 75. World Bank. Washington DC. 1991.

Goody, J. (editor). The Developmental Cycle in Domestic Groups. Cambridge University Press. Cambridge. 1958.

Goody, J. "The Fission of Domestic Groups Among the Lodagaba." In Goody, J. (editor). The Developmental Cycle in Domestic Groups. Cambridge University Press. Cambridge. 1958.

Goody, J. (editor). Changing Social Structure in Ghana: Essays in the Comparative Sociology of a New State and an Old Tradition. International African Institute. London. 1975.

Goody, J. "Rice-burning and the Green Revolution in Northern Ghana." Journal of Development Studies. January 1980.

Gordon, G. An Evaluation of Nutrition Education Given to Pregnant and Nursing Women in Six Communities in the Upper Region of Ghana. Masters Thesis in the Faculty of Science, University of Ghana. Legon. 1973.

Gould, P. The Development of the Transportation Pattern in Ghana. Studies in Geography, Number 5. Northwestern University. Evanston, Illinois. 1960.

Guyer, J. "Household and Community in African Studies." African Studies Review, 24(2/3). June/September 1981.

Guyer, J. "From Seasonal Income to Daily Diet in a Partially Commercialized Rural Economy (Southern Cameroon)." Chapter 9 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.

Gyimah-Boadi, E. "Policies and Politics of Export Agriculture." Chapter 9 in Hansen, E. and Ninsin, K. (editors). The State, Development and Politics in Ghana. CODESRIA. London. 1989.

Haaga, J. and Mason, J. "Food Distribution Within the Family: Evidence and Implications for Research and Programmes." Food Policy. May 1987.

Habicht, J-P., Mason, J.B. and Martorell, R. "Growth and Socioeconomic Change." Paper prepared for Meeting on Purpose, Use and Interpretation of Anthropometric Indicators of Nutritional Status. Geneva. October 1983.

Hansen, A. "Coping with Famine, Drought, and War in Sub-Saharan Africa." Studies in Third World Societies, 36: Natural Disasters and Cultural Responses. Department of Anthropology, College of William and Mary. Williamsburg, Virginia. June 1986.

Hansen, A. and McMillan, D. (editors). Food in Sub-Saharan Africa. Lynne Rienner. Boulder. 1986.

Hansen, E. "The State and Food Agriculture." Chapter 8 in Hansen, E. and Ninsin, K. (editors). The State, Development and Politics in Ghana. CODESRIA. London. 1989.

Hansen, E. and Ninsin, K. (editors). The State, Development and Politics in Ghana. CODESRIA. London. 1989.

Harriss, B. Agricultural Marketing in the Semi-Arid Tropics of West Africa. Development Studies Occasional Paper. University of East Anglia. Norwich. 1981.

Harriss, B. Agricultural Marketing in the Semi-Arid Tropics of West Africa: A Partially Annotated and Indexed Bibliography. ICRISAT. Andhra Pradesh. 1982a.

Harriss, B. "Commercialisation and Food Systems." Paper for the SSRC Human Geography Workshop on Food Production and Distribution. Leeds. November 1982b.

Harriss, B. "Markets and Rural Undernutrition." Mimeo. London School of Hygiene and Tropical Medicine. June 1983.

Harriss, B. "The Intra Family Distribution of Hunger in South Asia." Mimeo. University of Oxford. 1987.

Hart, K. "Informal Income Opportunities and Urban Employment in Ghana." Journal of Modern African Studies. 1973.

Hart, K. "Migration and the Opportunity Structure: A Ghanaian Case-Study." In Amin, S. (editor). Modern Migrations in West Africa. Oxford University Press. Oxford. 1974.

Hart, K. "Swindler or Public Benefactor? - The Entrepreneur in his Community." In Goody, J. (editor). Changing Social Structure in Ghana. International African Institute. London. 1975.

Hart, K. The Political Economy of West African Agriculture. Cambridge University Press. Cambridge. 1982.

Haswell, M. "Food Consumption in Relation to Labour Output." Chapter 2.2 in Chambers, R., Longhurst, R. and Pacey, A. (editors). Seasonal Dimensions to Rural Poverty. Frances Pinter. London. 1981.

Hazell, P., Pomareda, C. and Valdes, A. (editors). Crop Insurance for Agricultural Development: Issues and Experience. Johns Hopkins University Press. Baltimore. 1986.

Henry, C. "Body mass index and the limits of human survival." European Journal of Clinical Nutrition, 44. 1990.

Heyer, J., Roberts, P. and Williams, G. (editors). Rural Development in Tropical Africa. Macmillan. London. 1981.

Heyer, J. "Landless Agricultural Labourers' Asset Strategies." IDS Bulletin, 20(2). Institute of Development Studies. Sussex. April 1989.

Heyer, J. "Poverty and Food Deprivation in Kenya's Smallholder Agricultural Areas." Chapter 7 in Drèze, J. and Sen A. (editors). The Political Economy of Hunger, Vol. III: Endemic Hunger. Oxford University Press. Oxford. 1991.

Hilderbrand, K. "Assessing the Components of Seasonal Stress amongst Fulani of the Seno-Mango, Central Mali." Chapter 12 in Hill, A. (editor). Population, Health and Nutrition in the Sahel. Routledge and Kegan Paul. London. 1985.

Hill, A. (editor). Population, Health and Nutrition in the Sahel. Routledge and Kegan Paul. London. 1985.

Hill, P. Rural Hausa: A Village and a Setting. Cambridge University Press. Cambridge. 1972.

Hill, P. "The West African Farming Household." In Goody, J. (editor). Changing Social Structure in Ghana. International African Institute. London. 1975.

Hill, P. Dry Grain Farming Families: Hausaland (Nigeria) and Karnataka (India) Compared. Cambridge University Press. Cambridge. 1982.

Hill, P. Development Economics on Trial. Cambridge University Press. Cambridge. 1986.

Hindmarsh, P. and Trotter, B. "Grain storage and food security." The Courier, 114. March-April 1989.

Hoddinott, J. "Households as Units of Analysis: Review and Suggestions for Research." Mimeo. Oxford. 1987.

Hoddinott, J. Migration, Accumulation and Old Age Security in Western Kenya. D.Phil. Thesis. University of Oxford. 1989.

Hong, C. and Martinez, E. "Sasakawa Global 2000 Agricultural Project in Northern, Upper East and Upper West Regions in Ghana from 1986 to 1988." Paper presented at the Workshop Feeding the Future. Accra. August 1989.

Huss-Ashmore, R. and Katz, S. (editors). African Food Systems in Crisis: Part Two: Contending with Change. Gordon and Breach. New York. 1990.

Ibrahim, F. "The Exchange of Livestock and Grain and their Role in Enhancing Vulnerability to Famine in the Semi-Arid Zone of the Sudan." Chapter 10 in Bohle H., *et al.* (editors). Famine and Food Security in Africa and Asia. Bayreuth Geowissenschaftliche Arbeiten. Bayreuth. 1991.

IDS Bulletin. "Seasonality and Poverty." Institute of Development Studies, University of Sussex. Brighton. July 1986.

International Labour Organisation. Yearbook of Labour Statistics. ILO. Geneva. 1977; 1978; 1983; 1985; 1986.

Irvine, F.R. West African Crops. Oxford University Press. Oxford. 1969.

- James, W., Ferro-Luzzi, A. and Waterlow, J. "Definition of chronic energy deficiency in adults." European Journal of Clinical Nutrition, 42. 1988.
- Jiggins, J. "Women and Seasonality: Coping with Crisis and Calamity." IDS Bulletin, 17(3). Institute of Development Studies. Sussex. July 1986.
- Jodha, N. "Famine and Famine Policies: Some Empirical Evidence." Economic and Political Weekly. 11 October 1975.
- Jodha, N. "Effectiveness of Farmers' Adjustment to Risk." Discussion Paper 1. International Crops Research Institute for the Semi-Arid Tropics. Hyderabad. November 1977.
- Jodha, N. "Role of Credit in Farmers' Adjustment against Risk in Arid and Semi-Arid Tropical Areas of India." Economic and Political Weekly. October 17-24, 1981.
- Killick, T. Development Economics In Action: A Study of Economic Policies in Ghana. Heinemann. London. 1978.
- Kirchler, E. "Spouses' Influence Strategies in Purchase Decisions as Dependent on Conflict Type and Relationship Characteristics." Journal of Economic Psychology, 11. 1990.
- Kludze, A. "Property Law and Rural Development in Ghana." Rural Africana, 17. Fall 1983.
- Knudsen, O. and Scandizzo, P. "The Demand for Calories in Developing Countries." American Journal of Agricultural Economics. February 1982.
- Koli, S.E. A Guide to Cotton Cultivation In Ghana. Ghana Publishing Corporation. Tema. 1973.
- Koli, S.E. "Effect of Sowing Date on Grain Yield of Millet." Ghana Journal of Agricultural Sciences, 8. 1975.
- Komolafe, M.F. *et al.* Agricultural Science for West African Schools and Colleges. Oxford University Press (Nigeria). Ibadan. 1979.
- Konings, P. Peasantry and State in Ghana: The Example of the Veia Irrigation Project in the Upper Region of Ghana. Working Paper No. 5. African Studies Centre. Leiden. 1981.
- Konings, P. The State and Rural Class Formation in Ghana: A Comparative Analysis. KPI. London. 1986.
- Korem, A. Bush Fire and Agricultural Development in Ghana. Ghana Publishing Corporation. Tema. 1985.

- Kowal, J. and Kassam, A. Agricultural Ecology of Savanna: A Study of West Africa. Clarendon Press. Oxford. 1978.
- Kraus, J. "The Political Economy of Agrarian Regression in Ghana." Chapter 6 in Commins, S., Lofchie, M. and Payne, R. (editors). Africa's Agrarian Crisis: The Roots of Famine. Rienner. Boulder, Colorado. 1986.
- Krings, T. "Indigenous Agricultural Development and Strategies for Coping with Famine - the Case of Senoufo (Pomporo) in Southern Mali (West Africa)." Chapter 3 in Bohle H., *et al.* (editors). Famine and Food Security in Africa and Asia. Bayreuth Geowissenschaftliche Arbeiten. Bayreuth. 1991.
- Kumar, S. "The Nutrition Situation and Its Food Policy Links." Chapter 3 in Mellor, J., Delgado, C. and Blackie, M. (editors). Accelerating Food Production in Sub-Saharan Africa. Johns Hopkins University Press. Baltimore. 1987a.
- Kumar, S. "Women's Role and Agricultural Technology." Chapter 10 in Mellor, J., Delgado, C. and Blackie, M. (editors). Accelerating Food Production in Sub-Saharan Africa. Johns Hopkins University Press. Baltimore. 1987b.
- Kumar, S. "Effect of Seasonal Food Shortage on Agricultural Production in Zambia." World Development, 16(9). September 1988.
- Kuznets, S. "Economic Growth and Income Inequality." American Economic Review. March 1955.
- Ladouceur, P. Chiefs and Politicians: The Politics of Regionalism in Northern Ghana. Longman. London. 1979.
- Latham, M. "Strategies for the Control of Malnutrition and the Influence of the Nutritional Sciences." Chapter 24 in Gittinger, J., Leslie, J. and Hoisington, C. (editors). Food Policy: Integrating Supply, Distribution, and Consumption. Johns Hopkins University Press. Baltimore. 1987.
- Lawrence, M., Lawrence, F., Cole, T., Coward, W., Singh, J. and Whitehead, R. "Seasonal Pattern of Activity and its Nutritional Consequence in the Gambia." Chapter 3 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.
- Laya, D. "Interviews with Farmers and Livestock-Owners in the Sahel." African Environment, 1(2). Dakar. April 1975.
- Lenin, V.I. The Development of Capitalism in Russia. Progress Publishers. Moscow. 1956.
- Lewis, W. "Economic Development with Unlimited Supplies of Labour." The Manchester School of Economic and Social Studies. May 1954.

- Lipton, M. "Migration from Rural Areas of Poor Countries: The Impact on Rural Productivity and Income Distribution." World Development, 8(1). 1980.
- Lipton, M. Poverty, Undernutrition, and Hunger. Staff Working Paper Number 597. World Bank. Washington DC. 1983.
- Longhurst, R. "Household Food Strategies in Response to Seasonality and Famine." IDS Bulletin, 17(3). Institute of Development Studies. Sussex. July 1986.
- Longhurst, R. "The Role of Agricultural Research and Secondary Food Crops in Reducing Seasonal Food Insecurity." Chapter 17 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.
- Longhurst, R. and Payne, P. "Seasonal Aspects of Nutrition." Chapter 2.4 in Chambers, R., Longhurst, R. and Pacey, A. (editors). Seasonal Dimensions to Rural Poverty. Frances Pinter. London. 1981.
- Lucas, R. and Stark, O. "Motivations to Remit: Evidence from Botswana." Journal of Political Economy, 93(5). 1985.
- Mahama, R. Cotton in the Economy of the North. B.Sc. Thesis. Faculty of Agriculture, University of Science and Technology. Kumasi. 1976.
- Martorell, R. "Child Growth Retardation: A Discussion of its Causes and its Relationship to Health." In Blaxter, K. and Waterlow, J. (editors), Nutritional Adaptation in Man. John Libbey. London. 1985.
- Matlon, P. The Size Distribution, Structure and Determinants of Personal Income Among Farmers in the North of Nigeria. Ph.D Thesis in Economics. Cornell University. 1977.
- Matlon, P. "Income Distribution Among Farmers in Northern Nigeria: Empirical Results and Policy Implications." African Rural Economy Papers, No. 18. Michigan State University. East Lansing, Michigan. 1979.
- Matlon, P. "The West African Semiarid Tropics." Chapter 5 in Mellor, J., Delgado, C. and Blackie, M. (editors). Accelerating Food Production in Sub-Saharan Africa. Johns Hopkins University Press. Baltimore. 1987.
- Mbillah, J.A. Aspects of Kusasi Traditional Religion. Dissertation for Diploma in Theology. Trinity College. Legon. June 1982.
- McCorkle, C. "Foodgrain disposals as early warning famine signals: A case from Burkina Faso." Disasters, 11(4). 1987.
- McDowell, I. and King, F.S. "Interpretation of arm circumference as an indicator of nutritional status." Archives of Disease in Childhood, 57. 1982.

- McKim, W. "The Periodic Market System in Northeastern Ghana." Economic Geography. July 1972.
- McLean, W. The Identification of Nutritional Risk at the Household Level: A State of the Art Review. Occasional Paper No. 2. Department of Human Nutrition. London School of Hygiene and Tropical Medicine. London. 1984.
- McMillan, D. "Distribution of Resources and Products in Mossi Households." In Hansen, A. and McMillan, D. (editors). Food in Sub-Saharan Africa. Lynne Rienner. Boulder. 1986.
- Meillassoux, C. "The Impact of Capitalism on Indigenous Trade in West Africa" (1967). In Allen, C. and Williams, G. (editors). Sociology of "Developing Societies": Sub-Saharan Africa. Macmillan. London. 1982.
- Mellor, J., Delgado, C. and Blackie, M. (editors). Accelerating Food Production in Sub-Saharan Africa. Johns Hopkins University Press. Baltimore. 1987.
- Mercer-Quarshie, H. "Some Yield Losses of Sorghum in Northern Ghana." Ghana Journal of Agricultural Sciences, 2. 1969.
- Mercer-Quarshie, H. "Effect of Plant Spacing Within Ridge on Grain Yield and its Components in Varieties of Tall, Late Maturing Sorghum." Ghana Journal of Agricultural Sciences, 5. 1972.
- Messer, E. "The "Small but Healthy" Hypothesis: Historical, Political, and Ecological Influences on Nutritional Standards." Human Ecology, 14(1). March 1986.
- Messer, E. "Seasonality in Food Systems: An Anthropological Perspective on Household Food Security." Chapter 10 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.
- Moris, J. "Indigenous Versus Induced Solutions to Food Stress in Africa." Chapter 13 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.
- Mortimore, M. Adapting to Drought: Farmers, Famines and Desertification in West Africa. Cambridge University Press. Cambridge. 1989.
- Naden, T. (Editor). "Law in Some North Ghanaian Societies." Linguistic Aspects of Culture, No. 2. Institute of African Studies, University of Ghana. Legon. 1984.
- Netting, R., Cleveland, D. and Stier, F. "The Conditions of Agricultural Intensification in the West African Savannah." In Reyna, S. (editor). Sahelian Social Development. Regional Economic Development Services Office, West Africa. USAID. Abidjan. 1980.

- Newbery, D. and Stiglitz, J. The Theory of Commodity Price Stabilization: A Study in the Economics of Risk. Clarendon. Oxford. 1981.
- Ninsin, K. "Land, Chieftaincy, and Political Stability in Colonial Ghana." Research Review, New Series, 2(2). Institute of African Studies. University of Ghana. Legon. July 1986.
- Ninsin, K. "The Land Question since the 1950s." Chapter 7 in Hansen, E. and Ninsin, K. (editors). The State, Development and Politics in Ghana. CODESRIA. London. 1989.
- Norman, D., Ouedrago, I. and Newman, M. The Farmer in the Semi-Arid Tropics of West Africa, Volume I. ICRISAT. Hyderabad. February 1979.
- Norman, D., Simmons, E. and Hays, H. Farming Systems in the Nigerian Savanna: Research and Strategies for Development. Westview Press. Boulder, Colorado. 1982.
- Nyanteng, V.K. "The Storage of Foodstuffs in Ghana." Technical Publication Series, No. 18. Institute of Statistical, Social and Economic Research. University of Ghana. Legon. 1972.
- Nyanteng, V.K. "Farmer - Trader Relationship: Is There Exploitation?" Discussion Paper, No. 3. Institute of Statistical, Social and Economic Research. University of Ghana. Legon. February 1978a.
- Nyanteng, V.K. "Local Food Prices: Trends and Factors Affecting Them." Discussion Paper, No. 5. Institute of Statistical, Social and Economic Research. University of Ghana. Legon. May 1978b.
- Ofori, J.K. The Role of the Upper Regional Agricultural Development Programme (URADEP) in the Upper Region. B.A. Thesis. Faculty of Social Sciences, University of Science and Technology. Kumasi. 1985.
- Ogbu, J. "Seasonal Hunger in Tropical Africa as a Cultural Phenomenon." Africa, 43(4). October 1973.
- Okyere, W.A., Asante, F.A. and Gyekye, L.O. Case Studies on Rural Poverty Alleviation in the Commonwealth: Ghana. Commonwealth Secretariat. London. 1992.
- Onyemelukwe, J. and Filani, M. Economic Geography of West Africa. Longman. London. 1983.
- Osmani, S. "Nutrition and the Economics of Food: Implications of Some Recent Controversies." Paper for the WIDER Symposium on Food Strategies. World Institute for Development Economics Research. Helsinki. January 1987.

Owusu, K. and Tetteh, W. "An Experiment in Agricultural Credit: The Small Farmer Group Lending Programme in Ghana (1969-1980)." Savings and Development, 6(1). 1982.

Payne, P. "Public Health and Functional Consequences of Seasonal Hunger and Malnutrition." Chapter 2 in Sahn, D. (editor). Causes and Implications of Seasonal Variability in Household Food Security. International Food Policy Research Institute. Washington DC. 1989.

Phillips, D., Coles, A. and Seaman, J. Village Food Systems in West Africa - An Abstract. International African Institute. London. 1983.

Pitt, M. and Rosenzweig, M. "Health and Nutrient Consumption Across and Within Farm Households." Review of Economics and Statistics, 67. 1985.

Pitt, M., Rosenzweig, M. and Hassan, M.N. "Productivity, Health and Inequality in the Intrahousehold Distribution of Food in Low-Income Countries." American Economic Review. December 1990.

Plange, N. "Underdevelopment in Northern Ghana: Natural Causes or Colonial Capitalism?" Review of African Political Economy, 15/16. September 1979.

Plange, N. "The Colonial State in Northern Ghana: The Political Economy of Pacification." Review of African Political Economy, 31. December 1984.

Platt, B. "Food and its Production." Chapter 4 in Banks, A. (editor). The Development of Tropical and Sub-Tropical Countries. Edward Arnold. London. 1954.

Platteau, J-P. "Traditional Systems of Social Security and Hunger Insurance: Some Lessons from the Evidence Pertaining to Third World Village Societies." Working Paper No. 15. Development Economics Research Programme. London School of Economics. September 1988.

Pollak, R. "A Transaction Cost Approach to Families and Households." Journal of Economic Literature, XXIII. June 1985.

Popkin, S. The Rational Peasant: The Political Economy of Rural Society in Vietnam. University of California Press. Berkeley. 1979.

Pottier, J. (editor). Food Systems in Central and Southern Africa. School of Oriental and African Studies, University of London. London. 1985.

Raeburn, J. Report on a Preliminary Economic Survey of the Northern Territories of the Gold Coast. Her Majesty's Colonial Office. London. 1950.

Rangasami, A. "'Failure of Exchange Entitlements' Theory of Famine: A Response." Economic and Political Weekly, 20(41). 1985.

- Rattray, S. Tribes of the Asante Hinterland, Volume Two. Oxford University Press. Oxford. 1932.
- Ravallion, M. Markets and Famines. Clarendon Press. Oxford. 1987.
- Ravallion, M. "Income Effects on Undernutrition." Economic Development and Cultural Change, 38(3). 1990.
- Reardon, T., Matlon, P. and Delgado, C. "Coping with Household-level Food Insecurity in Drought-affected Areas of Burkina Faso." World Development, 16(9). September 1988.
- Reardon, T., Matlon, P. and Delgado, C. "Determinants and Effects of Income Diversification Amongst Farm Households in Burkina Faso." Journal of Development Studies, 28(2). January 1992.
- Rempel, H. "Seasonal Out-Migration and Rural Poverty." Chapter 7.5 in Chambers, R., Longhurst, R. and Pacey, A. (editors). Seasonal Dimensions to Rural Poverty. Frances Pinter. London. 1981.
- Reyna, S. (editor). Sahelian Social Development. Regional Economic Development Services Office, West Africa. USAID. Abidjan. 1980.
- Roche, C. "Households, Food Production and Aid in Burkina Faso: A Case Study." Paper presented to the Workshop on Household Survival Strategies and Family Structure. Institute of British Geographers. Leeds. January 1985.
- Roe, T. and Graham-Tomasi, T. "Yield Risk in a Dynamic Model of the Agricultural Household." Chapter 9 in Singh, I., Squire, L. and Strauss, J. (editors). Agricultural Household Models: Extensions, Applications, and Policy. Johns Hopkins University Press. Baltimore. 1986.
- Roncoli, M.C. "Rural Marginality and Peasant Differentiation: Dilemmas of Household and Community Reproduction in Northeastern Ghana." Mimeo. University of New York. Binghamton. September 1986a.
- Roncoli, M.C. "Migration and Marginality: Dilemmas of Household and Community Reproduction in Northeastern Ghana." Mimeo. State University of New York at Binghamton. November 1986b.
- Roncoli, M.C. Marginality, Migration and Market Agriculture: Strategies of Household Reproduction in Northeastern Ghana. Ph.D. thesis (draft). State University of New York. Binghamton. June 1991.
- Rostow, W. The Stages of Economic Growth. Cambridge University Press. Cambridge. 1960.

Rothschild, M. and Stiglitz, J. "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information." Quarterly Journal of Economics, 90(4). November 1976.

Rouch, J. Notes on Migrations into the Gold Coast. CNRS. Paris. 1954.

Roumasset, J., Boussard, J-M. and Singh, I. (editors). Risk, Uncertainty and Agricultural Development. Agricultural Development Council. New York. 1979.

Sahn, D. (editor). Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.

Sahn, D. "A Conceptual Framework for Examining the Seasonal Aspects of Household Food Security." Chapter 1 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.

Sahn, D. and Delgado, C. "The Nature and Implications for Market Interventions of Seasonal Food Price Variability." Chapter 11 in Sahn, D. (editor), Seasonal Variability in Third World Agriculture: The Consequences for Food Security. Johns Hopkins University Press. Baltimore. 1989.

Sahn, D. "Malnutrition in Côte d'Ivoire: Prevalence and Determinants." Social Dimensions of Adjustment in Sub-Saharan Africa: Working Paper No. 4. World Bank. Washington DC. 1990.

Savonnet-Guyot, C. État et Sociétés au Burkina: Essai sur le politique africain. Karthala. Paris. 1986.

Schmidt, G. and Frey, G. "Crop Rotation Effects in Savannah Soil at the Nyankpala Agricultural Experiment Station." Nyankpala Agricultural Research Report, No. 4. Deutsche Gesellschaft für Zusammenarbeit (GTZ). Nyankpala, Northern Region, Ghana. 1988.

Schofield, S. "Seasonal Factors affecting Nutrition in Different Age Groups and Especially Preschool Children." Journal of Development Studies, 11(1). October 1974.

Scott, E. (editor). Life Before the Drought. Allen and Unwin. Boston. 1984.

Scott, J. The Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia. Yale University Press. New Haven. 1976.

Seidman, A. Ghana's Development Experience. East African Publishing House. Nairobi. 1978.

Sen, A. Poverty and Famines. Clarendon Press. Oxford. 1981.

Sen. A. "Economics and the Family." Asian Development Review, 1. 1983.

Senah, K. "Problems of the Health Care Delivery System." Chapter 10 in Hansen, E. and Ninsin, K. (editors). The State, Development and Politics in Ghana. CODESRIA. London. 1989.

Shalit, H. "Calculating the Gini Index of Inequality for Individual Data." Oxford Bulletin of Economics and Statistics, 47(2). May 1985.

Shanin, T. The Awkward Class: Political Sociology of Peasantry in a Developing Society: Russia 1913-1925. Oxford University Press. London. 1972.

Sharif, M. "The Concept and Measurement of Subsistence: A Survey of the Literature." World Development, 14(5). 1986.

Shenton, R. The Development of Capitalism in Northern Nigeria. James Currey. London. 1986.

Shenton, R. and Watts, M. "Capitalism and Hunger in Northern Nigeria." Review of African Political Economy, 15/16. May-December 1979.

Shepherd, A. "Agrarian Change in Northern Ghana: Public Investment, Capitalist Farming and Famine." Chapter 7 in Heyer, J., Roberts, P. and Williams, G. (editors). Rural Development in Tropical Africa. Macmillan. London. 1981.

Simmons, E. "Calorie and Protein Intakes in Three Villages of Zaria Province, May 1970 - July 1971." Samaru Miscellaneous Paper No. 55. Ahmadu Bello University. Nigeria. 1976.

Singh, I., Squire, L. and Strauss, J. (editors). Agricultural Household Models: Extensions, Applications, and Policy. Johns Hopkins University Press. Baltimore. 1986.

Smith, R. "Agriculture in Kusasi." Mimeo. Bawku. 1945.

Songsore, J. Co-operative Credit Unions as Instruments of Regional Development: The Example of N.W. Ghana. Occasional Paper No. 17. Centre for Development Studies. University College of Swansea. 1982.

Spitz, P. "Drought and Self-Provisioning." Working Paper, Food Systems and Society. United Nations Research Institute for Social Development. Geneva. 1980.

Spitz, P. "Livelihood and the Food Squeeze." Ceres. May-June 1981.

Spring, A. "Women Farmers and Food in Africa: Some Considerations and Suggested Solutions." In Hansen, A. and McMillan, D. (editors). Food in Sub-Saharan Africa. Lynne Rienner. Boulder. 1986.

Staniland, M. The Lions of Dagbon: Political Change in Northern Ghana. Cambridge University Press. Cambridge. 1975.

Stark, O., Taylor, J. and Yitzhaki, S. "Remittances and Inequality." Economic Journal, 96(3). 1986.

Strauss, J. "Households, Communities, and Preschool Children's Nutrition Outcomes: Evidence from Rural Côte d'Ivoire." Economic Development and Cultural Change, 38(2). 1990.

Svedberg, P. Undernutrition in Sub-Saharan Africa: A Critical Assessment of the Evidence. Chapter 5 in Drèze, J. and Sen A. (editors). The Political Economy of Hunger, Vol. III: Endemic Hunger. Oxford University Press. Oxford. 1991.

Swift, J. "Why are Rural People Vulnerable to Famine?" IDS Bulletin, 20(2). Institute of Development Studies. Sussex. 1989.

Syme, J.K.G. The Kusasis: A Short History. Mimeo. Bawku. 1932.

Szerezewski, R. Structural Changes in the Economy of Ghana, 1891-1911. Weidenfeld and Nicolson. London. 1965.

Toulmin, C. "Access to Food, Dry Season Strategies and Household Size amongst the Bambara of Central Mali." IDS Bulletin, 17(3). University of Sussex. 1986.

Tripp, R. Economic Strategies and Nutritional Status in a Compound Farming Settlement of Northern Ghana. Doctoral Dissertation in Social Anthropology. Columbia University. 1978.

Tripp, R. "Farmers and Traders: Some Economic Determinants of Nutritional Status in Northern Ghana." Journal of Tropical Pediatrics, 27. February 1981.

Twumasi, P.A. Social Research In Rural Communities: The Problems of Fieldwork in Ghana. Ghana Universities Press. Accra. 1986.

Udry, C. "Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy." World Bank Economic Review, 4(3). World Bank. Washington DC. 1990.

Udry, C. "A Competitive Analysis of Rural Credit: State-Contingent Loans in Northern Nigeria." Center Discussion Paper No. 630. Economic Growth Center. Yale University. April 1991.

UNICEF. Within Human Reach. UNICEF. New York. 1985.

UNICEF-Accra. "Adjustment Policies and Programmes to Protect Children and other Vulnerable Groups in Ghana." Chapter 4 in Cornia, G., Jolly, R. and Stewart, F. (editors). Adjustment With a Human Face: Volume II. Country Case Studies. Clarendon Press. Oxford. 1988.

- UNICEF-Accra. National Nutrition Survey, Ghana: 1986. UNICEF and Ministry of Health, Ghana. Accra. 1989.
- van Apeldoorn, G. Markets in Ghana: A Census and Some Comments. Volume 1: Northern and Upper Regions. ISSER Technical Publication Series, No. 17. Institute of Social, Statistical and Economic Research. University of Ghana. Legon. 1971.
- van Apeldoorn, G. Perspectives on Drought and Famine in Nigeria. George Allen and Unwin. London. 1981.
- van Hear, N. "'By-Day' Boys and Dariga Men: Casual Labour versus Agrarian Capital in Northern Ghana." Review of African Political Economy, 31. December 1984.
- van Schendel, W. Peasant Mobility: the Odds of Life in Rural Bangladesh. Manohar. New Delhi. 1981.
- Vaughan, M. "Household Units and Historical Processes in Malawi." Review of African Political Economy, 1985.
- von Pischke, J., Adams, D. and Donald, G. (editors). Rural Financial Markets in Developing Countries: Their Use and Abuse. Johns Hopkins. Baltimore. 1983.
- Walker, T. and Jodha, N.S. "How Small Farm Households Adapt to Risk." Chapter 2 in Hazell, P., Pomareda, C. and Valdes, A. (editors). Crop Insurance for Agricultural Development: Issues and Experience. Johns Hopkins University Press. Baltimore. 1986.
- Walsh, R. "The Nature of Climatic Seasonality." Chapter 1.2 in Chambers, R., Longhurst, R. and Pacey, A. (editors). Seasonal Dimensions to Rural Poverty. Frances Pinter. London. 1981.
- Waterlow, J.C. "Note on the Assessment and Classification of Protein-Energy Malnutrition in Children." The Lancet. July 14, 1973.
- Watts, M. A Silent Revolution: The Changing Character of Food Production in Northern Nigeria. PhD Thesis. University of California. Berkeley. 1979.
- Watts, M. Silent Violence: Food, Famine and Peasantry in Northern Nigeria. University of California Press. Berkeley. 1983.
- Watts, M. "The Demise of the Moral Economy: Food and Famine in a Sudano-Sahelian Region in Historical Perspective." Chapter 6 in Scott, E. (editor), 1984.
- Weekes-Vagliani, W. Actors and Institutions in the Food Chain: The Case of the Ivory Coast. Development Centre Papers. Organisation for Economic Co-Operation and Development. Paris. 1985.

White, H. and Gleave, M. An Economic Geography of West Africa. G. Bell & Sons. London. 1971.

Whitehead, A. "'I'm Hungry, Mum': The Politics of Domestic Budgeting." In Young, K., Wolkowitz, C. and McCullagh, R. (editors). Of Marriage and the Market. C.S.E. Books. London. 1981.

Whitehead, A. Gender and Famine in West Africa. Draft of Paper for Development Studies Annual Conference. Bradford. September 1984a.

Whitehead, A. "Beyond the Household? Gender and Kinship-Based Resource Allocation in a Ghanaian Domestic Economy." Draft Paper for Workshop: Conceptualising the Household: Theoretical, Conceptual and Methodological Issues. Harvard Institute for International Development. Cambridge, Massachusetts. November 1984b.

Whitehead, A. "Women in Rural Food Production in Sub-Saharan Africa: Some Implications for Food Strategies." Paper for the WIDER Symposium on Food Strategies. World Institute for Development Economics Research. Helsinki. July 1986.

Whitehead, A. "Distributional Effects of Cash Crop Innovation." IDS Bulletin, 19(2). Institute of Development Studies. Sussex. 1988.

Wilk, R. (editor). The Household Economy: Reconsidering the Domestic Mode of Reproduction. Westview Press. Boulder. 1989.

Williams, G. "Taking the Part of Peasants." In Allen, C. and Williams, G. (editors). Sociology of "Developing Societies": Sub-Saharan Africa. Macmillan. London. 1982.

Wilson, F. Migrant Labour in South Africa. South African Council of Churches. Johannesburg. 1972.

Wolfe, B. and Behrman, J. "Is Income Overrated in Determining Adequate Nutrition?" Economic Development and Cultural Change, 31. April 1983.

World Bank. World Development Report. World Bank. Washington DC. 1978-1986.

World Bank. Ghana: Policies and Program for Adjustment. World Bank. Washington DC. 1984b.

World Health Organisation. "Use and interpretation of anthropometric indicators of nutritional status." Bulletin of the World Health Organisation, 64(6). 1986.

Young, K., Wolkowitz, C. and McCullagh, R. (editors). Of Marriage and the Market. C.S.E. Books. London. 1981.

Zachariah, K. and Conde, J. Demographic Aspects of Migration in West Africa - Volume 1. World Bank Staff Working Paper No. 414. Washington DC. 1980.

Zinyama, L., Campbell, D. and Matiza, T. "Traditional Household Strategies to Cope with Food Insecurity in the SADCC Region." Paper Presented to the Third Annual Conference on Food Security Research in Southern Africa. Harare. November 1987.

GHANA GOVERNMENT MATERIALS

National Archives of Ghana: Accra

- ADM 5/1/116. Report on the Department of Agriculture for the Year 1939-40. 1940.
- ADM 5/1/117. Report on the Department of Agriculture for the Year 1940-41. 1941.
- ADM 5/1/118. Report on the Department of Agriculture for the Year 1941-42. 1942.
- ADM 5/1/119. Report on the Department of Agriculture for the Year 1942-43. 1943.
- ADM 5/1/122. Report on the Department of Agriculture for the Year 1945-46. 1946.
- ADM 5/1/123. Report on the Department of Agriculture for the Year 1946-47. 1947.
- ADM 5/1/124. Report on the Department of Agriculture for the Year 1947-48. 1948.
- ADM 5/1/125. Report on the Department of Agriculture for the Year 1948-49. 1949.
- ADM 5/1/126. Report on the Department of Agriculture for the Year 1949-50. 1950.
- ADM 5/1/127. Report on the Department of Agriculture for the period 1st April, 1950 to 31st March, 1951. 1951.
- ADM 5/1/128. Report on the Department of Agriculture for the period 1st April, 1951 to 31st March, 1952. 1952.
- ADM 5/1/129. Report on the Department of Agriculture for the period 1st April, 1952 to 31st March, 1953. 1953.
- ADM 5/1/130. Report on the Department of Agriculture for the Year 1st April, 1953 to 31st March, 1954. 1954.
- ADM 5/1/131. Report on the Department of Agriculture for the Year 1st April, 1954 to 31st March, 1955. 1955.
- ADM 5/1/132. Report on the Department of Agriculture for the Year 1st April, 1955 to 31st March, 1956. 1956.
- ADM 5/1/133. Report on the Department of Agriculture for the Year 1st April, 1956 to 31st March, 1957. 1957.
- ADM 5/4/77. Togoland Annual Report. 1950.

ADM 56/1/128. Food Supply in Fra-Fra. 1911.

ADM 56/1/461. Quarterly Report, Northeastern Province, 31.12.1911. 1912.

ADM 56/1/468. Quarterly Report, Northeastern Province, 30.10.1914. 1915.

ADM 56/1/471. Annual Report, Northeastern Province, 1913. 1914.

ADM 56/1/497. Annual Report: Mandated Togoland, 1922-1925. 1925.

ADM 57/5/1. Informal Diary - Bawku. 1921-1933.

ADM 57/5/2. Informal Diary - Bawku. 1933-1937.

ADM 57/5/8. 1931 Census Report on Kusasi District: Including Mandated Area. 1931.

ADM 57/5/9. Informal Diary - Bawku. 1913-1916.

Gold Coast Government. Annual Report on the Gold Coast for the Year 1946. Her Majesty's Stationery Office. London. 1947.

Gold Coast Government. Colonial Reports: Gold Coast 1950. Her Majesty's Stationery Office. London. 1951.

National Archives of Ghana: Tamale

RAT 10. Informal Diary - Bawku. 1932-1934.

RAT 40-50. Direct Taxation. 19 August 1936.

RAT 283. Informal Diary - Bawku. 1935-1937.

RAT 306. Informal Diary - Bawku. 1938-1940.

RAT 339. Informal Diary - Bawku. 1940-1946.

RAT 509. Annual Report, Mamprusi District, 1949/50. 1950.

RAT 520. Annual Report, Mamprusi District, 1947/48. 1948.

RAT 531. Annual Report, Kusasi District, 1936/37. 1937.

RAT 533. Annual Report, Kusasi District, 1937/38. 1938.

Local Government and Miscellaneous Materials, Upper East Region

Asigri Abugrago Azoka II, Paramount Chief of the Bawku Traditional Area. Welcome Address by the Bawku-Naba on the Occasion of the Annual Saman-Piig Festival. Bawku. 10 December 1988.

Bawku District Administration. Allocation/Distribution of Canadian Food Aid to the Upper East and Upper West Regions. File BG/1/SF17/18. Bawku. June 1984.

Bawku District Assembly: Relief and Disaster Sub-Committee. Report on the Food Situation in Bawku East District, 1989. Bawku. May 1989.

Bawku District Council. District Accounts Book. Bawku. 1987-1989.

Ministry of Agriculture/URADEP. Monthly Reports. Bawku. 1982-1989.

Ministry of Agriculture/URADEP. Pusiga FSC Monthly Progress Report. Pusiga, Bawku District. 1987-1989.

Ministry of Agriculture/URADEP. Annual Report: General Extension Division, Bawku District. Bawku. 1986.

Ministry of Agriculture/URADEP. Report on Army Worms Outbreak, Bawku District. Bawku. August 1987.

Ministry of Agriculture/URADEP: Plant Protection and Regulatory Services. Army Worm Outbreak: Comprehensive Report. Bawku. July 1987.

Ministry of Agriculture/URADEP. Upper East Region: Crops and Farms Survey 1988. Regional Head Office, Policy Planning, Monitoring and Evaluation Department. Bolgatanga. August 1988.

National Mobilisation Committee. Allocation of Relief Food Aid to Famine Areas, Bawku District. Bawku. 20 September 1988.

Nunoofio, S. Commercial Manager, FASCOM. Speech delivered at a Farmer's Rally. Zebilla, Bawku District. 9 May 1989.

Sasakawa Global 2000. Annual Report, Upper East Region: 1988. Bolgatanga. 1989.

National Government Publications

Republic of Ghana. Economic Recovery Program. Volumes I and II. Government of the Republic of Ghana. Accra. 1983.

Republic of Ghana. National Programme for Economic Development. Government of the Republic of Ghana. Accra. July 1987a.

Republic of Ghana. Performance of the Agricultural Sector 1987. Ministry of Agriculture. Accra. September 1987b.

Republic of Ghana. 1984 Population Census of Ghana: Demographic and Economic Characteristics: Upper East Region. Statistical Service. Accra. December 1987c.

APPENDICES

Appendix 1. Fieldwork Methodology

0. Summary of Fieldwork

The primary research on which this thesis is based was undertaken in a 13-month period of fieldwork, from July 1988 to August 1989, in a village in the extreme northeast of Ghana, West Africa. The focus of the research being food consumption rather than production strategies, the fieldwork was timed such that the repeat interviewing and nutrition surveillance occurred between two harvests - during the dry season following the main annual harvest in November 1988, through to the rains preceding the early millet harvest of the new farming season, the following July.

Following a census of two sections within the village, 5 rounds of regular economic and nutritional monitoring of the sampled households constituted the quantitative backbone of the research. Over 700 interviews were conducted with household heads, and over 500 people - adults as well as children - were monitored for seasonal changes in nutritional status, health and diets.

In addition, interviews were conducted with 36 elderly people on their lives and local history, 33 women on their income-earning activities, 28 seasonal migrants, and about 24 local officials on topics relating to agriculture, health, education, taxes, forestry and others. Finally, several notebooks were filled with material gathered in numerous discussions with neighbours and interpreters, which greatly enhanced my understanding of local conditions and culture.

1. Sample Enumeration

Enumerating the units in the sampling frame was the first major methodological task of this fieldwork. Because repeat surveying was involved, dealing with changes in the sample during the research period also provided a constant source of concern.¹

1.1. Site Selection

The area chosen for the fieldwork was Bawku District, one of six Districts comprising the Upper East Region of Ghana. Bawku town, the District capital, lies 50 miles east of Bolgatanga, the regional capital, and about 450 miles due north of Accra (see maps at frontispiece). The decision to work in Bawku had been made in Oxford, and derived largely from a reading of the work of Ann Whitehead, of the University of Sussex, whose descriptions of fieldwork in Bawku District in the 1970s - both in writing and in personal meetings - suggested that this area would be ideal for the pursuit of research into seasonal food insecurity.

After arriving in Bawku town in mid-July, 1988, the first task was to choose a village in which to work. The primary criterion was to find a site in which the majority of farming households were not self-sufficient in grain production during the fieldwork period, since the focus of the research proposal was 'household food insecurity'. Selecting a village was simplified by the fact that the District had suffered a serious attack of armyworm (*spodoptera exempta* - a cereals-eating insect), which devastated millet and sorghum crops in June 1988, for the second successive year. The worst affected village was Pusiga, 9 miles east of Bawku town. After making preliminary visits and contacts, Pusiga was selected as the fieldwork site.

Within Pusiga itself, the contiguous sections of Tesnatinga and Terago were regarded by the Ministry of Agriculture as worst affected by armyworm in both 1987 and 1988,

¹. This topic is elaborated in Devereux (1992), from which this section draws.

with many farmers harvesting no cereals at all. This afforded an opportunity to study a situation in which responding to food shortages was of central concern to the majority of households. Local people were more actively involved in market transactions - buying grain, selling cash crops and animals, borrowing - than they would have been in other years, and this fact was to provide valuable insights into the role of markets in exacerbating or alleviating food crises.

1.2. Sample Selection

After moving into accommodation in Terago, contact was made with the elders and sub-chiefs of Terago and Tesnatinga. These sub-chiefs had recently compiled lists of households for their sections, which were used by the District Administration to distribute small quantities of government food aid in October 1988. These lists named 119 and 118 households heads in Tesnatinga and Terago as of early 1988. However, as seen below, these figures proved inaccurate, and only 100 and 101 households (respectively) were located during the first round of interviews in September-October.

Complete enumerations of Tesnatinga and Terago were completed by late October 1988, with 201 interviews having been conducted in a period of seven weeks. Preliminary analysis of these data, conducted prior to sample selection, included ranking households by total wealth - defined as the value in current market prices of all animals, farm equipment and domestic assets owned by the household. This exercise revealed a wide spread of wealth and a diversity of income sources. Since the research was concerned broadly with inequality (processes of accumulation and impoverishment) and with inter-household relationships (credit transactions, labour exchange or hiring, patronage), and not exclusively with the behaviour of vulnerable households under food stress, simple random sampling was preferred to a stratification system which deliberately over-sampled poor and food insecure households.

Two samples were required. The larger sample was to be monitored regularly on economic activities and food consumption, by means of structured questionnaires

administered to household heads. A smaller sub-sample was to be monitored regularly for nutrition status, diet and health indicators, by means of anthropometric measurement of the whole household and questionnaires administered to all adult women. The two surveys were to run in tandem with each other.

Research which depends on repeated contact with the same individuals over an extended period is particularly vulnerable to sample decay. From the total of 201 households interviewed during the complete enumeration, two 60% samples were drawn. Terago and Tesnatinga were sampled separately, in the unfounded expectation that illuminating differences would be observed between the two sections. The sampling fraction was some 20% larger than required, to ensure that a total of 100+ households would remain by the end of the year. In the event, 13 households provided incomplete interviews through non-cooperation, temporary absence or permanent out-migration during 1989, which left 110 complete sets of interviews (first enumeration plus 5 repeated rounds).

Though households were the unit of enumeration for interviewing purposes, compounds were preferred as the unit for selecting households for various samples. (As explained below, the compound is the basic residential unit in northern Ghana. Each compound contains one or more households, the primary production and consumption unit.) Sampling households directly would have biased selection towards multi-household compounds, which tended on average (and per capita) to be wealthier: average wealth in Terago was lower than in Tesnatinga, which also had a higher household/compound ratio: 1.7 *versus* 1.3 in Terago.

Compounds were selected using a random number generator on a pocket calculator. These numbers were checked off against a complete list of 'landlords' (the senior male by age and status in each compound). Every household in selected compounds automatically became part of the sample. For the larger samples, compounds were randomly selected until at least 60 households in Tesnatinga and 61 households in Terago had been selected. Because the last random number generated for Tesnatinga corresponded to a multiple-household compound, the first samples comprised 62 and 61 households in Tesnatinga and Terago respectively.

Table A1.1. Sample Sizes, Tesnatinga and Terago

Survey:	Complete Enumeration	Economic Surveys	Nutrition Surveillance
Sampling fraction:	100%	60%	33%
Households:			
Tesnatinga	100	62	33
Terago	101	61	33
Total:	201	123	66

The size of the sub-samples was set at 33% of the total population, or 33 households in each section. As before, random numbers were generated on a pocket calculator, but only compounds already selected for the first sample were considered for the second. The nutrition sub-samples were therefore selected as simple random samples drawn from the larger samples, which were themselves generated as simple random samples from a complete census of two separate sections. Table A1.1 above summarises the numbers of households involved.

1.3. Units of Analysis

An extensive literature addresses the problem of defining the 'household', and questions whether the household is an appropriate unit or level of analysis at all (Vaughan 1985; McMillan 1986; Hoddinott 1987; Wilk 1989). The debate is conducted at both inter- and intra-household levels. Those who emphasise inter-household relations criticise the focus on households as production and consumption entities isolated from extended family or kinship groups (Guyer 1981; Whitehead 1984b; Berry 1984, 1986). The intra-household literature falls broadly into two camps: the predominantly feminist literature on gender relations and (specifically) the sexual division of labour in African

agriculture (Bryson 1981; Dey 1981, 1984; Spring 1986; FAO 1987; Kumar 1987b; Whitehead 1981, 1986, 1988); and theoretical conceptualisations, mainly by neoclassical economists, of households as quasi-firms which can be modelled as utility-maximising loci of 'cooperative conflict' (Sen 1983; Pollak 1985; Folbre 1986; Ben-Porath 1979).

Definitions of households as "groups which are specifically defined by residence and descent" (Goody 1958:56) are complicated in West Africa by both production systems and local living arrangements. As a Ghanaian sociologist points out: "The researcher needs some ingenuity to understand a household unit in a typical rural Ghanaian settlement" (Twumasi 1986:26). The residential unit in rural areas is the compound - a connected series of huts or rooms enclosed by a wall with a single entrance - but a compound can be home to anything from 1 to 40 people, and from a single household to 5 or 6. The potential for confusion arises because, although a compound is a physical construction, the household is a cultural construct. Moreover, households in northern Ghana are often extended. Many men are polygamous; bereaved relatives (mainly widows) are often incorporated into the domestic group; and some complex households consist of several agnatic kinsmen - a father with adult sons (paternal); two or more adult brothers (fraternal) - each with their own nuclear or polygynous families.

Despite these complications, the household was adopted as the primary unit for sampling, interviewing and data analysis in this research because it corresponded to the local population's articulation of their own domestic organisation, and because this articulation reflected the research focus on domestic reproduction. Among the Kusasis (the dominant ethnic group), a household (*yir* in Kusaal) is culturally defined as a patrilineally related domestic group which works together for the joint provision of the group's reproductive needs (food and other subsistence goods). This is expressed in the phrase "farming together and feeding themselves" - though labour relations among adult males are so complex that, in practice, consumption units are easier to differentiate than production units.

1.4. Pre-Survey Enumeration Errors

As noted above, the household lists provided by the sub-chiefs of Tesnatinga and Terago proved inaccurate in several respects. Six sources of over-reporting of households were identified, involving 28 households in 21 compounds; and three sources of under-reporting, involving 6 households in 5 compounds. Table A1.2 below summarises these errors. Correcting them reduced the units in the sampling frame from 237 households to 215, though only 201 were located at the time of the first census.

The main reason for over-reporting was the awareness by local residents that these lists would be used for distributing food aid. Many adult males farming together claimed to be separate households, in an attempt to secure extra allocations of food. (A very different reaction would have been observed had the purpose of household enumeration instead been tax collection!) This exaggeration persisted during the first round of interviews, when a rumour circulated that the research project was associated with donors who would bring more food aid or subsidised assistance to the village. These excess households were soon discovered and removed from the lists.

Under-reporting of households occurred most commonly with elderly widows living alone, either because they insist on retaining their independence or because they have been abandoned by their families. Often dependent on handouts from relatives and neighbours, being too infirm to work and having no-one to help them with farming, they are not perceived as autonomous households because they are neither "farming separately" nor "feeding themselves".

Table A1.2. Corrections and Changes to Sampling Frame, 1988-89

	Number of Households			Number of Compounds		
	Terago	Tesna-tinga	Total	Terago	Tesna-tinga	Total
Chiefs' original household lists:	118	119	237	94	69	163
- over-reporting	-17	-11	-28	-15	-6	-21
+ under-reporting	+3	+3	+6	+2	+3	+5
Corrected totals: (September 1988)	104	111	215	81	66	147
Changes during 1989:						
+ increases	+1	+5	+6	+1	+1	+2
- decreases	-3	-5	-8	-0	-2	-2
Final totals: (July 1989)	102	111	213	82	65	147

1.5. Changes During the Year: Household Mobility, Mortality, Assimilation and Fission

Table A1.2 also summarises changes in the sampling frame during the year. During the initial enumeration of household membership in Terago and Tesnatinga, some household heads named sons or brothers who had been absent for several years, or even decades. While these cases were easily dealt with (they were excluded), less clear were cases where relatives had lived and worked elsewhere for only a year or two, and were expected to return "at any time", or where individuals retained residential links with other households (eg. women with natal homes).

During the year a significant amount of mobility was observed, of both individuals and households. Whole household out-migration occurred in two cases. Seasonal migration of young men was the most common form of migration. Even where the migrant was a household head, this did not affect the number of households in the sampling frame. The migrant's senior wife or oldest son was effectively the household head in his absence, and was interviewed until his return. Similarly, women often returned to their father's home after giving birth (a customary practice associated with birth spacing),

and wives or children in poor households sometimes went to wealthier relatives for a time because of hunger and poverty. In some cases the person concerned could appear to be a member of more than one household, so fluid were the boundaries between domestic groups.

When the head of a household died, either another family member was promoted to this status or the bereaved were assimilated into another household. Four heads of sampled households died during the year. In two cases a son of the deceased became the new household head, and in a third the dead man's wife continued as a female-headed household. In the fourth case the household dissolved, the deceased's five wives being absorbed into the household of a son and his assets divided between relatives.

Household segmentation (or fission) and assimilation during the year further confused the issue. Two sons of a wealthy farmer-trader 'separated' from their father when the new farming season began in June 1989, adding two new households to the sampling frame. Also, some long term absentees returned to Pusiga during 1989. These newly formed or reconstituted households were excluded from the data set. One man who came from Burkina Faso with few assets built a separate granary outside his brother-in-law's house, where he was staying; but halfway through the year the granary was demolished. From then on he was no longer interviewed separately - the compound now contained one household, not two.

Despite the fluidity of individuals and domestic groups in Pusiga in 1988/9, the local conceptualisation of the household as a production and, especially, consumption unit proved robust and appropriate to the research. Groups of individuals within compounds could be identified who together exercised control over their food supplies and consumption, and this relationship of people to food was the primary focus of the fieldwork.

2. Data Collection

2.1. Research Assistants

The regular rounds of interviewing and monitoring were conducted by two teams of two members each. Repeat surveys were carried out by the author and an interpreter, Seidu Mumuni, a farmer from Tesnatinga who also worked as an extension officer for the Ministry of Agriculture in Pusiga. He had a strong, practical knowledge of local agriculture and economy, and a good relationship with most families in both sections.

Nutrition surveillance was carried out by Gillian Devereux, a trained nurse, who was assisted by Dorcas Panada, a pastor's wife from a nearby village. As a rule, Stephen Devereux and Seidu Mumuni interviewed men, except in cases of female-headed households, while Gillian Devereux and Dorcas Panada worked mainly with women.

For in-depth interviews with elderly farmers about local history and life histories, a professional researcher was hired - Nachinaba Bugri, a local (Kusasi) man employed by the Institute of African Studies, the University of Ghana. He worked with Stephen Devereux as a translator and assistant in open-ended and semi-structured discussions.

2.2. Quantitative Data

The first 'census' of 201 households in Terago and Tesnatinga was carried out in September and October 1988. Instead of simply enumerating household composition, a four-page questionnaire was administered to all household heads in the two sections. This questionnaire elicited baseline demographic and economic information, including household size and composition, the sources and value of production and income, indebtedness, and asset ownership. Questions were also asked about the poor 1987 harvest, and responses to subsequent food deficits during the 1988 dry season.

In the five rounds of repeat interviews with 123 sampled households which followed, regular data were collected on both market and non-market responses to rising food insecurity (falling food stocks and rising food prices) during the 'hungry season'. This included information on food storage and depletion of stocks, rationing of food consumption, sales of assets, food purchases, and inter-household transfers of money and food - borrowing from wealthier farmers and traders, gifts from relatives, and remittances (broadly defined) from migrants. Respondents were also questioned about expenditures on non-food items (such as funerals and dowries), in order to assess the competing priorities between which personal and household resources were allocated.

Alongside the 'economic' interviews, five rounds of nutrition surveillance were carried out on the sub-sample of 66 households. All household members were weighed on each visit, and heights were measured twice - at the start of the exercise, in December 1988, and at the end, in July 1989. Upper-arm circumferences of children under five were also collected at every visit. Initial difficulties in determining ages accurately were greatly reduced by devising a local calendar. (Chapter 6 describes the nutrition methodology in detail.)

Both sets of data were collected in 5 rounds at 6-week intervals, each round lasting about 3 weeks. Round 1 was completed in December 1988, Round 2 in February 1989, Round 3 in early April, Round 4 in May and Round 5 in July, when a second census of non-sampled households was also undertaken. Table A1.3 shows this timetable.

Table A1.3. Timetable of Regular Interviews Conducted in 1988-1989

Type of Survey	HHs	1988					1989				
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun Jul
Complete Enumeration	201	1st ++++++					2nd ++++++				
Economic Surveys	123				Rd 1 ++++	Rd 2 ++++	Rd 3 ++++	Rd 4 ++++	Rd 5 ++++		
Nutrition Surveillance	66				Rd 1 ++++	Rd 2 ++++	Rd 3 ++++	Rd 4 ++++	Rd 5 ++++		

In July 1989 a second complete enumeration was conducted of those household heads interviewed during the first census who had not been part of the regular surveys. This questionnaire asked for a summary of the household's economic activities during 1988/9 - much the same information which was collected in greater detail and frequency from the sampled households in repeat interviews. In addition, apart from providing an inventory of current assets, individuals were asked to recall major asset acquisitions or losses over the previous few years. During the same month, interviews were conducted with 28 migrants who had returned to Pusiga for the farming season. These interviews enquired about the work migrants had done 'down south' (in Ashanti, Brong-Ahafo, or Côte d'Ivoire), what they had earned and remitted, how much food they had bought for their families, and so on.

Other quantitative data were acquired from Pusiga market and from secondary sources. Prices of basic grains and pulses were monitored in Pusiga by Seidu Mumuni every six days (every second market day) from October 1988 to July 1989. Data on past market prices, and on agricultural production, were obtained from Ministry of Agriculture offices at district, regional and national level - in Bawku town, Bolgatanga and Accra. Daily rainfall statistics for Bawku District from 1970 to 1989 were transcribed from records of the local Crops Research Institute.

2.3. Qualitative Data

Apart from these short term ('hungry season') data, qualitative information was also collected on significant changes in the village and the District during this century. In June 1989 open-ended interviews were conducted with 36 elderly men on aspects of local history, with particular reference to food crises and their own family histories. During the same month, 33 women were interviewed on their income-earning activities, the changing roles of women, and related issues.

This historical information was supplemented by research in the National Archives at Accra, primarily on Gold Coast Reports and diaries written by successive Bawku District Commissioners between the 1920s and 1940s. This secondary research was carried out in visits to Accra made between rounds of interviewing - after completion of Round 2, in February 1989, and after Round 3, in April. Valuable material on the agriculture and history of Bawku District was also found at the University of Ghana at Legon, notably in the Library of the Institute of African Studies.

In addition, a number of interviews were conducted throughout the year with local officials in Bawku and Bolgatanga in such ministries and institutions as the Ministry of Agriculture (notably the Extension Division and the Animal Health and Production Division), the Crops Research Institute at Manga-Bawku, the Department of Community Development, the Forestry Department, the Farmers Services Company (FASCOM), and Bawku Hospital. (A list of these interviews is provided in Appendix A1.1). In Pusiga itself, key informants such as the Chief and sub-chiefs, local government officials, agricultural extension workers and schoolteachers were consulted for their observations on changes in social structure and practices, farming and economic activities, as well as for further background on the history of Pusiga.

2.4. A Note on Respondents

Attitudes to the research from the local population ranged broadly from courteous to enthusiastic. Two or three recalcitrant farmers were encountered, but they were generally regarded as 'difficult' or unpopular within the village. More discontent was expressed by people excluded from the sample than by participants, perhaps because they feared they would derive none of any benefits that the research might provide. The courtesy with which interviewees responded to the research did not diminish as their expectations regarding food aid or other assistance faded. Nor was respondent fatigue or boredom a visible problem. Care was taken to be sensitive to respondent feelings by avoiding delicate topics or approaching them indirectly (but not deviously). Staggering the interviews over six visits allowed each session to be fairly brief

(averaging half an hour). A different set of questions was added to each questionnaire so that a wide range of topics was covered during the year, and this also reduced the repetitiveness of the repeat survey component.²

3. Limitations of the Fieldwork

Fieldwork requires selectivity. Decisions must be made about what information to collect from the range of potential avenues of inquiry, and about which sets of data to write up from the masses of completed questionnaires and notebooks brought back from the field. In this thesis, as already discussed, the primary unit of analysis was the household. While data were also collected on inter-household relations and at the community level, as well as on intra-household topics of interest, these levels of analysis have necessarily received less attention. Descriptive statistics are reported mainly in terms of numbers of households. One consequence is that social relations of production and exchange are not explored in depth; another is that intra-household considerations are examined only in Chapters 4 and 6.

As for specific omissions in data collected, the most significant were perhaps grain production and land 'ownership'. Measuring or even estimating 'subsistence food production' proved problematic. Kusasis do not measure their grain harvests, nor do they store grain in convenient standardised units (unlike pulses, which are bagged). Millet, sorghum and maize are tossed unthreshed into granaries, to be taken out at regular intervals and consumed as needed. The household head has sole jurisdiction over the granary, the contents of which are a jealously guarded secret. Women, children and strangers (including researchers!) are rarely permitted even to look inside.

As with cereals production, Kusasi farmers do not measure their farms, which typically consist of a number of scattered plots (known as *yakim*) of irregular size and shape. Fields are not fenced, instead being delineated by bush paths, streams, and other natural

². As Appendix 2 to this thesis shows, the repeated questionnaire typically comprised 3 pages, the first 2 remaining more or less unchanged, while the third varied each round.

boundaries. They can be any size, from 1/4 acre to 2 or 3 acres, and farmers can tell researchers no more than the number of plots they farm. The fact that the bulk of fieldwork was conducted during the dry season, when the land was so dry and barren that it seemed incredible that Pusiga was a farming area at all, prohibited measurement of plots, and this indicator of wealth and food security remained unquantified.

Finally, with hindsight, more detailed data on women's incomes would have proved extremely useful, not least because this would have allowed testing of the proposition that child nutrition status is a function of mother's more than father's income, in a society where incomes are earned individually and are not pooled. The decision not to interview women in depth on their economic activities was based on a number of considerations. First, this was a male-dominated farming system, in which men are obliged to provide grain for the family, from either the compound farm or the market. This fact motivated the focus on male incomes, since men did, in fact, buy most of the staple foodgrain consumed in food deficit households during 1988/9.

Second, male incomes proved more substantial, regular and easier to quantify. For instance, male agricultural labour was remunerated at a standard rate of C200 per day in 1989, so the respondent merely had to recall his days worked since the previous interview (eg. 3 days per week for 6 weeks @ C200 = C3600). Women's incomes were more irregular and involved complex calculations of costs, sales, gross earnings and net profits over discontinuous periods of time.³ Interviews were conducted with women engaged in each income-earning activity recorded, but these data could not be generalised to others engaged in the same activity, because costs and returns varied according to the scale of enterprise, the duration of the activity, and so on.

In all these cases - grain production, plot sizes, and women's incomes - the collection of detailed and accurate data was feasible only with the investment of disproportionate amounts of time and research assistance, which would have diverted these scarce resources from the pursuit of primary research interests.

³. Difficulties in estimating women's incomes in West Africa have also been noted by Hill (1972), Matlon (1979), and Norman, Simmons and Hays (1982) in separate North Nigerian studies.

4. Post-Fieldwork Analysis

4.1. Household Classification

Although the sample of 110 households was not stratified for purposes of data collection in the field, it became necessary for cross-sectional analysis of results to divide the households into categories. Attempts to classify households by various criteria were foiled by the presence of a large middle group (whichever criterion was adopted) and the lack of an obvious way of subdividing it. Alternative criteria which seemed appropriate to the topics of analytical interest included: (1) wealth quartiles; (2) occupation groups; (3) food security status.

The wealth quartile method involved ranking the 110 sampled households by summing the value of their saleable assets after the first census, then dividing this list into 4 approximately equal groups (27, 28, 28, 27). Advantages of using wealth quartiles are that it provides sizeable groups amenable to statistical tests for differences between quartiles (such as the chi-square test); and that it bypasses the problem of identifying discrete cut-off points between clusters of households. Disadvantages are that it erroneously implies a continuous distribution of wealth across the sample, and that it overlooks the correlation in this sample between household size and household wealth, so that the distribution of individuals across quartiles was highly skewed, even though the distribution of households was approximately equal.

A second categorisation method focused on occupations. A major determinant of relative prosperity was involvement in off-farm income-generating activities. The 10 wealthiest households in the sample were farmer-traders with distinct characteristics which separated them from their neighbours. The poorest 26 households were identified by their lack of participation in any but minor income-earning activities (such as agricultural labour, begging, making grass mats, cutting firewood). But this left a large 'middle-income' group of 74 households (67% of the sample), which defied subdivision on occupational criteria, so this means of classification was rarely used.

The third criterion for categorising households - the classification preferred throughout most of this thesis - was food security status, defined in the following way:

- households which purchased no grain during the year and reported no rationing were deemed to be **self-sufficient** and consumption secure;
- households which purchased grain during the year but reported no rationing were deemed to be market dependent but **consumption secure**;
- households which reported rationing, but where children ate 3 or 4 times per day throughout the period, were deemed to be **mildly consumption insecure**;
- households which reported rationing, and where children ate less than 3 meals per day, and adults less than 2, on average, throughout the period, were deemed to be **severely consumption insecure**.

The 'meals per day' criterion distinguished households where rationing did not imply hunger from those where the two went together - it being a cultural norm that children should eat 3 or 4 times a day and adults at least twice. (The distinction between 'rationing' and 'hunger' was clearly articulated by both respondents and interpreters. Heads of households could restrain food consumption by reducing snacks and second helpings, but hunger did not necessarily result until entire meals were skipped by adults and/or children.)

For analytical purposes, categories 1 and 2 were often aggregated into 'food secure' households, unless the analytical focus was on responses to production deficit. This produced three revised groupings: the food secure (23 wealthy households, of which 4 were self-sufficient), the mildly food insecure (56 middle-income households), and the

severely food insecure (31 impoverished and vulnerable households). The problem of further dividing the large middle group (51% of sample) remained intractable, but rarely precluded obtaining statistically significant data on the three categories thus defined.

A possible objection to this classification system is that it is based on self-reporting, rather than measured (through food intake assessment, for instance). However, these data were independently verified by two pairs of enumerators, putting questions about rationing and consumption to adult men and adult women separately, on separate visits. This classification was also supported by the (local) research assistants' perceptions about the economic and nutritional status of these households.

4.2. Software Used in Data Analysis

Quantitative fieldwork data were coded and entered into the mainframe VAX computer at Oxford University's Computing Service (OUCS). Much of the basic data analysis was carried out using SAS. Figures and graphs were produced in Lotus 1-2-3 and Quattro-Pro spreadsheet packages. Nutritional data were analysed by CDC-PROG, which calculates anthropometric indicators such as weight-for-age, height-for-age and weight-for-height, and generates associated Z-scores.

Appendix A1.1. Specialist Interviews⁴

Daniel Abbiw	Curator, University of Ghana Herbarium, Legon [Accra]
Mumuni Abubakari	Schoolteacher, Ninkongo Primary School, Pusiga
John Abugrey	Technical Officer in Charge, Bawku Nutrition Programme, Rural Health Services, Bawku District
Peter Abugrey	Technical Officer for Pusiga, Ministry of Agriculture
Paul Addai	Technical Officer, Forestry Department, Pusiga
Prof. Kwame Arhin	Director, Institute of African Studies, University of Ghana at Legon [Accra]
Issah Ayanaba	District Community Development Officer, Bawku District
George Ayariga	Revenue Clerk, Bawku District Council, Pusiga
James Ayemaw	Principal Technical Officer and Station Manager, Crops Research Institute, Manga-Bawku [Manga]
George Badu-Yeboah	District Development Officer, Ministry of Agriculture, Bawku
Alex Bempah	Manager, Ghana Commercial Bank, Bawku Branch
Dr Samuel Dapaah	Director, Policy Planning, Monitoring and Evaluation, Ministry of Agriculture, Head Office, Accra [Accra]
Dr Oscar Debrah	Acting Medical Officer in Charge, Bawku Hospital
J.S.K. Ellety	Assistant Conservator of Forests, Forestry Department, Bawku District [Zorse]
Dr Kodwo Ewusi	Director, Institute of Social, Scientific and Economic Research (ISSER), University of Ghana at Legon [Accra]
M.M. Fuseni	Senior Production Officer, Animal Health and Production, Ministry of Agriculture, Bawku [Bazua Livestock Station]
Hilla Gbene	District Crops Officer, Farming Systems Research Division, Crops Research Institute, Manga-Bawku [Manga]
James Konogini	District Development Officer, Ministry of Agriculture, Bawku

⁴. The interviewee's name is followed by his professional title; interviewees are listed alphabetically. Location of interviews was Pusiga or Bawku town unless otherwise indicated in parentheses.

Alex Ndepeni	Policy Planning, Monitoring and Evaluation Department, Ministry of Agriculture, Bawku District
Alex Nuagah	District Officer, Ghana Cotton Company, Bawku [Misiga]
Charles Owusu	National Mobilisation Programme, Bawku District
E.K. Salia	Managing Director, Farmers Services Company (FASCOM) [Bolgatanga]
S.K. Salifu	State Registered Nurse, Pusiga Rural Health Clinic
Steve Seidu	Town and Country Planning Department, Bawku District
Steve Sule	Senior Commercial Assistant, Ghana Food Distribution Corporation, Tamale

Fieldwork Questionnaires

COMPLETE ENUMERATION

Interview Number: _____ Date: _____ Village: _____
Compound Number: _____ Households? _____ Household Number: _____
Landlord: _____ Household Head: _____
Relationship to Landlord: _____ Respondent: _____
Tribe: _____ Religion: _____ Estimated Age: _____
Remarks: _____

A1. Could you tell me about all the members of your household who are living here in the compound right now?

[illegible]

A2. Are there any other adult men and women who live with you in the compound, but are not here right now because they have travelled?

[illegible]

B1. What crops are you growing on your compound farm this year?

B2. Does anybody in your household have any bush farms? _____

B3. How many bags or bowls of each crop did you harvest last year?

	Early Millet	Late Millet	Sorghum	Maize	Rice	Ground-nuts
Compound						
Bush Farms						
Harvest 87						

	White Beans	Bambara Beans	Soya Beans	Sweet Potato	Cotton	Lale
Compound						
Bush Farms						
Harvest 87						

B4. Remarks: _____

C1. This year, did you use animal manure, chemical fertilisers, both or neither on your farms? _____

C2. If you used chemical fertilisers, what kind and how many bags?

<u>Type of Fertiliser</u>	<u>Bags</u>	<u>1987</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

D1. What did you use to plough your farms this year? _____

D2. (a) If hand hoe: family, hired or communal labour? _____

(b) If bullock plough or tractor: whose? _____

(c) If bullock plough: were the bullocks strong or weak, and were they trained or untrained? _____

D3. About how many days did it take to plough your farms this year?

	Bullock Plough: Days	Tractor		Hand Hoe	
		Days	Acres	Days	Men
Compound					
Bush Farms					

D4. Remarks: _____

E1. Does your household farm more land, less land, or the same amount of land as five years ago? _____

E2. Does your household farm enough land to meet its needs? _____

E3. Remarks: _____

F1. How much food did your household buy from the market this year?

<u>Type of Foodcrop</u>	<u>How Much Food?</u>	<u>What Price?</u>	<u>Which Months?</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

F2. Was there enough food to feed all your household this year, or was there hunger? _____

F3. Remarks: _____

G1. In the year before the armyworms, was there enough food in your granary to feed all your household? _____

G2. If not, can you remember when the food in your granary ran out?

(a) Which season? _____ (b) Which month? _____

(c) What farm work were you doing? _____

G3. During that same year, the year before the armyworms came:

(a) Did you buy food in the market? _____

(b) Did you sell food in the market? _____

(c) Was there hunger in your household? _____

G4. Remarks: _____

H1. This year, did you and the members of your household sell any crops and animals to buy food or to pay for expenses such as: farming costs, weddings, funerals, festivals, and health?

Sale of Crops

and Animals

How Many?

Price Per Unit

Which Month?

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

H2. Remarks: _____

H3. Apart from selling crops and animals, how else do you and the members of your household earn cash income?

<u>Source of Income</u>	<u>Which Persons?</u>	<u>Source of Income</u>	<u>Which Persons?</u>
Sale of Weaving	_____	Work (what kind?)	_____
Cotton Spinning	_____	_____	_____
Sewing	_____	_____	_____
Sheanut Butter	_____	_____	_____
Dawadawa	_____	_____	_____
Pito Brewing	_____	Trade (in what?)	_____
Money Lending	_____	_____	_____
Borrowing	_____	_____	_____
Rent (from what?)	_____	Other (what?)	_____

H4. Remarks: _____

I1. Finally, can you tell me how many of each of the following things you and the members of your household own altogether?

<u>Farm Tools</u>	<u>Number</u>	<u>Animals</u>	<u>Number</u>	<u>Domestic Items</u>	<u>Number</u>
Bullock Plough	_____	Horse	_____	Lorry or Truck	_____
Donkey Cart	_____	Bullock	_____	Motor Bike	_____
Watering Can	_____	Cow	_____	Bicycle	_____
Bucket	_____	Donkey	_____	Radio/Cassette	_____
Spade	_____	Goat	_____	Batteries?	_____
Pickaxe	_____	Sheep	_____	Clock or Watch	_____
Cutlass	_____	Pig	_____	Kerosene Lamp	_____
Ridging Hoe	_____	Duck	_____	Torch	_____
Sowing Hoe	_____	Chicken	_____	Wooden Bed	_____
Grass Cutter	_____	G. Fowl	_____	Zinc Roof	_____
Garden Fork	_____	Pigeon	_____	Weaving Loom	_____
Granary	_____	Dog	_____	Sewing Machine	_____
Corn Mill	_____	Cat	_____	Enamel Pot	_____

J1. General Comments on Interview: _____

REGULAR SURVEY: ROUND ONE

Interview Number: _____ Date: _____ Village: _____
Compound Number: _____ Households: _____ Household Number: _____
Landlord: _____ Household Head: _____

A1. Household Members

Census Data: _____

[illegible]

A2. Comments: _____

A3. Seasonal Migration

Is anyone in your household planning to go south to Kumasi, Accra or the Ivory Coast for work during the dry season next year?

Name	Going Where?	To Do What Work?	Been Before?	Returning When?

B1. Harvest 1988

Census Data: Early Millet _____ Late Millet _____ Sorghum _____
Maize _____ Rice _____ Groundnut _____ Cotton _____ Lale _____
Beans _____ Bambara Bean _____ Soybean _____ Sweet Potato _____

Household Member	Crop	Bowls Planted	Source of Seed	Harvest	Disposal of Harvest

B2. Comments on Harvest: _____

C. Crop Sales (since nara harvest)

Household Member	Crop	Quantity	Price	Reason for Selling

D. Miscellaneous

D1. Bullock plough owner? _____ What kind of plough? _____
D2. Food Aid (Terago only): Did you receive any food aid? _____
How much? _____ Maize, beans or groundnuts? _____
Shared with other households? _____

E. Food Consumption

- E1. What type of grain are you using for TZ this month? _____
- E2. If nara: are you still feeding from your nara harvest? _____
If not nara: how long ago since the nara ran out? _____
- E3. This month, does the grain for TZ come from the household granary, the landlord's granary, the market, or where? _____
- E4. This month, do you ever have any meal in the evenings apart from TZ and soup (eg. rice and beans)? _____
- E5. How many meals a day is your family eating this month? _____
- E6. Is there enough food to feed everyone in your family this month? _____

F. Crop Purchases (since nara harvest)

Household Member	Crop	Quantity	Price	Reason for Buying

G. Animals

Animal	Census Total	Trans-action	Number	New Total	Price	Reason for Transaction

H. Loans (since nara harvest)

- Census Data: _____
- H1. Loans repaid: _____
- H2. New loans or "help" received: _____
- H3. Loans or "help" given out: _____
- H4. Loans outstanding: _____
- General Comments: _____

REGULAR SURVEY: ROUND TWO

Interview Number: _____ Date: _____ Village: _____
Compound Number: _____ Households: _____ Household Number: _____
Landlord: _____ Household Head: _____

A. Household Membership

Round 1 Data: _____

Absentees & Prospective Migrants: _____

A1. Has anyone left the house or returned since we last visited here?

Name	Went Where?	For What Reason?	Been Before?	Returning or Returning when?

B. Market Gardening

Census Data - 1987: _____

B1. Market garden this year? HHH: _____ Others: _____

[illegible]

C. Crop Sales and Asset Sales

[illegible]

D. Food Consumption

Foodcrop	Nara	Za	Belko	Naga Red	Naga White	Maize	Rice
Planted							
Harvest							
Disposal							
Finished							

- D1. What type of grain are you using for TZ this month? _____
- D2. Source of grain for TZ? _____ Anyone helping? _____
- D3. Meals other than TZ: _____ Source: _____ Time/Week: _____
- D4. Meals per day? Rationing? Adults: _____ Children: _____

E. Crop Purchases and Asset Purchases

Household Member	Crop or Asset	Quantity	Price	Reason for Buying

F. Animals

Animal	Round 1 Total	Trans-action	Number	New Total	Price	Reason for Transaction

General Comments: _____

Other Income: _____

Other Expenses: _____

REGULAR SURVEY: ROUND THREE

Compound Number: _____ Households: _____ Household Number: _____
Village: _____ Interview Number: _____ Date: _____
Landlord: _____ Household Head: _____

A. Household Composition

Round 2 Data: Absentees, Migrants, Births, Deaths: _____

- A1. Has anyone left the house or returned since we last visited here?
- A2. Has anyone gone away for a visit or have any visitors come here?
- A3. Have there been any births or deaths here since the harvest?

Name	Went Where?	For What Reason?	Returning or Returning when?

B. Market Gardening

B1. Costs: fertiliser, labour? _____

Household Member	Crop	Amount Planted	Source of Seed	Harvest	Disposal of Harvest

C. Crop Sales and Asset Sales

Round 2 Data: Crops stored: HHH _____

Others: _____

[illegible]

D. Food Consumption

Foodcrop	Nara	Za	Belko	Naga Red	Naga White	Maize	Rice
Granary							
Finished							

- D1. What type of grain are you using for TZ now? _____
- D2. Source of grain for TZ? _____ Anyone helping? _____
- D3. Meals other than TZ: _____ Source: _____ Times/Week: _____
- D4. Meals per day? Rationing? Adults: _____ Children: _____
- D5. Are you buying "fly" or "cheap sorghum" for TZ? _____
- D6. Do you take pito? _____ How much per week in Cedis? _____

E. Crops and Asset Purchases and Foodcrop Borrowing

Round 2 data: _____

Household Member	Crop or Asset	Quantity	Price	Bought When? Relative? Where? Source of Cash?

F. Animals

Animal	Round 2 Total	Round 1 Changes	Trans-action	New Total	Price	Reason for Transaction
Bullock						
Cow						
Goat						
Sheep						
Pig						
Duck						
Fowls						
G.Fowls						

G. Trees and Treecrops

- G1. Do you or does anyone in your household own or rent any trees:-
Mango, Kapok, etc? _____
- G2. Disposal of treecrops: _____

H. Inter-Compound Relationships

- H1. Can you tell me the names of all landlords from other compounds in Tesnatinga and Terago who are from your family?
- H2. Who of these relatives of yours helps you or who do you help with bullocks or bullock plough, food money or land for farming?

Name of Landlord	Relationship ("He is my ...")	Help Given	Help Received

- H3. How many married daughters do you have? ____ Married sons? ____
- H4. Are the families of your married daughters helping you with food or money because of the hunger? _____
- H5. Are you helping the families of your wives or your sons with food or money because of the hunger? _____
- H6. Comment: _____

I. Sources of Income

- Round 2 Data: _____
- I1. Other Income: _____
- _____

J. Other Expenses

- Round 2 Data: _____
- J1. Funerals, Health, House-building, etc: _____
- _____

General Comments: _____

REGULAR SURVEY: ROUND FOUR

Compound Number: _____ Households: _____ Household Number: _____
Village: _____ Interview Number: _____ Date: _____
Landlord: _____ Household Head: _____

A. Household Composition

Round 3 Data: Absentees, Migrants, Births, Deaths: _____

- A1. Has anyone left the house or returned since we last visited here?
A2. Has anyone gone away for a visit or have any visitors come here?

Name	Went Where?	For What Reason?	Returning or Returning when?

B. Crop Sales and Asset Sales

Round 3 Data: Crops stored: HHH _____
Others: _____

Household Member	Crop or Asset	Quantity	Price	When? Where? Used Money for What?

- B1. After the nara harvest last year, did you sell any nara at all,
even one or two bowls? _____ If yes, how many bowls? _____
Why did you sell it? _____
- B2. Since the main harvest last year, have you sold any late millet or
Sorghum at all, even one or two bowls? _____
If yes, which crop? _____ How much did you sell? _____
Why did you sell it? _____

C. Food Consumption

Foodcrop	Nara	Za	Belko	Naga Red	Naga White	Maize	Rice
Granary							
Finished							
Seeds?							

- C1. What type of grain are you using for TZ today? _____
- C2. Source of grain for TZ? _____ Anyone helping? _____
- C3. Meals other than TZ: _____ Source: _____ Times/Week: _____
- C4. Meals per day? Rationing? Adults: _____ Children: _____
- C5. Are you buying "fly" or "cheap sorghum" for TZ? _____

D. Crops and Asset Purchases and Foodcrop Borrowing

Round 3 data: _____

Household Member	Crop or Asset	Quantity	Price	Bought When? Relative? Where? Source of Cash?

E. Animals

Animal	Round 3 Total	Round 2 Changes	Trans-action	New Total	Price	Reason for Transaction
Bullock						
Cow						
Goat						
Sheep						
Pig						
Duck						
Fowls						
G.Fowls						

F. Agricultural Labour 1988

F1. Last year, did you hire any labour, beg any labour, or call any communal labour parties to work on any of your farms? _____

F2. Did you or anyone else in your household go for labour on anyone else's farm, either for money or food, or as part of a communal labour party, or to help your in-laws? _____
Name of farmer, if in Tesnatinga or Terago: _____

Activity	Type of Labour	How many persons?	How many days?	Payment (in cash or food)

G. Borrowing and Lending 1988-89

B/L	Amount of loan	Amount Due	Repaying When	Teshie/ Terago?	Man or Woman?	Name of Lender or Borrower

G1. Reasons for Borrowing/Lending: _____

G2. How to Repay? _____

H. Sources of Income:

Round 3 Data: _____

H1. Other Income: _____

I. Other Expenses:

Round 3 Data: _____

I1. Funerals, Health, House-building, etc. _____

REGULAR SURVEY: ROUND FIVE

Compound Number: _____ Households: _____ Household Number: _____
Village: _____ Interview Number: _____ Date: _____
Landlord: _____ Household Head: _____

A. Household Composition

Round 4 Data: Absentees, Migrants, Births, Deaths: _____

- A1. Has anyone left the house or returned since we last visited here?
A2. Has anyone married into or out of the house since the harvest?

Name	Went Where?	For What Reason?	Returning or Returning when?

B. Crop Sales and Asset Sales and Lending

Round 4 Data: Crops stored: HHH _____
Others: _____

Has anyone in the house lent Suma for seeds this year? _____

Household Member	Crop or Asset	Quantity	Price	When? Where? Used Money for What?

C. Ploughing 1989

- C1. Did you use a bullock plough or hand hoe this year? _____
C2. Whose bullocks did you use for ploughing? _____
C3. Any change from last year? _____
C4. Last year, did you plant at the right time or late? _____
If late planting, why? _____

D. Food Self-Sufficiency History

D1. How frequently do you buy or sell millet - Every year; Most years; About every second year; Only occasionally; First time this year:
Buy millet: _____ Sell millet: _____

E. Food Consumption

Foodcrop	Nara	Za	Belko	Naga Red	Naga White	Maize	Rice
Granary							
Finished							

E1. What type of grain are you using for TZ today? _____
E2. Source of grain for TZ? _____ Anyone helping? _____
E3. Meals other than TZ: _____ Source: _____ Times/Week: _____
E4. Are you buying "fly" for TZ? _____
E5. Meals per day? Rationing? Adults: _____ Children: _____
E6. Did you borrow any bags, basins or bowls of millet this year?

F. Crops and Asset Purchases

Round 4 data: _____

Household Member	Crop or Asset	Quantity	Price	Bought When? Where? Why? Source of Cash?

G. Planting 1989

Farm	Crop	1989	Bowls	Source of Seed	Remarks
Household	Nara				
	Za				
	Naga Red				
	Naga White				
	Belko				
	Maize				
Private	Rice				
	Suma				
	Benga				
	Bambara				
	Maggi				
	Dankale				
	Lale				
	Cotton				

G1. Wives and Widows: _____

G2. Brothers and Sons: _____

H. Animals and Poultry

Animal	Round 4 Total	Round 3 Changes	Transaction	New Total	Price	Reason for Transaction
Bullock						
Cow						
Goat						
Sheep						
Pig						
Duck						
Fowls						
G.Fowls						

I. Assets Inventory 1988-89

Assets	1988	1989	Reasons for Changes 1988-89
Lorry/Truck			
Motor Bike			
Bicycle			
Radio/Cassette			
Watch			
Kerosene Lamp			
Torch			
Wooden Bed			
Bullock Plough			
Corn Mill			
Mango Trees			
Zinc Roof			

J. Sources of Income

Round 4 Data: _____

J1. Other Income: _____

J2. Agric. Labour: _____

K. Other Expenses:

Round 4 Data: _____

K1. Health; Funerals; Housebuilding; etc. _____

K2. Clothing this year - Smock? Women's cloths? _____

K3. Postponed a funeral this year? _____

SECOND CENSUS: 1989

Compound Number: _____ Households: _____ Household Number: _____
Village: _____ Interview Number: _____ Date: _____
Landlord: _____ Household Head: _____

A. Change in Household Composition 1988-89

Census Data: _____

A1. Births and Deaths: _____

A2. Migrants Out and Back: _____

A3. Marriages In and Out: _____

A4. Visitors In and Out: _____

B. Harvest and Sales 1988-89

Crop	Harvest	Harvest Disposal	Price/bag	Used Money How?
Nara				
Naga Red				
Naga White				
Belko				
Za				
Maize				
Rice				
Suma				
Benga				
Bambara				
Maggi				
Dankale				
Onions				
Tomato				
Lale				
Cotton				

C. Food Consumption 1988-89

- C1. Did anyone help you with food or money this year? _____
- C2. Did you help anyone with food or money this year? _____
- C3. Did you borrow money to buy food? _____
- C4. Was there hunger in your house this year? _____
- C5. Did you buy "fly" this year? _____ Bowls/Week: _____ Price: _____
- C6. How frequently do you buy or sell millet: Every year; Most years;
About every second year; Only occasionally; First time this year:
Buy millet: _____ Sell millet: _____

D. Crop Purchases 1988-89

Crop	Bags; Basins Bowls/Market	Price	Place	When	Source of Money
Nara					
Naga Red					
Naga White					
Belko					
Za					
"Millet"					
Maize					
Rice					
Suma					
Maggi					

E. Sources of Income 1988-89

- E1. How did you and the other men in your household earn money during the dry season this year?
Kola Trading; Cattle Trading; Millet Trading; Other Trading;
Weaving; Sewing; House Plastering; Cutting Grass; Making Grass Mats; Dry Season Gardening; Migrant Labour; Other:

Details: _____

E2. How did your wives and other women in the household earn money during the dry season this year?

Making Malt; Brewing Pito; Sheabutter; Dawadawa; Clay Pots;
Shelling Rice; Making Kuli-Kuli or Food; Trading in Millet;
Other Trading; Spinning Cotton; Sewing; Cutting Grass; Other:

Details: _____

F. <u>Major Expenses 1988-89</u>	<u>Money?</u>
F1. Health: _____	_____
_____	_____
F2. Housebuilding: _____	_____
_____	_____
F3. Funerals: _____	_____
_____	_____
F4. Other (Cloths, Smocks, Etc.): _____	_____
_____	_____

F5. Did you postpone a funeral, major housebuilding, or other major expenses because of the hunger this year? _____

G. Ploughing 1989

G1. Did you use a bullock plough or a hand hoe this year? _____

G2. If bullock plough, whose bullocks and plough? _____

G3. Any change from last year? _____

H. Assets Inventory 1988-89

Assets	1988	1989	Reasons for Changes 1988-89
Bullocks			
Cows			
Goats			
Sheep			
Pigs			
Chickens			
Guinea Fowls			
Ducks			
Donkeys/Horse			
Lorry or Truck			
Motor Bike			
Bicycle			
Radio/Cassette			
Batteries?			
Watch			
Kerosene Lamp			
Torch			
Wooden Bed			
Zinc Roof Room			
Bullock Plough			
Grinding Mill			
Mango Trees			

I. Borrowing and Lending 1988-89

B/L	Amount of Loan	Amount Due	Repaid/ Repaying	Teshie/ Terago	Man or Woman	Borrower or Lender's Name

NUTRITION SURVEILLANCE: ROUND TWO

Interview Number: _____ Date: _____ Village: _____

Compound Number: _____ Households: _____ Household No: _____

Landlord: _____ Household Head: _____

[illegible]

Sickness since last visit

No.	Name	Description of Sickness	Action Taken	Expenditure: 1) Medicine 2) Transport 3) Other

Main constituents of family's diet at the moment

Food	Ingredients	Times per day	Source of food	Who provides this food?
TZ				
Soup				
Snacks				
Other				

Comments: _____

Food Consumption

	Meals per day	Rationing?
Adults		
Children		

NUTRITION SURVEILLANCE: ROUND THREE

Interview Number: _____ Date: _____ Village: _____

Compound Number: _____ Households: _____ Household No: _____

Landlord: _____ Household Head: _____

[illegible]

Sickness since last visit

No.	Name	Description of Sickness	Action Taken	Expenditure: 1) Medicine 2) Transport 3) Other

Main constituents of family's diet at the moment

Item	Ingredients	Times per day		Source of food	Who provides this food?
		Adults	Children		
TZ					
Soup					
Snacks					
Other					

Rationing: Adults: _____ Children: _____

Name	Buying Millet? How much?	Cooks how often?	Spends how much on soup ingredients?

Comments: _____

NUTRITION SURVEILLANCE: ROUND FOUR

Interview Number: _____ Date: _____ Village: _____

Compound Number: _____ Households: _____ Household No: _____

Landlord: _____ Household Head: _____

[illegible]

Sickness since last visit

No.	Name	Description of Sickness	Action Taken	Expenditure: 1) Medicine 2) Transport 3) Other

Main constituents of family's diet at the moment

Item	Ingredients	Times per day		Source of food	Who provides this food?
		Adults	Children		
TZ					
Soup					
Snacks					
Other					

Rationing: Adults: _____ Children: _____

Name	Buying Millet? How much?	Cooks how often?	Spends how much on soup ingredients?

Comments: _____

NUTRITION SURVEILLANCE: ROUND FIVE

Interview Number: _____ Date: _____ Village: _____

Compound Number: _____ Households: _____ Household No: _____

Landlord: _____ Household Head: _____

[illegible]

Main constituents of family's diet at the moment

Item	Ingredients	Times per day		Source of food	Who provides this food?
		Adults	Children		
TZ					
Soup					
Snacks					
Other					

Rationing: Adults: _____ Children: _____

Are any women buying millet or fly? _____ Who? _____

How much millet or fly per market? _____

Cooking

Woman's Name	Cooks Fresh	Bitu Bowls Each time?	Number Fed		Soup Items: Cost/Market	Source of Cash
			Adult	Child		

Have any women changed the type of soups or the quality of soups they are cooking since the last harvest because of lack of money?

What changes? _____

Sickness since last interview

No.	Name	Description of Sickness	Action Taken	Expenditure: (M, T, Other)

Comments: _____

MIGRANTS

Household Number: _____ Name: _____
Village: _____ Landlord: _____ Date: _____

1. When did you leave Pusiga? _____
2. When did you return to Pusiga? _____
3. Where did you go? Region: _____
4. Did you go alone? _____
5. Are you married? _____ Wives: _____ Children: _____
6. Who was feeding your family while you were away? _____
7. Did you leave them any millet or money before you went? _____
8. What work did you do down south?
 - (a) Cocoa, coffee, or Agric. Labour: _____
 - (b) Contract, Sharecropping, or By-Day work: _____
 - (c) Domestic service, or Other work: _____
9. What was the rate of pay? _____
10. What did you have to pay for the following expenses:
 - (a) Transport; (b) Accommodation; (c) Food:
 - (a) _____ (b) _____ (c) _____
11. How many months did you work for? _____
12. How much money did you earn altogether? _____
13. Did you buy anything down south and bring it back with you such as a bicycle, clothes, or millet for the house? _____
14. How much money did you bring back with you? _____
15. Have you bought anything for the house since coming back with the money you earned down south; such as millet? _____
16. Did you farm here last year? _____
17. Will you farm here this year? _____
18. How many times have you been down south for work before? _____
 - (a) If more than once, how frequently (every year)? _____

Do you always go to the same place? _____

Do you always work for the same man? _____

Is it always easy to get work? _____

Why do you go? _____

Do you like living down south? _____

Which work is best - sharecropping, contract, or by-day - and why do you think so? _____
 - (b) If this was your first time, why did you go? _____

How did you choose where to go to? _____

Was it easy to find work? _____

Did you like living down south? _____

Will you go again next year? _____

Recollections of Past Famines

1. Can you tell me what you remember about the worst hunger there has ever been in Pusiga during your lifetime? What was the famine called? Why did it have that name? What caused it to happen?
2. How old were you at the time? Where were you living? Were you married? Were you farming separately? How many people were in your household?
3. What was your harvest like that year - Nara? Main harvest? Groundnuts and beans? What about other farmers - was everybody affected equally badly? Did everybody in Pusiga have to buy millet that year? Did anyone you know of in Tesnatinga or Terago have a surplus of millet to sell?
4. Did anybody in your household die because of the hunger that year? Did you know anybody in Pusiga who died of hunger that year? Did you hear about people dying of hunger in other villages outside Pusiga?
5. Who do you think suffered most from the hunger in Pusiga that year - farmers or traders? Men or women? Old people or children? Why?
6. How widespread was the famine that year - did it affect only Pusiga, all of Bawku District, the whole Region, or all of Northern Ghana? What about neighbouring countries -Burkina Faso, Togo, Ivory Coast - were they also affected? What about down south - Kumasi and Accra?
7. Where did you buy millet that year? In Pusiga market? In Bawku town? In Burkina? In the Northern Region? In Kumasi? Did traders bring food to Bawku or Pusiga? From where? What was the price? How much did you buy?
8. How did you get money to buy millet that year? Did you sell animals? Did you sell other things from the house? Did you find extra work locally? What kind of work? Were you paid in cash or food, or both? How much?
9. Did you borrow money or millet that year? From whom? How much? When did you repay? Was it difficult getting loans?
10. Did anybody help you with millet that year? Who? How much millet? Did you help him in return in any way at all - eg. by working on his farm?
11. Did you or anyone in your house go south to look for work or help that year? What did you/they bring back? Had you/they gone before, or did you/they go for the first time that year because of the hunger? Did you hear of anyone who left Pusiga and went to live down south, and never came back? If so, was it only men on their own, or whole families?
12. What did the women in your house do to help with getting food? And the children? And the old people?
13. Did anybody in your house go to stay in someone else's house because of the hunger? eg. did any wives go back to their fathers' houses? Did you hear of people sending their

daughters to other houses as "pua elinga" so that they could collect a cow and sell it for millet? What about boys?

14. Did you use any unusual ingredients for your TZ and soup that year, such as "fly" for TZ and wild leaves for soup? Did you eat anything else that you wouldn't normally eat, because of the hunger that year - eg. lizards, forest plants and roots? Did you hear of other people eating unusual foods that you did not eat yourself? If so, what?
15. Did the Government or any Church organisation help with free food or cheap food because of the hunger that year? What kind of food? How much was distributed? Was it enough? Who was it distributed to?
16. The following year, was the harvest good or bad? Did people find farming difficult, because of being weak from hunger? What about you?
17. Were you forced to eat some of your nara before it was ready the next year because of hunger? Did you hear of other people doing this?
18. What other famines do you remember or have you heard about in Bawku District? Can you list them in order, from the most serious to the least serious? How does the hunger of this year and last year compare with these big famines of the past?
19. Is there more or less hunger now than there used to be in Pusiga? Why? What can the Government or development agencies do to help prevent more hunger in Pusiga in the future?

Food Intake Measurement

1. Millet weights - before and after cooking
2. Ingredients of soup, and costs, and source - compound, market, bush
3. Method of preparation
4. Time for each stage of cooking
5. Number of men, women and children fed
6. Differences in threshing times of different millets and maize
7. Costs of grinding millets and maize - who pays?
8. Consumption: do men or women eat more?
9. Who eats less in times of hunger?
10. Cooking for other wives and their children?
11. Meat and fish consumption
12. 1 unthreshed basin = how many bowls threshed?
1 basin lasts how many days?
13. Cook fresh how often? Same size bowls morning and night?
14. Costs of cooking pots, bowls, basins. Who buys them? Basic list of cooking utensils for each woman
15. Traders in pepper, vua etc. take their own ingredients out?

Local History: Women

1. Introduction - We want to talk about the past and how things have changed during your lifetime, especially about changes in food and diets and in women's work.
2. Soup ingredients - When there was bush around here and people had less money then now, did they gather wild foods for soups? What did you gather? (Ask about: allo, kolpak, lilara, luloos, salim, sambabit, zeemaasa - get descriptions.) Still gathered today? Where? Can you buy them in the market? Were they sold in the past?
3. Soups - List soups from cheapest to most expensive. Which are most popular and why? Any soups made in the past but not today? Any new soups introduced during your lifetime? What meat and fish was used in the past - eg. bush rats caught in the forest; fish caught in local rivers?
4. Hunger - What unusual foods did you eat during Poyanglal and other famines - eg. wild figs, bush yams? How did you prepare these foods? Did people get sick or poisoned by eating bad food or not preparing famine foods properly? When there is food shortage, who goes hungry first - men, wives, widows, or children? Who eats most in normal times - men or women?
5. Women's work - Do women work harder now than in the past?
 - 5.1. Domestic work: Did women walk further to fetch water in the past? Did they cut firewood when there was bush around here? Any other changes in household work - cooking, raising children, etc.?
 - 5.2. Farming: Do women work more on family farms now than they used to? Have women always grown soup ingredients and vegetables? What kinds of soup ingredients did they grow - kenaf, alefi, berigas, etc.? When did women start growing groundnuts, rice, maggi, etc. to sell? Do women grow millet to sell or help feed their children? How do they get farming land? What help do they get from their husbands (ploughing eg.)?
 - 5.3. Trading: Have women always traded? In what? Any differences in what they trade now and in the past? Which markets do they use? Do they travel further trading now because of lorries? When did women start lending groundnuts? What else do they lend?

- 5.4. Income-earning activities: Have women always made clay pots, dawadawa, sheabutter, etc.? Have any income-earning activities died out? Why? Have any started recently? Do women weave mats or baskets in Pusiga? Do they sell eggs? Is there any difference between Kusasis and Mossi women and other tribes in the work they do - farming, trading, and other income-earning activities? eg. Moslem women don't brew pito; Kusasi women don't trade salt - why not?
- 5.5. Old women's work: Old women collect dung - do they sell it? How much per basin? Since when? Old women also collect firewood and grass to sell, and crushed dawadawa pods for beating floors - anything else that old women do for money?

6. Women's assets

- 6.1. What are the basic essential items in a woman's kitchen - cooking pots, enamel bowls, water basins, cooking utensils? How many of each? How much do they cost nowadays? Who provides them - the women themselves, their husbands, their mothers? What did women use in the past before enamel basins and bowls etc. were introduced?
- 6.2. What are the basic clothing items all women have? How much do women's cloths cost? Do women buy them or do their husbands buy cloth as gifts?
- 6.3. Do women collect jewellery or gold and other valuables? Who inherits these things when a woman dies - her husband, her daughters?
- 6.4. What other assets do women have - animals etc.?

7. General

- 7.1. Do women travel more than they used to? Have you yourself ever been to Accra? Kumasi? Tamale? Bolgatanga? Burkina Faso? Sankase (Togo)? What about your daughters?
- 7.2. Are women generally better off or worse off now than they used to be? How?

Local History: Men

Slash and burn - when did farmers stop making bush fires and why? History of bush fires in Pusiga? Why do people burn things now?

Storage losses - millet in granary, groundnuts in bags, etc. What difference have chemicals made? Introduced when? Used by everybody?

Varieties of sorghum grown now apart from Belkos and Nagas. Which varieties are indigenous - i.e. have always been cultivated? Is Naga White old or an improved variety? Red Belko introduced when?

Introduction of mango trees.

Introduction of market gardening.

Why do compounds face west?

History of hunting, fishing, meat consumption: lizards, geckos, snakes, bats.

History of armyworms and locusts in Pusiga.

Hunger - borrowing of millet; pawning of men; 'selling' women for millet.

Quarantine Station opened when? Closed when and why?

When did the boreholes come? How? Water supplies before then? Guinea worm?

When did grinding mills come to the villages? Changes induced by this?

When and how was Pusiga market day chosen? Ever changed? Village markets?

Introduction of health clinics. Use of clinics, Bawku Hospital and herbalists.

Cost of school uniforms - who needs them? Other non-fee costs? How to select which children to send to school? Schools built when?

Dowries - easier to pay because of more animals owned in the past? Differences between various tribes? Only Kusasis pay 4 cows?

Changes in tributes paid to chiefs?

Men's Life History Interviews

Where were you born? When?

Who built this house? You? Your father? Grandfather?

Where did your family come from?

When did your family move here? Why?

When did you or your father buy your first plough?

Have you ever been to Kumasi or anywhere else to live or work for some time?

When did you start farming separately?

When did you first get married?

How did you pay the dowry?

How many wives have you had?

How many children have you had altogether?

Have some of your children moved away? Where to?

Have you had any major sickness or death in your family?

Women's Income-Earning Activities

How is it made?

What materials do you need to start?

Is capital needed?

Who engages in the activity eg. young women, widows - why?

Why don't the men do it?

The process of production (day 1, day 2, etc.)

What happens with the fruit eg. ie. by-products

How many hours do they work per day?

How many people work on it?

Do they get other people to help them eg. by fetching water?

Cycle of production - eg. pito-brewing takes 3 days.

Seasonality - do they do it at certain times of the year or all year through?

Costs, Income and Marketing

How much of each material do they use, ie. quantities
(eg. 1 basin sheanuts, 10 basins water)

How much each material costs.

Do they sell it - what units, i.e. lumps, pots, basins

Who does the selling - eg. themselves, traders, their children

Amount produced from one cycle.

Sale price of one unit? Where do they sell it?

Do they sell all at once or store and sell small amounts

Do they sell it at different prices throughout the year eg. can they make more money by making now and selling later.

What happens with the money from selling - is it shared equally, some given to husbands. Do they buy materials for more processing or do they buy other things eg. for the house, especially millet.

Do they do the activity continually - how many production cycles in a week or month.

History

Personal: How did they get started

Who taught them eg. mothers

How old were they when they started

General: Local history - have people always made it, do they only make it here or elsewhere in Ghana

Is it more or less popular or widespread than it used to be

Problems

Difficulties - is it hard work - do you need to be strong, do you need a lot of money.

Why don't more people do it

Is there any support they would like from the Government or Ministry of Agriculture eg. with inputs - credit, loans, marketing

Do they need help selling their products eg. lorries.

Women Traders

What do they trade in?

Do they trade in the same things all year round / different things at different times of year?

Reasons for seasonality - find out what seasons are eg. oranges, mangoes

Is there any processing involved, details eg. how they make it, eg. kuli-kuli ie. ingredients, process time, etc.

If they are buying - where do they go to buy their product

Where do they sell - what markets they use, the frequency, the cycle

How do they get to market - if walking, how long there and back

Do they walk alone, with friends, daughters?

Do they trade all year round, or stop and farm

If they have a baby, how long do they stop working for - before birth and after

Retailing - what is the mark-up on unit prices

Processing - what profit they make

Seasonality and prices - what they buy and what they sell

Do they sell more at some times of year

Quantities involved eg. 1 bag or 1 basin, are mangoes bought in basins

Profit - per week, market day

What do they use the profits for? Do they buy millet?

How did they get started ie. mother was doing it

When did they start

How did they get the capital to start

Do they trade more now than they used to or has it always been the same?

Did they ever trade in anything different and changed - why?

Are they also farming separately - if not, why not

Is trading, or farming, more profitable?

Is trading now more profitable than it used to be? Why?

If trading for a long time, what happened during Ayayua - did they stop, did they profit eg. by selling millet?

