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by

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Abstract

The paper uses basic theories of Marx on social structure and Malthus on demography to explain many features of Arabia in terms of the arid environment. The focus is on traditional Arabia, but it is argued that the same consideration continue to apply to modern Arabia. Beginning with the desert, it is argued that the only viable economic activity in 'traditional' Arabia was herding, and the only feasible system of property was communal ownership. Malthusian demography implies that the population expanded until the average product of labour equaled subsistence. Since labour was at subsistence and land had no value, neither could provide a tax base for a state. Hence, the social system was tribal–tribes had no budgets. There were two exceptions: International trade could be taxed, as in Yemen. Oasis land could also be taxed. Water meant that the average product of labour exceeded the marginal, which equaled subsistence. The difference was a taxable surplus. Some Bedouin tribes claimed ownership of oases and the implications are analyzed. The Saudi states that emerged beginning in the eighteenth century were Bedouin sheikhdoms writ large. Their finance came from oases like al-Hasa and al-Qatif near the Gulf Coast. With Shiite populations, Wahabism proved a useful ideology to justify their plundering by Sunni tribes from the interior. The finances of the Gulf Sheikhdoms are also analyzed as are the finances and investment strategies of the rulers of Oman as well as the role of slavery. Oman is a good example of a hydraulic civilization. Oil replaces water in modern Arabia, and guest workers replace slaves, but the system continues much as before since it continues to meet many needs. Wahabism continues its useful ideological role since the oil fields happen to be adjacent to the al-Hasa oasis.

Arabia was different. Most of the world's great civilisations have been based on agriculture with grain being the main crop. Cultivation was usually done by peasants who lived in permanent villages. The farm land was private property, there was substantial inequality, and the societies were governed by powerful states. The only place in Arabia where this was the case was in Yemen in the southwest corner of the peninsula. Otherwise most of the land was steppe or desert, mobile herding was themain economic activity, there were tribes rather than states, and the land was not private but instead was managed as the common property of the tribe. The desert was interrupted here and there by oases which were planted with date palms–the main vegetable food source. Oases were private property and the cultivators were often slaves. Generally people were very poor.

The explanation of this pattern clearly has something to do with the lack of rain, but what exactly? The situation is made more complicated because sometimes states–usually weak–appeared. Why did tribes give way to states and why were they weaker than those of the great empires? In this paper I present a theory of tribal society and oasis society and how they were related to each other. This throws light on the property systems and the possibilities of state formation. The framework is prompted by the ideas of Marx and Engels and the demography of Malthus, and I begin with their observations on Arabia. The model is then developed and applied to historical episodes in the histories of the Saudi states, the Gulf Sheikdoms, and Oman.

Most of the discussion is concerned with Arabia before the discovery of oil. However, the analysis has important implications for understanding the world today, and those implications are developed the last sections.

A grand question that arises is: How much agency do human beings have in their social and political arrangements and how much is dictated by circumstances beyond their control? In Arabia, the environment dictated much that we observe. Even where alternatives are possible, the options are circumscribed by environmental circumstances.

Marxism in Arabia

Marx and Engels wrote little about Arabia; however, the peninsula is mentioned in Marx's famous paragraph dealing with irrigation and the function of the state in Asia.[1] The

[1]The paragraph appeared in Marx's column in the New York *Tribune* on 25 June, 1853. Marx wrote, "There have been in Asia, generally, from immemorial times, but three departments of Government: that of Finance, or the plunder of the interior; that of War, or the plunder of the exterior; and, finally, the department of Public Works. Climate and territorial conditions, especially the vast traces of desert, extending from the Sahara, through Arabia, Persia, India and Tartary, to the most elevated Asiatic highlands, constituted artificial irrigation by canals and waterworks the basis of Oriental agriculture...Hence an economic function devolved upon all Asiatic Governments, the function of providing public works. This artificial fertilization of the soil, dependent on a Central Government,

paragraph was a re-working of Engel's original formulation in a letter written to Marx nineteen days earlier:

> The absence of landed property [that is large estates staffed with slaves or serfs or let to tenants for rent] is indeed the key to the whole of the East...But how to explain the fact that orientals never reached the stage of landed property, not even the feudal kind? That is, I think, largely due to the climate combined with the nature of the land, more especially the great stretches of desert extending from the Sahara right across Arabia, Persia, India and Tartary to the highest of the Asiatic uplands. Here artificial irrigation is the first prerequisite for agriculture, and this is the responsibility either of the communes, the provinces or the central government. In the East, the government has always consisted of 3 departments only: Finance (pillage at home), War (pillage at home and abroad), and *travaux publics*, provision for reproduction [i.e. irrigation]. (Husain 2006, p. 263)

The emphasis on the arid climate and the state provision of irrigation is prescient, but it is far from a full analysis of Arabian society. I expand it by locating it in Marx's general theory of social evolution (Cohen 1978).

The *Preface to the Critique of Political Economy*[2] is a succinct statement of Marx's general view. A society's technology (which Marx called the 'material forces of production') determined its system of ownership and labour control ('the social relations of production'). Together the 'forces' and the 'social relations' constituted the economic base or 'mode of production.' Examples of modes of production include capitalism, feudalism, societies founded on slavery, and the Asiatic mode of production featured in Engel's quote. The modes of production, in turn, determined the legal system, political structure, religion, and culture of the society.

Causation among the different elements of social and economic life runs from technology to the organization of land, labour, and capital in production, to other aspects of human life. Marx was opposed to the frequently advanced thesis that economic organization and performance are explained by people's culture. This includes Weber's (1930) argument

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and immediately decaying with the neglect of irrigation and drainage, explains the otherwise strange fact that we now find whole territories barren and desert that were once brilliantly cultivated, as Palmyra, Petra, the ruins in Yemen, and large provinces of Egypt, Persia and Hindustan." (Husain 2006, p. 13)

[2]"In the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production. The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness. " Marx (1859).

that Calvinism explained the rise of capitalism or the popular theory of the 'clash of civilizations' (Huntington 1996). The latter includes the claim that the world can be divided into 'civilisations' whose economic behaviour and widely held attitudes are determined by their religions–Christian, Islamic, Confucian, whatever. While people are brought up in these traditions, which influenced their behaviour to some degree, Marx regarded them as re-interpretable and thus not very constraining. For over a millennium, Christians believed , for instance, that it was wrong to charge interest on loans, but this view was interpreted away as economic development led to business loans contributing to commercial prosperity. Similarly, Muslims have invented 'Islamic banking' so that their financial institutions can perform the same functions as western institutions but with differences in structure, so they do not formally violate the Koran's prohibition against *riba*.

Marx's scheme looks overly deterministic. In other places he allows scope for human agency. He famously wrote: "Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past" (Marx 1852). In an important sense this is unobjectionable. All of us operate within the context of a world inherited from our ancestors. The questions are: what are those circumstances? How constraining are they? The answer is that the constraints decline the further down the chain of determination one goes. There is least scope for agency in the choice of technology–most is transmitted from the past and it evolves only slowly. There is more latitude for agency in the organization of production since the same process can be operated in more than one way. Matters like religion are least determined by the economic base, and are of least consequence in Marx's view, as our argument about usury shows.

In this essay we proceed in a more specific way to establish the scope of 'human agency' (as opposed to material circumstances) in explaining social institutions. We begin reasoning 'from the sand up' to see how much we can explain deterministically. There come points where material circumstances create options for social organization but not a unique solution. Human agency explains which option was chosen. At that juncture we can see its role clearly. But even here its scope is limited.

Marx developed his theory with European countries primarily in mind. The environment did not require a mention, for the natural world did not seriously constrain development options–with the partial exception of the location of coal fields (Fernihough and O'Rourke 2020). That was not the case in Arabia, however, and the environment must be included in the analysis. Marx and Engels did notice the importance of irrigation in an arid environment, but, before exploring that observation, I consider the desert itself.

In the desert Marx's schema becomes very simple: In pre-industrial times, the desert permitted only one technology: nomadic herding. This, in turn, implied a single set of social relations of production: the land was common property and herding was done by small groups of people wandering with their animals over the landscape in search of water and grass. The political structure was also uniquely determined: there was no tax base for a state,

so the only system of organization was the tribe. Nevertheless, there was scope for agency in this society; but it was confined to questions like: who would be in a group of people that wandered together? What would they do if their animals died in a drought? What happened if someone murdered someone else? Who would be in a tribe? Who would be the Sheikh? Would the tribe go to war? There were many issues for people to debate and act on, but the debates and actions took place in a context of 'circumstances'–technologies, institutions, and ideologies–'inherited from the past,' and in the desert they were very constraining.

Part I. Life in the Desert[3]

To develop these ideas, we start with the natural environment. Figure 1 shows rainfall in Arabia and there is very little in most of the peninsula. Yemen is the exception, for 300 mm or more fall on its mountains each year, and that is enough to grow wheat and other crops. A band across the centre of the peninsula gets 100-150 mm per year. This is enough moisture for some grasses and shrubs, and they provide rough grazing for sheep. As it turns out, there is water just below the surface. The rest of the peninsula gets less than 100 mm of rain per year, and that land can support nothing but camels. Yemen aside, most of Arabia is so dry that the only feasible economic activities are raising sheep or camels. The harsh environment meant that there was little scope for human agency in the choice of technology.

The environment also determined the social relations of production. The point is that rain was not simply sparse, but it was also highly variable in two sense. First, some years were wetter than others. Second, and perhaps more important, there was never continuous rainfall over a broad territory. Instead, showers occurred here and there and appeared randomly and unpredictably. If rain fell in an area, there was a burst of plant growth, and grazing became possible. Soon, however, the land dried out again, and the grass disappeared. People had to move themselves and their animals to another place where rain had recently fallen. The distance might be great. Indeed, much effort was spent learning where rain had recently fallen.

This character of the rainfall has profound implications: First, it is not possible to divide the desert into small, self-contained areas–that is to say 'farms'–that could be divvied out among the population for cultivation or grazing. Instead everyone was engaged in endless treks across the landscape in search of water and grass. The land, as a result, had to be held in common, so people could always move towards the new grass. What 'common property' meant is that everyone had the same right as anyone else to pasture their animals on any given piece of ground. In other words, no one or no institution, had the right to exclude anyone from pasturing their animals wherever they chose. One implication is that no one could charge anyone else rent for the use of land. In that sense, land was 'free'.

Second, the area watered by any given shower is also so small, that the new grass that appeared could support only a small number of people and animals. As a result, at its most

[3]Many of these ideas were discussed by Emanuel Marx (1978).

elemental, society consisted of small groups of (generally closely related) people sharing a landscape with other, similar groups that held the land in common.

Most of Arabia was common property and grazed with sheep or camels depending on the rainfall. The only exceptions were the mountains of Yemen and parts of Oman where rain fed agriculture was possible, and the oases where dates and other crops were grown. We will consider how oases affected the situation after we consider some of the implications of common property.

Implications of common property: demography and income

One thing that Marx's theories do not explain is how many people were living in the desert. This is a question that Malthus tackled head on.

Malthus (1798, p. 12) thought that fertility, mortality, and population growth were governed by universal biological principals that applied to all species of plants and animals. His two postulates were 'food is necessary to the existence of man' and, indeed, all living things, and 'the passion between the sexes is necessary and will remain nearly in its present state.' The second meant that population would grow inexorably and overtake the production of food at which point the standard of living of all (in an egalitarian society) or most (in an unequal society) would be forced to basic subsistence. At that point the first principal implies that rising mortality would check the population increase. Darwin (1958, p. 120) thought this an impressive argument, and it led him to his theory of natural selection as a result of the universal struggle for existence. Malthus did allow one avenue for human rationality and social norms to influence demography: when times got tough, people could delay marriage and that would lower fertility. This 'preventive check' only moderated the misery without overturning the basic argument.

Malthus thought that his argument explained the poverty of the working class during the Industrial Revolution. Marx vehemently opposed Malthus's explanation. Both thought low incomes were due to 'surplus population,' but Malthus attributed that to high working class fertility, while Marx attributed it to labour saving technical change–a view which I share (Allen 2017). More generally, Marx (1867, pp. 443-4) contended that demography was not biologically determined but socially determined and that each mode of production had its own distinctive demographic system. Other than his argument about technological unemployment, which he curiously thought of as a model of capitalist demography, he never described these systems.

Anthropologists have studied the determinants of fertility and mortality among hunter/gatherers and settled horticulturalists. Some claim that population control was normal and attribute it to culture rather than to the carrying capacity of the land, which is the variable that Malthus emphasized (e.g. Hayden 1972). Others, however, see fertility and mortality as biological processes in which human agency plays only a very limited role. Kelly (2013, pp.

186-213) argues that fertility is determined mainly by fecundity, which depends on breast feeding, aerobic activity, and the level and regularity of calorie intake. Mobile foraging leads to low fertility by influencing these variables, while sedentism raises fertility. Infanticide is the only 'cultural' practice that might influence population growth, but it is of importance only in harsh, marginal environments like the arctic. This approach is in line with the view of Malthus and Darwin.

In judging Malthus' theory, it is also important to notice that it predicts that most people before the Industrial Revolution lived at bare subsistence. As far as we can measure it, this prediction is born out by the facts (Allen et al 2011, 2012, Allen 2020). That is important evidence in favour of Malthus. It is only with the demographic transition that this biological view of fertility gives way to the social factors that Marx championed.

Malthus did not believe that nineteenth century Arabia had reached that stage. In the second edition of his *Principle of Population*, Malthus applied his arguments to Arabia. He noticed nothing that indicated the operation of the preventive check. Instead, he believed that fertility was unconstrained, which led to unending pressure of population on the means of subsistence and a very low level of income for most people. "In a state of society where power generally procures subsistence, each individual family derives strength and importance from its numbers. These ideas act strongly as a bounty upon population; and, co-operating with a spirit of generosity which almost produces a community of goods, contribute to push it to its utmost verge, and to depress the body of the people in the most rigid poverty." (EP I, ch VII) In support, Malthus quoted Volney that the Arab bedouins "deny that the religion of Mahomet was made for them. 'For how,' they say, 'can we perform ablutions when we have no water; how can we give alms when we have no riches; or what occasion can there be to fast during the month of Ramadan, when we fast all the year?'" (Ibid.)

Malthus also quoted Volney on the geographical pattern of settlement, which shows another important implication of the positive check:

> "In the barren cantons, that is, those which are ill furnished with plants, the tribes are feeble and very distant from each other, as in the desert of Suez, that of the Red Sea, and the interior part of the Great Desert [in Arabia]. When the soil is better covered, as between Damascus and the Euphrates, the tribes are stronger and less distant. And in the cultivable cantons, as the Pachalic of Aleppo, the Hauran, and the country of Gaza, the encampments are numerous and near each other." Such a distribution of inhabitants, according to the quantity of food which they can obtain in the actual state of their industry and habits,...is, in fact, equally applicable to the whole earth, though the commerce of civilized nations prevents it from being so obvious as in the more simple stages of society. (EP I, chap VII)

The full implications of Malthus' demographic model depends on the system of

property that prevailed–whether it be private or communal. The aridity of Arabia implied the latter, so we develop the model accordingly. Figure 2 is a diagram of the positive check Malthusian model with common property. The left quadrant is the typical vital rate diagram tipped on its side. Income is on the vertical axis and vital rates on the horizontal axis increasing to the left. The right quadrant shows the average product of labour. Normally, Malthusian models are developed with the marginal product of labour. The marginal product is appropriate when property is private, but the average product is the appropriate curve for common property since the total production is divided among all of the producers. W* and L* are the equilibrium income and population, for the population will remain constant with these values. W* is a subsistence income. As drawn, this is a positive check model: that is births are always at a high, constant rate, and the adjustment to economic conditions occurs through changes in the death rate. For instance, if we imagine the population being at an income greater than W*, the death rate would be low since people are well fed. As a result the population would expand until income dropped enough to force the death rate up to the birth rate, and people would end up poor.

The diagram has three important implications for pre-industrial Arabia. First, the income of mobile herders always tends to subsistence W*. In Malthus' (and Darwin's) view, population naturally outran food supplies until mortality rose to a high enough level to stop it. That is the equilibrium shown in Figure 2. Second, this was true of everyone in Arabia. All of the income went to the herders. Figure 2 shows no surplus that could support an aristocracy or a state. Inequality could only arise when someone owned more livestock than other people had. But that was an unstable source of wealth given the high mortality of animals during droughts. Third, suppose conditions improved–for instance, the average rainfall increased so more people could be supported on the land. What would happen? In Figure 2, a more fruitful natural environment would be represented by an upward shift in the average product of labour. This would lead to a rise in the standard of living and a increase in the population, as mortality fell. As population expanded, living standards would drop, and, in the long run, population would increase to the point where income equalled W*. In the new equilibrium, there would be more people but the same income per head. The reason that people were poor in Arabia was not because the environment was harsh but because of their demography. This is Malthus's pessimism, and it is the conclusion that Marx railed against.

Economic insecurity

With the average income at subsistence, the variability of rainfall had frightening implications, for it meant that frequently people found themselves with inadequate income–that is to say, they could not find enough water and grass for their animals. Eventually, they would die and so would their owners if nothing was done.

Contrast this to the situation in Europe. Many peasants were at subsistence and in

danger when harvests failed, which they did. However, in Europe land was private property and much of its production was taken by the state and the aristocracy. Many of the landowners were ecclesiastical institutions. They had stocks of food from previous harvests, and they provided alms to the poor in times of crisis. This ameliorated their plight. Social mechanisms along these lines were lacking in the desert since everyone was at subsistence.

The only recourse for people whose animals had died in a drought was to restock their herds by raiding and plundering their neighbours and taking their sheep or camels. This was a frequent occurrence. It meant that Arabia as characterized by anarchic warfare.

Political organization

Figure 2 has important political implications. States have budgets that pay for officials, soldiers, and the opulence of the ruler.[4] Budgets require taxes and, thus, a tax base. The tax base could be income from land, labour, capital–or foreigners if international trade was involved. In medieval Europe, the aristocracy and the King derived their income from ownership of land and control over labour. But these avenues were precluded by the desert. As we have seen common property meant that there was no rental income to support the upper class or a state. And with the population at Malthusian subsistence, there was no surplus for a ruler to take even if the population were declared to be slaves. Furthermore, on the practical level, it was not feasible to tax a sparse, mobile population of herders, even if a state administration existed.

That leaves capital or people involved or affected by trade. An example is the ancient trade in frankincense and myrrh. The capital involved was merchant capital, and the trade was transporting these aromatics in camel convoys from the south coast of Arabia, across the east side of the Yemeni mountains and then north past Mecca and Medina to Petra and from there to Gaza where the goods were sold to Romans. This trade was heavily taxed as it passed the cities like Saba, Qataban, Zafar, and Shabwa. These were early states. The Queen of Sheba (=Saba) was their most famous ruler. The taxes that supported her were born by merchants, Roman consumers, and perhaps the growers of the *Boswellia sacra* and *Commiphora myrrha* trees whose sap turned into the aromatics. But Yemen was the exception that proves the rule: states exist only where there is a tax base.

With frequent and widespread local subsistence crises in the desert, raiding and pillaging became normal behaviour. A state might have suppressed this activity and provided alternative remedies for droughts, but a state was impossible. Second best arrangements were developed to deal with the disorder. One was the tribe. Success in raiding could be improved by increasing the number of raiders, so the men in an area banded together to form

[4]I define the state in terms of fiscal capacity in line with Dow and Reed (2022, pp. 440-1). This differs from Weber's (1978, p. 56) definition in terms of a monopoly of legitimate force, which is commonly used (Bowles and Fochesato 2024, p. 1517, Trigger 2003, pp. 47, 92, Kirch 2010, Service 1975).

a militia–a tribe. As other groups did the same, this became doubly important since it was necessary to defend a tribe's land against the raids of other groups. Since the tribe had no more capacity to tax the land than other possible state-like institutions, it had no resources of its own, so its leadership was unpaid and acquired its authority through popular acclaim and whatever gains it could bring the group. Chiefs were, thus, charismatic leaders who led by example and force of personality.

Aside from the military function, tribes met other needs. Chiefs mediated disputes among members. Fighting together and following the same chief promoted group identity. This, in turn, led to some mutual assistance in times of drought. This was not a substitute for raiding, however, especially when many people in the same area were affected.

Another response to endemic raiding was the vendetta. Raiding other groups and stealing their animals might have led to people being killed. That was not desirable. There was no state to punish murder; instead, the relatives of the deceased were compelled to murder the murderer (unless blood money was paid). A revenge murder entailed a retaliatory murder in turn, so violence could continue indefinitely. That was a deterrent to too much violence by raiders or defenders.

The vendetta had a tribal dimension, as well. In the final analysis, the tribe had the responsibility of avenging assaults against its members. A man without a tribe was alone in a Hobbesian state of nature. No group would protect him from attacks by anyone. The support and protection given by a tribe to its members made them reluctant to leave its territory of authority.

Part II: Oases

Not all of Arabia was bone dry. Large aquifers lay under the desert, and water occasionally erupted to the surface. In view of the slope of the geology, the greatest concentration of springs was on the eastern side of the peninsula in Saudi Arabia's eastern province, Bahrain, Oman, and at Liwa and Al Ain in the UAE. The LabOasis Foundation is listing all oases in the middle east and north Africa, and its website currently shows twenty-one in Saudi Arabia, 168 in Oman, 73 in Yemen, and 2 in the UAE.[5] Probably all of the oases in Saudi are natural, but many of the others are artificial.

The largest oasis by far is the al-Hasa oasis in eastern Saudi Arabia. It covers 85.4 square kilometres and is watered by 280 artesian springs. Dates are the principal product in most oases, and al-Hasa has 2.5 million date palms. Grain, vegetables, and alfalfa–the latter to feed cows– are also grown between the palms and in fields. The al-Hasa oasis has been cultivated for millennia, as have many others (Vidal 1955).

Equilibrium between desert and oasis

[5]http://www.laboasis.org/atlas-saharan-and-arabian-oases/

The grazing economy and the agricultural economy were interdependent. The herders exchanged cheese, hides, transport services, wool, and meat for the dates, grain, and handicraft manufactures made by the settlers in the oases. They also supplied the nomads with some imported goods like coffee and rice. In addition, people could shift from one economy to the other. How smoothly that happened is a question. On the one hand, Cole (1975, p. 160) reports that camel raising Bedouin "despise agriculture and [furthermore] know nothing about it" with the result that modern settlement programs have often failed. Moreover, for reasons already discussed, herders might not want to leave their tribal area for an oasis town. On the other hand, Heard-Bey (1982, p. 199) and Wilkinson (1977, p. 189) agree that Arabs in Oman and the future UAE normally combined camel and sheep herding with date cultivation, pearling, charcoal manufacturing, and salt hewing. Figure 3-5 are accordingly constructed on the assumption that Arabs would shift sectors when the returns were greater with the result that returns were equalized between sectors.

The figures are drawn assuming fixed proportions in the oasis technology. The main product was dates, although some vegetables and fruits were grown in the shade of the palms and wheat and alfalfa in land downstream from the date garden that was occasionally watered with overflow from the palms. There was variation from region to region in the size of farms, but a typical configuration was the following: Farms were .4 hectares (half in the date garden and half in the run-off field) operated by a family (assumed to consist of one man, one woman, and 2-3 children). Each farm had 40 palms.[6] A date palm produced about 40 kg (Ihaq 2016, p. 450. Typically half of this was taken as rent, and the other half was consumed by the farm family, who also consumed the remaining produce of the farm. This provided them with a bare subsistence diet averaging about 1800 calories per person that was deficient in many nutrients. This representation of oasis agriculture accords reasonably with Wilkinson's (1977, p. 92) view that "40 to 50 palms support a family-group of five persons."

Figure 3 shows the equilibrium between desert and oasis under the assumption that the oasis was a common property regime like the desert. This was not true, but it is a useful place to begin. As before, the population is shown in a Malthusian equilibrium at subsistence. The herder population is represented by the distance from O1 to A. The oasis population is given by the distance from O3 back to A and is divided into two parts. O3G is the population (workforce) required to cultivated the irrigated land. The farmers occupy identical farms that produce GC or O3D per household. CD traces out both the average and the marginal product of labour in the oasis. Were the oasis population equal to GO3, the model would not be in equilibrium, for the average product of labour in the oasis O3D would

[6]Abu-Bakr (1976, p. 46) and Ishag (2016, p. 45). The land-labour ratio is determined by the peak labour demand, which occurred during the date harvest. I assume that Tamar dates (those ripened on the tree the longest and which lasted the whole year) were produced, and that harvest lasted four weeks–a generous allowance. The date palm had to be climbed several times to harvest since dates ripened at different rates. A cultivator who made six ascents per day and harvested each tree four times would finish exactly 42 trees in four weeks (Aboonajmi 2004, p. 2, Akyurt 2002, p. 481, Lobo et al 2014, p. 66, Morton 1981, pp. 6-7) .

be greater than the average product of labour in herding. The oasis population would earn more than the subsistence income W-pos since it would receive the full production of the farm. In the oasis births would exceed deaths, and the oasis population would expand to O3A. The curved line BC is a rectangular hyperbole and traces out the average product of oasis labour as the fixed production GCDO3 is divided among an enlarged population. When the population expands to O3, the demography and economics are in equilibrium and population growth ceases. The oasis is overpopulated: Its population consists of the work force necessary to farm the land O3G plus the surplus population AG. The marginal product of labour in oasis production is zero–a Lewis (1954) surplus labour economy has been created.[7] In this equilibrium all income goes to those who labour, as before.

Land in an oasis was scarce and highly productive since it was watered, so it is hard to see why it would be a common property resource. Indeed, it was normally private property. The implications[8] are shown in Figure 4. When land was privatized in the oasis, landowners would have hired labour to farm it up to the point where the marginal product of labour equalled the subsistence wage. This implies less employment than the common property organization. Privatization also generated rent, as indicated in Figure 4. What happened to the rent? Food was the main product of this economy, and, if we assume that everyone ate the same amount, then the answer is simple. The landowners who received the rent used it to (effectively) hire people to provide them goods and services–officials to serve them, soldiers to defend them, jewellers to decorate them, poets to sing to them, and so forth. This extra non-farm employment is shown in Figure 4 as AG–the population that was 'surplus' in the common property case. The 'surplus' labour has been 'mobilized' by converting it into a proletariat. Rent FCDE equals the income of the proletariat ABFG. The proletariat was created by the privatization of communal land and worked at the direction of the landowners.

Who were the landowners? In many cases they were Bedouin tribes. In modern times, Bedouin have purchased land with money earned in pearling or the oil industry (Heard-Bey 1982, p. 200). In the more distant past they may have acquired ownership by renovating abandoned falaj systems (Wilkinson 1977, p. 189-99). Sometimes Bedouin gained control through conquest or the simple assertion of ownership. Often the Bedouin ruler built a castle in his oasis and settled there. Thus Muhammad ibn Saud was the emir of the al-Diriya oasis in eighteenth century, and Al Rashid was the emir of Hail (Vassiliev 200, pp.54-5). In this case Figure 4 describes the economic structure: the rents from the oasis are paid out as wages for craftsmen and proletariat in the oasis.

But not all sheikhs chose to live in their oasis. Reilly (2015, pp. 82-101) recounts the history of Khaybar, an important oasis in northwestern Arabia. It was an ancient settlement, reportedly inhabited by Jews before the Caliph 'Umar expelled them from the peninsula. At some later point, the village fell under the control of the Anaza tribe. The Anaza did not occupy the oasis–it was shunned by Arabs who feared the malaria carried by the mosquitoes

[7]This exercise assumes that the prices of the products are constant.
[8]My analysis has strong affinities to Cohen and Weitzman (1975).

that thrived in its humid micro-climate–but none-the-less collected rent from the growers every year. In the seventeenth and eighteenth centuries, the al-Hasa oasis was controlled by a clan of the Bani Khalid tribe. They continued to live in the desert, but troops were stationed in the oasis (Vassiliev 1997, p. 54).

In cases like this where the rent of the oasis was divided up among the Bedouin of the tribe, the result was not the creation of a proletariat in the oasis. Instead the rent was dissipated in population growth: With a higher income per Bedouin, births exceeded deaths and the Bedouin population expanded until their incomes returned to subsistence. The income of the additional Bedouin population equalled the rent taken from the oasis. This result parallels Malthus' criticism of the Old Poor Law in England: taxing land to support the poor would simply result in an expanded population of poor people with no improvement in their economic situation.

Figure 5 diagrams this equilibrium. The line of the average product of labour of the nomads has been elevated by an amount equal to each Bedouin's share of the oasis rent since the Bedouin's income now includes both the value of what he produces plus his rent share. This new line shows the total income of a Bedouin and that governs the demography. The immediate effect of the higher income is to reduce the death rate and increase the rate of population growth. This occurs until the total income of Bedouins from both sources drops to subsistence. That population will be the same as the Bedouin population plus the additional oasis population shown in Figure 4. In the equilibrium of Figure 5, there is no rent and everyone is at subsistence.

Oases and the Saudi Kingdoms

An oasis with a Bedouin sheikh looks like an incipient state. They undoubtedly existed for centuries, however, without any development towards large scale territorial organization. This changed in the eighteenth century with the formation of the first Saudi kingdom.

The first Saudi kingdom was founded by Muhammad ibn Saud, who ruled the oasis of Diriyah near Riad. The Diriyah settlement was founded in 1446-7. The first Saudi kingdom was proclaimed in 1727. In 1744 Muhammad ibn Saud formed an alliance with Muhammad ibn Abd al-Wahab, the theologian who founded Wahabism, a strictly monotheistic form of Islam. Wahabism became the official form of Islam in the Saudi state and remains so today. Muhammad ibn Saud expanded his domain by enlisting Bedouin tribes to his cause. They were compensated with loot seized from newly conquered territory. They had to profess Wahabism, and they also had to foreswear plundering within the Saudi kingdom. Many wars occurred in the eighteenth century as Saud expanded his kingdom. Rich provinces like al-Hasa were conquered several times before they were finally subdued–al-Hasa only in 1796. (Vassiliev 2000, pp. 84-91). By the early nineteenth century, Saud's forces had conquered most of the Peninsula, but that meant there was no more loot from new territories to reward

the Bedouin supporters. Revolts were commonplace, and they were severely suppressed and the property of the insurrectionists was confiscated. In 1818, the first kingdom was destroyed by the invasion of the Egyptian ruler Mohammed ali Pasha.

The second Saudi kingdom was established in 1824 and lasted until 1891. The second kingdom encompassed less territory than the first, but we know more about its finances due to the information collected by William Gifford Palgrave (1871) in his travels across Arabia in 1862-3. He listed the population and taxes of every province of the kingdom. Figures 6 and 7 show maps with approximate boundaries and taxes collected. Most of the taxes came from three provinces–al Hasa (150,000 riyals). Al Qatif (50,000), and Kaseem (120,000). Al Hasa was the largest oasis in Arabia. Al Qatif was also a large oasis on similar geology.

Kaseem was also a major date producing region, although it was necessary to dig shallow wells to irrigate the palms. The province contained the pale green splotch in Figure 1 in central Arabia that received 121-150 mm of rain per year. Palgrave (1871, pp. 148-9) described the land and its potential:

> The Arabic word "Kaseem" denotes a sandy but fruitful ground. Such is, in fact, the leading idea of this province. The soil, red or yellow, appears indeed at first sight of little promise. Yet, unlike most things, it is better than it seems, and wherever irrigation reaches it bears a copious and varied vegetation. Fortunately, water is here to be met with everywhere, and at very little depth below the surface; six feet or whereabouts was the farthest measure that I witnessed in any well of Kaseem from the curb-stone to the water-line, often it was less.

The land was private property owned by the families that cultivated it. In at least one case, well construction was a communal project. (Palgrave 1871, p, 145, 187). State action was not necessary to irrigate Kaseem. With water just below the surface, villages or even individual families could secure water for crops with their own efforts.

Dates were the most important crop in Kaseem. "A small cluster of palms is often the entire maintenance of a poor townsman or villager. The fruit partly serves him and his household for aliment, in which it holds about the same proportion that bread does in France or Germany; the rest, often in large quantities, is exported to Yemen and Hejāz, in this respect less favoured by nature." (Palgrave 1871, p. 149). Grain, vetches, herbs, and cotton were also grown and fruit trees were abundant. "But the extent of cultivation and tillage is limited by the necessity of artificial irrigation." (149) Taxation in Kaseem was levied on the cultivators and merchants, rather than on nomadic herders.

None of the other provinces of the kingdom had enough water to practice any significant amount of cultivation. The many descendants of Muhammad ibn Saudi who ruled one after the other in Riyad supported themselves by taxing the date growers and merchants of al-Hasa, al-Qatif, and Kaseem, whom they had conquered. The political

economy of the Saudi Kingdom was that of a bedouin Sheikh writ large.

It is in the context of this political economy that the Wahabism of the Saudi state makes sense. While most of the Arabs of Arabia are Sunnis, many of the inhabitants of the east coast–in particular those of the al-Hasa and al-Qatif oases–were Shiites. Shiites venerated saints and made pilgrimages to holy places–practices that Wahab condemned as polytheistic. Wahab argued that his followers had not only the right but the duty to defeat them and plunder them as heretics. With the Shiite provinces contributing 55% of the tax revenue, Wahabism was the perfect ideology for a Bedouin Sheikh planning to seize and exploit the great oases to the east. (Conveniently Saudi Arabia's oil fields are in the same region, so the ideology retains its utility.) According to Palgrave, Wahabism was enthusiastically embraced only by the inhabitants of the provinces that paid little tax, and many of whom hoped to gain plunder in future jihads (Palgrave 1871, p. 294-7). The Shiites of Hasa and Qatif were, of course, not Wahabis. Palgrave (1871, p. 296) thought that the inhabitants of Kaseem, while Sunnis, were WINO's-Wahabis In Name Only.

Could a large state like the Saudi state have been created in the centuries before Muhammad ibn Saud began his creation? I can see no material circumstance that would have prevented its emergence earlier. The option was there, but it was not taken until Muhammad ibn Saud forged his alliance with Wahab. In that case, the state was down to Saud and human agency.

State finances in the early twentieth century

The history of the Saudi Kingdoms supports the theory that a state could not be based on nomadic herders since they generated no production beyond their own subsistence needs. States could only be erected on the basis of productive agriculture or commerce. Early twentieth century fiscal data also support this view.

Shortly before the First World War, J.G. Lorimer's *Gazetteer of the Persian Gulf* (1908, 1915) was prepared. It was published for the colonial government in India and contained thousands of pages of information on all settlements on either side of the Gulf. Among that information were breakdowns of the revenues of many of the states of the region. Table 1 summarizes this information for states on the Arab side of the Gulf.

None of the states in the Table relied on taxing Bedouin. Kuwait was the only one that raised any money from that source. Kuwait did it in two ways. First, it received $25,000 in Zakat from Bedouin flocks. Zakat was a tax for the relief of the poor. It was obligatory for Muslims and prescribed in the Koran. Despite that support, only Kuwait succeeded in collecting any from mobile herders. The second tax was cleverer. Kuwait imposed an export tax on goods shipped to the interior. Since that would become part of the price paid by Bedouin for their cloth, rifles, and so forth, it was hard for them to evade. That tax yielded $20000.

State revenue came from other sources. Three of the emirates were large wholesale centres. European steamers and Indian dhows visited Kuwait, Bahrain, and Muscat, delivering rice, cloth, and hardware and collecting dates and pearls. These states raised half of their revenue from duties on the imports. The rest came from the production or taxation of dates and other sources related to the urban economy. Kuwait earned some revenue from pearl collections in its waters and Oman received a large subsidy from the British.

The smaller Sheikdoms in what would become the United Arab Emirates earned scarcely anything from taxing international trade. Only Sharjah had a customs house, and it brought in little money. Abu Dhabi raised some money from date gardens in the Buraimi and Liwa oases. Pearling was the most important source of revenue for these emirates.

The twentieth century saw a boom in pearl production. Pearl beds were not private property, and pearls could be taken by anyone with a boat and a crew. With completely open access all rent would have been dissipated, as with grazing in the desert. One way to prevent rent dissipation is for a regulator to charge a fee for all those pearling. The Sheikhs levied these fees on boats pearling in the waters they claimed. This revenue supported the smaller emirates and was important to Kuwait as well. It is surprising that Bahrain derived such a small share of income from pearling fees since it had the most productive pearling banks and more boats than any state shown in the table. Bahrain did collect some fees, but most boats were exempt.

The revenues collected by these states did not represent a large share of resources. Wage labour was not common in many of the Gulf Sheikhdoms, but wages are quoted for masons in Bahrain, which was larger and more commercially orientated. In 1911, the British Political Agent reported that masons received a minimum of 3 rupees per day (UK Board of Trade 1913, pp. 10-11). A calculation of the cost of bare subsistence indicates that a mason working 250 days in a year could have supported a family of four people at twice subsistence–a representative value for the middle east at that time. At the mason's annual wage, the income of Bahrain would have enough to hire 400 masons. Including their dependents, this work force would have amounted to 1.6% of the population of Bahrain (Lorimer 1908, Vol. II, pt 1, p 238). A similar calculation for Abu Dhabi gives a larger share of 3.8% (Lorimer 1908, Vol. II, pt 1, p. 408). States along the Gulf were "small" in the early twentieth century.

Falaj building and the state in Oman

Oasis agriculture was a basis for states in Arabia since well watered land was scarce and commanded a rent that could be taxed to fund soldiers, officials, and the royal household. Some land, as at al-Hasa, was irrigated naturally by springs and other land, as in Kaseem, required minimal investment by the local inhabitants to make it productive. But in many cases, substantial investment was required to irrigate land, and in Arabia that task was

undertaken by states. In this, they were fulling the role that Marx and Engels had assigned to oriental governments.

The early states in Yemen had led the way. They derived some of their income by taxing the transit trade across their territory, but they also raised revenue from agriculture made possible by their irrigation investments. The classic case is the great dam at Marib, the capital of the Sabaean kingdom. Earthen dams were constructed at the site as early as 1750 BCE, while the final stone dam was built in the eighth century BCE. The dam crossed the Wadi Dana that ran from the Yemen mountains into the Arabian desert. Monsoon rains led to floods in the wadi that were deflected by the dam onto fields where crops were grown. Up to 9600 hectares could be double cropped with this system, and the food produced from these fields fed the city. The state built and maintained this system (Hoyland 2001, pp. 87-8).

Oman is another example. State run irrigation in Oman began during the Sassanian Empire. The technology differed from that used at Marib. In Yemen, aflaj (singular falaj) were built to bring water from high in the mountains to hillside terraces or a valley floor that was to be irrigated. A falaj could be dozens of kilometres long and consisted of a channel that ran through tunnels, over aqueducts, and along channels in the earth. They had to be carefully constructed so that they ran continuously downhill at a moderate angle over their entire length. In Persia there were also thousands of similar structures called qanats, although qanats were usually entirely under ground. Aflaj were substantial structures that required resources beyond the means of villagers–so in Arabia the state was involved.[9]

Between 550 BCE and 651 CE, Oman was administered by the Achaemenid, Parthian, and Sassanian empires. Wilkinson (1977, pp. 122-36) has argued that most of the aflaj in Oman were built by the Persians in this period–although others differ–and dates would have been a major crop grown on fields watered by them, but beyond that we know little.

More is known about what happened later. Conversion to Islam in the mid-seventh century led to a revolt that drove out the Persians. During the eighth century, the Imamate was established in central Oman under which an imam was elected spiritual, political, and military leader. The Imams provided direction but not administration, and Oman became a collection of feuding tribes. When Portugal expanded its possessions in the Indian Ocean in the early sixteenth century, it met little resistance in Oman and occupied all of the major ports, thus isolating the interior from the coast. The empire did not last long as it came under assault by the English and Dutch East Indies Companies as well as local nationalist groups. The fall of the Portugese fort in Hormuz in 1622 to a combined English-Persian force was a turning point (Steensgaard 1974). It was followed by the election of the first Yarubid Imam in 1624. This dynasty ruled the country until 1742. The Yarubids did what earlier Imams

[9]Many qanats were constructed in Persia during the early Islamic period. These were not built by the state but rather by rich individuals who were property developers. They found an unoccupied valley and built a qanat from nearby mountain to water it. According to sharia law, the water from the qanat belonged to the developer as did the land that had been converted from waste to farmland. The developer recruited rent paying tenants to till the soil (Bulliet 2016, pp. 1-68).

had failed to do. They gradually recaptured all of the cities and forts occupied by the Portugese and re-united the country under an administration that had enough capacity to end tribal strife and build infrastructure.

The result was a boom in date production. It is unfortunate that records of the prices of dates and dibs–the sweet liquid that could be pressed from the fresh fruit–around the Indian Ocean have not survived in the early modern period. Prices would show whether demand was rising in India, for instance. It is clear, however, that demand was rising in the interior of Oman. Reuniting the country and establishing domestic order opened up foreign markets and cut transport costs to Suhar, the leading port for exports.

The rise in prices in the interior made it profitable to plant date palms and construct the presses to produce dibs in places as far inland as the Buraimi Oasis in al-Ain (Power and Sheehan 2012). Expansion took place across Oman. In 1696, John Ovington (1696, p. 423) reported that "the Staple Commodity of the Country is Dates, of which there are whole Orchards for some Miles together. They have so much plenty of this Fruit, for which they have so ready a vent in *India*, that several Ships are sent thither loaded from hence without any other Cargo." The Yarubid government played a pivotal role, for it financed the construction (or re-construction according to Wilkinson 1977, p. 126) of falaj irrigation schemes across the country.

> [The Imām Sayf b. Sultān al-Yaʿrubī] improved a large portion of Oman by making water-courses and planting date and other trees… he had acquired one-third of all the date-trees in Oman [over the course of his reign, c. 1692-1711]… he repaired the al-Sāyighy canal at al-Rastāk, the al-Yazīly in the Zāhira, the al-Kūthir at al-Hazm, and the also the Barazamān and al-Misfāh canals… [He] planted at Naʿmān Barkah 30,000 young date-trees and 6,000 cocoa-nut trees, besides which he planted at Biʾr al-Nashwa, al-Rāssa and al-Mandzarīya. (Power 2018, p. 230, who annotated it.)

Building the falaj systems represented a major investment. The return on the investment came through a rise in the value of oasis properties, and a significant share accrued to the Imam as a property owner. The gains were distributed somewhat more widely including relatives of the Imam, as well as merchant groups, who also bought oasis real estate. Land values were pushed upwards and protected as new crops were introduced to cultivators, and villagers were encouraged to undertake the falaj maintenance work (Wilkinson 1977, p. 126).

The investment and subsequent increase in production required a bigger work force. Population growth in response to higher labour incomes was one possible source, but it would be a long time coming since it took close to two decades to produce another worker. A reallocation of labour from herding to agriculture was another possibility, but it was bound to be slow as well.

Slavery was the solution to the labour supply problem since slaves were available in

elastic supply at a low price in east Africa. Zanzibar had been a Portugese possession since the early sixteenth century, and it was the major export point for slaves. After the Omanis expelled the Portugese, they expanded their own possessions in the Indian ocean and in 1698 conquered Zanzibar and Mombasa, thus internalizing the slave trade. In 1811, it was estimated that 6 - 10 thousand slaves a year were exported from Zanzibar. Around 1840 another estimate has it that one third of Oman's population were black slaves (Brucks 1856, p. 633), and in 1902 that all of the work in the date gardens in the Buraimi Oasis was done by black slaves who amounted to half of the population (Zwemer 1902, p. 62).

The Imams also profited from the date economy by taxing slave imports. Brucks (1856, p. 633) reports that Oman's revenues in the first half of the nineteenth century included $80000 per year from the slave trade. Kemball (1856, p. 649) states that there was a tax of $.50 on every slave landed in a Gulf port.

Doesn't the widespread use of slaves in Omani agriculture contradict my argument that slavery was impractical in Arabia since the working population eked out only a subsistence income? The contradiction is more semantic than real. In the Caribbean, slaves were given a below subsistence income (Burnard, Panza, Williamson 2019) and worked to death since they could be replaced at a very low price–that is at a price below the cost of raising a slave child to adulthood–and since they were performing unskilled work, so a new arrival was just as productive as a long standing resident. It was different in Arabia. In the first place, we are not talking about the desert, which was common property, but rather about the much more productive oases than were privately owned. Moreover, slaves in date gardens performed highly skilled work that required them to show initiative. They were best motivated by making them share croppers (Fenoaltea 1984, Temin 2013). Indeed, they were often freed since manumitted workers remained bound to their masters as were their children. The slaves were encouraged to marry and raise families since boys would help their fathers and learn to become date gardeners as they grew up. Newly arrived slaves were unskilled and, hence, would have had to learn to garden as they worked, which made them less productive and less desirable workers. The great advantage of slavery to the owners of date gardens was that it allowed a rapid expansion of the labour force which was essential in responding to an export boom.

In Oman the state actively played the role that Engels and Marx assigned to it. The state built and operated irrigation systems. This was done in the context of a global economy–expanding exports gave impetus to date production and the import of slaves provided the labour that complement the falaj investment and property development that were financed by the state.

Of course, it did not have to be like this. The economic circumstances were right for an irrigation state to be formed in the seventeenth century. What was required was a ruler with enough skill to bring the country together and enough foresight to invest in irrigation. The Circumstances created this option, but human agency was necessary to realize the opporutnity.

From the Sand Up

The economic and political structure of 'traditional' Arabia makes sense if we begin our analysis with the natural environment and reason upwards from there. Most of Arabia was desert. There was little scope for human agency in determining the basic patterns of life. Mobile herding was the only viable activity, and extreme aridity meant that property had to be communal. Inequality was limited since land could not be accumulated. States were impossible, so political life centred on tribes. The struggle for existence meant that everyone was poor, and the variability in rain fall meant that there were usually people who had lost everything and were desperate. The upshot was raiding and plundering.

It was only where there was water that these conditions could be ameliorated. Water meant date gardens plus some other crops and cows. Watered land was scarce and so commanded rent and was privatized. Private rent paying land created permanent inequality. Dates and pearls found markets outside Arabia, and booms in the export of these commodities unleashed big increases in the demand for labour that were met by importing slaves. Since slaves were skilled and, in the case of pearl diving, hard to monitor, positive incentives were more effective motivators than the lash (Dari-Mattiacci 2013), so Arabian slavery were more 'benign' than Caribbean slavery.

The income from the ownership and taxation of date gardens, pearls, and international trade provide income sources that could finance states. All Arabian states were based on these revenue sources. Since agriculture–and with it the tax base–could be broadened by building irrigation, states did that when projects were too big for local groups to manage. That pattern of state activity was what Marx and Engels had in mind with the 'Asiatic mode of production.' It was important in Yemen and Oman but not elsewhere in Arabia where political organization took different turns for different reasons.

Into the Twentieth Century I

A famous Marxist thesis is that capitalism is a progressive mode of production; that is, unlike previous modes, capitalism gave rise to incentives that led to capital accumulation and technical progress. The result was economic growth, although the gains were not equally distributed.

Arabia, as I have described it, certainly counts as a 'pre-capitalist' mode of production. There were three ways in which the 'nomadic mode of production' retarded economic development.

The first was the limited potential for generating savings to finance capital accumulation. Land in the desert was common property, and the herders were family operations without employees. The nomads generated no surplus for accumulation. There

was private property in the oases, and agriculture did generate a surplus, but it was either spent on a sheikh's household or purchases from local craftsmen (Figure 4) or it was taken by a Bedouin tribes, in which case it was dissipated in population growth (Figure 5). Only the former division had any potential for contributing to capital accumulation. Arabian economies had some capability of saving and investing in palm gardens and slaves when demand for dates increased but much of that was due to state taxation since private resources were limited.

Second, tribalism retarded the movement of labour out of the herding economy into modern sectors. Tribal membership conferred material benefits on tribesmen who remained in the tribal territory: these included some mutual assistance in the event of economic crisis as well as protection vis-a-vis people outside the tribe. In addition, attitudes that were functional for Bedouin made it difficult for them to accept other sorts of employment. These attitudes included contemp for people they had customarily raided: farmers, townsmen, or people who worked long hours at hard labour under the supervision of others. Bedouin found it comparatively easy to swap camels for truck driving, and they preferred high status jobs where they did not have to work long hours to craft and labouring positions. Poverty might eventually force them to take any job, but their attitudes about their place in the world and desirable work–'circumstances transmitted from the past'–inhibited rather than promoted the release of labour to the growing parts of the economy.

Third, while the nomads could operate their herds in regions with less than 200 mm of rain per year, which was the minimum for growing grain, they could be even more successful in raising animals when the rainfall was higher. That meant that they always had an incentive to pasture their stock on the crops of farmers and take over the land (Bates 1971, p. 114). Second, they also had an incentive to treat caravans and towns in the same way that they treated oases–namely to demand income from them. Third, droughts in the desert intensified these incentives. If there was too little water and grass for the sheep and camels to survive, what else could the nomads do but pasture their stock on cropped fields?

The eighteenth century saw a northward movement of the Anaza and the Shammar tribes from Arabia into Syria and Iraq. The Fertile Crescent, the arch of land across Syria and Iraq that received 200-400 mm of rain per year, was badly affected. The Ottoman army was no match for the Bedouin, and the farmers could not defend themselves. Some farmers paid off the herders, but hundreds of villages were abandoned and much land went out of cultivation. Caravans crossing this region were also assessed large sums. Even towns like Hama and Aleppo paid protection money to fend off raids by nomads (Issawi 1966, p. 206, 215, 258-68, Lewis 1987). Malthus noted these problems as follows:

> The peasants of the frontier provinces of Syria, Persia and Siberia, exposed, as they are, to the constant incursions of a devastating enemy, do not lead a life that is to be envied by the wandering Tartar or Arab. A certain degree of security is perhaps still more necessary than richness of soil, to encourage the

> change from the pastoral to the agricultural state; and where this cannot be attained, the sedentary labourer is more exposed to the vicissitudes of fortune than he who leads a wandering life, and carries all his property with him. Under the feeble, yet oppressive government of the Turks, it is not uncommon for peasants to desert their villages and betake themselves to a pastoral state, in which they expect to be better able to escape from the plunder of their Turkish masters and Arab neighbours.

None of this was good for economic development.

The upshot was that economic development required a state that had enough military power to control the nomads. Indeed, all countries in the middle east adopted a long term policy of 'settling the tribes.' They could become farmers, or run small businesses, or work as wage labourers in the ballooning cities. All of these activities were at least as productive as nomadic herding, and so they immediately increased GDP. Businesses might also generate investable savings. Dismantling the nomadic mode of production was an early institutional reform that promoted modern economic growth.

Into the Twentieth Century II

Oil pulled Arabia into the twentieth century. The first wells were drilled in the 1930s, and production expanded enormously in the decades after the Second World War. While much has changed, much remains the same. The oil economy operates with the institutions of the traditional economy. Oil has replaced water as the source of state income. While oil is not food like dates, it is converted into food and everything else by trading in the world market. Three similarities between the present and the past are particularly important.

First, oil comes from the desert and as such is the common property of the tribe. While the Sheiks have taken charge of the administration of oil, as was the custom with common resources, and have become enormously rich in the process, they act as though the traditional communal ownership still obtains. So much of the oil wealth is spent on development to provide the tribal members–now rebranded as citizens–with health services, education, housing, jobs, and income. Much of the latter includes dispensing largesse as in the past. These arrangements survive not because they are 'traditional' but rather because they continue to meet the needs of the Sheiks and of the citizens. The result is that all of the Arabian states with oil reserves have had much more successful development trajectories than many oil rich countries in other parts of the world.

Second, not all arrangements promote equitable development. While slavery has been substantially abolished (under external pressure), the need for labour in a commodity boom has led to its replacement by foreign contract labour. This is paid enough–but only enough–to make the move to Arabia worthwhile, and many regard the arrangements as tantamount to slavery.

Third, there is an important feature of the Saudi state that makes development less than fully inclusive, and that is the role of Wahabbism. As it happens, the Ghawar oil field, the largest in the world, is located only a few kilometres west of the Al-Hasa oasis in the Shiite part of the country. The remain oil reserves are in the same region. The continued plundering of Shiite resources remains the economic bedrock of the Saudi state, so the Wahabbi ideology retains its utility. It is not a coincidence that the sacred sites of Islam are ruled by a state espousing a reactionary version of the religion.

Table 1

Revenue Sources of Arab States on the Gulf, c. 1907

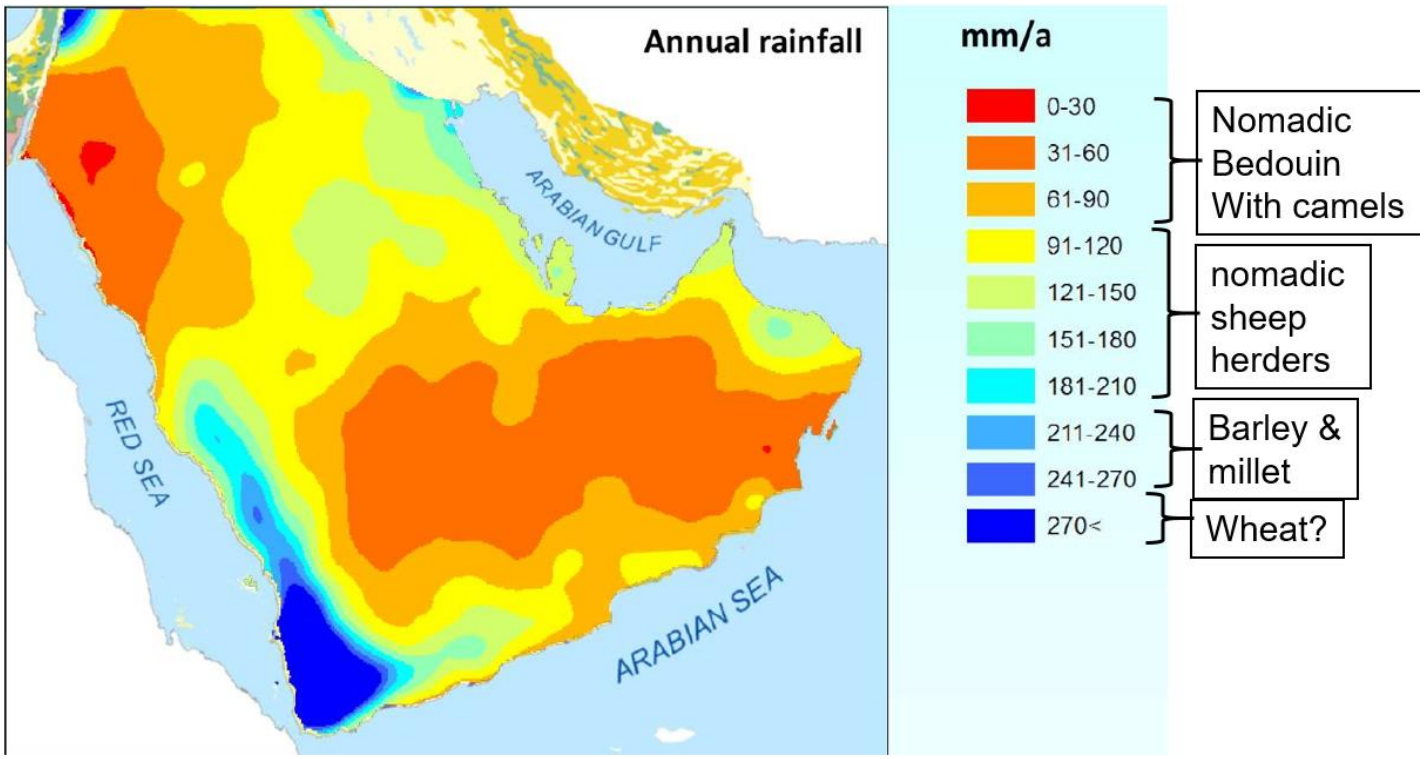
		import customs	pearls	dates	Bedoun/ sheep	judicial	town fees	susidy	misc	total
Kuwait	MT$	150000	67000	108000	45000	6000	23000			399000
Bahrain	MT$	111111	8889	74074		14815	10370		2963	222222
Oman	MT$	271852		45926			1296	64000		383074
Abu Dhabi	MT$		62000	10500				3000		75500
Dubai	MT$		38074							38074
Sharjah	MT$	6519	17333	148					741	24741
Ajman	MT$		3407	148						3556
total	MT$	539481	196704	238796	45000	20815	34667	67000	3704	1146167
		47%	17%	21%	4%	2%	3%	6%	0%	
wholesale centres		532963	75889	228000	45000	20815	34667	64000	2963	1004296
		53%	8%	23%	4%	2%	3%	6%	0%	
trucal Oman		6519	120815	10796	0	0	0	3000	741	141870
		5%	85%	8%	0%	0%	0%	2%	1%	

Notes: approximate annual revenue is in Maria Theresa dollars.

Source: Lorimer (1915, pp. 1078, 251, 1421-3, 409, 454, 1760-1, 53)

Figure 1

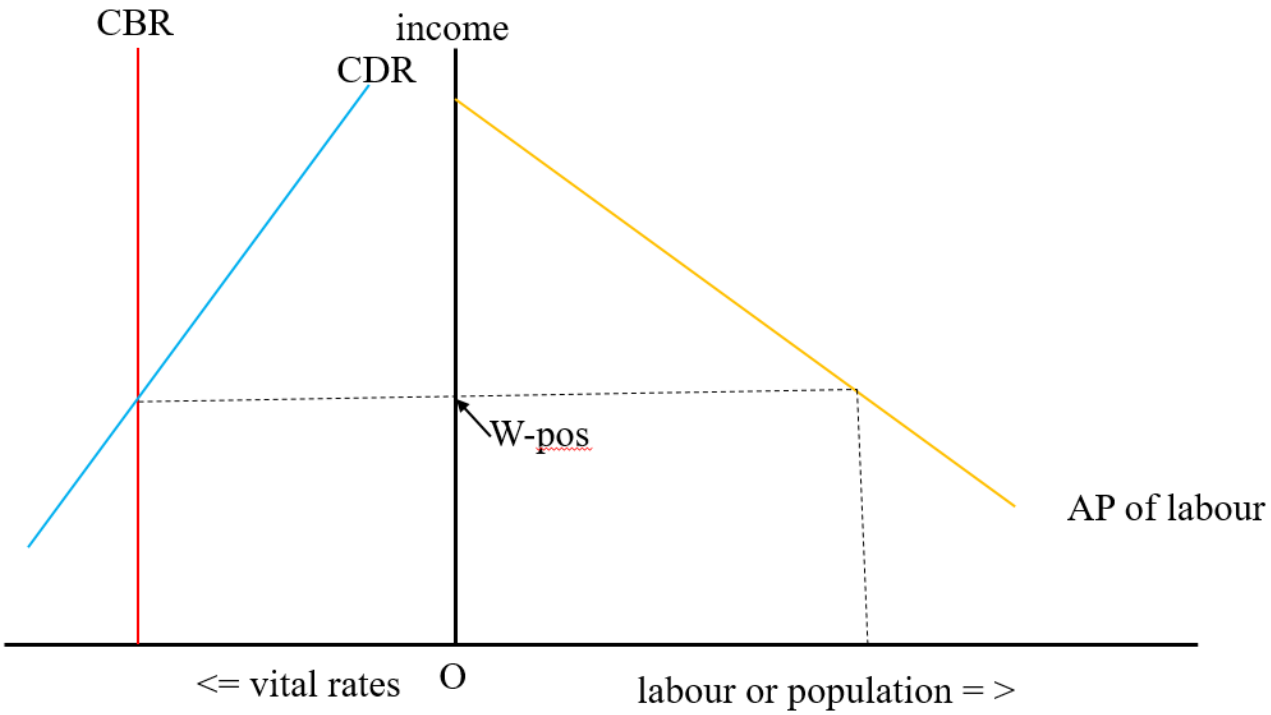
Rainfall and Economic Potential in the Absence of Irrigation



Source: Saad Al-Tokhais (2013, slide 8)

Figure 2

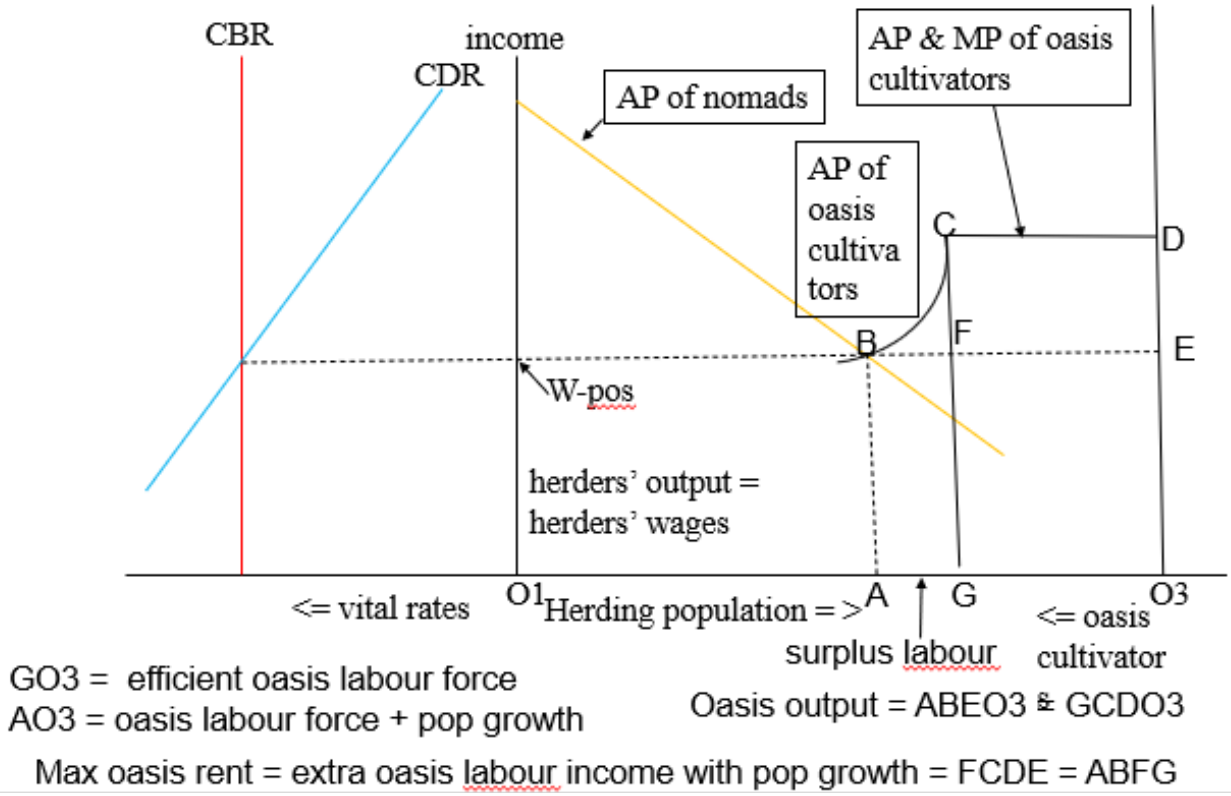
Malthusian Demographic-Economic Equilibrium with Common Property



Notice (1) it is the average product of labour, not the marginal
(2) all income goes to the wandering families—no surplus for state!
(3) equilibrium income is subsistence

Figure 3

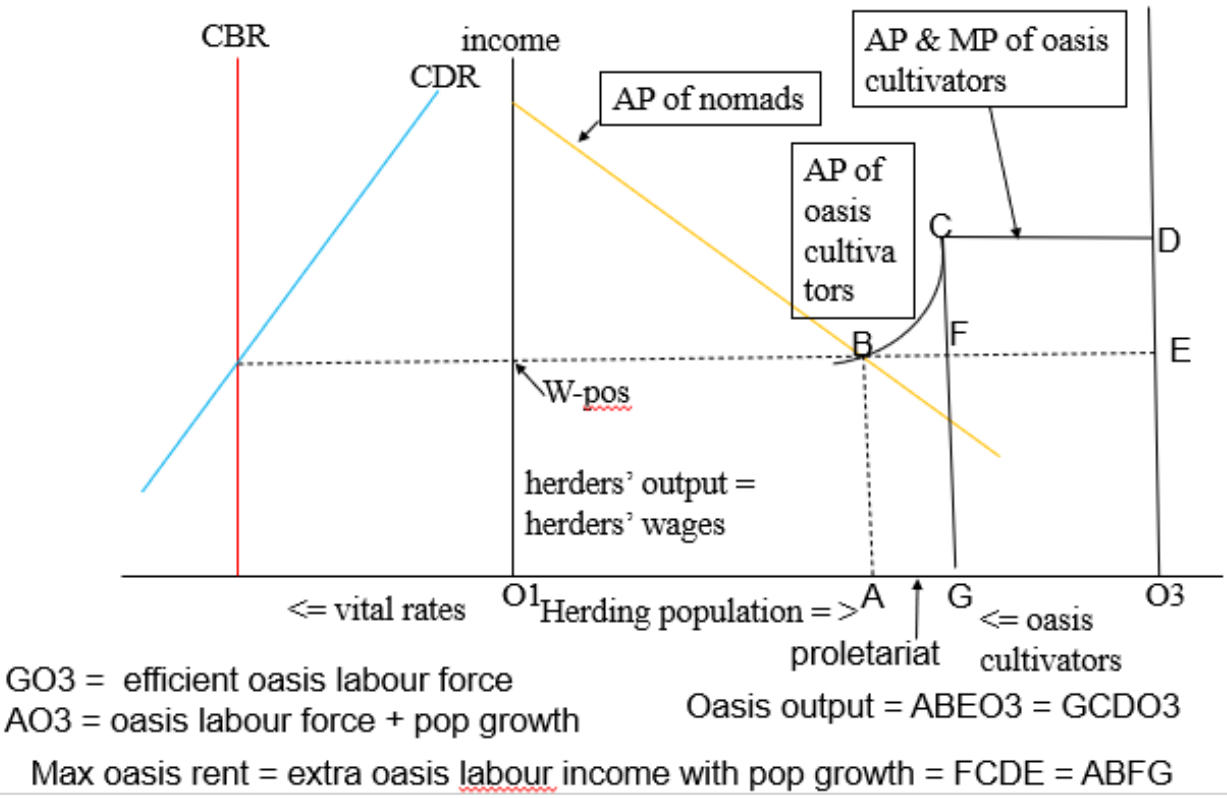
Equilibrium of Nomadic Herding and Oasis Agriculture when both have common property



Note: everyone earns the same income W-pos. Oasis land commands no rent.

Figure 4

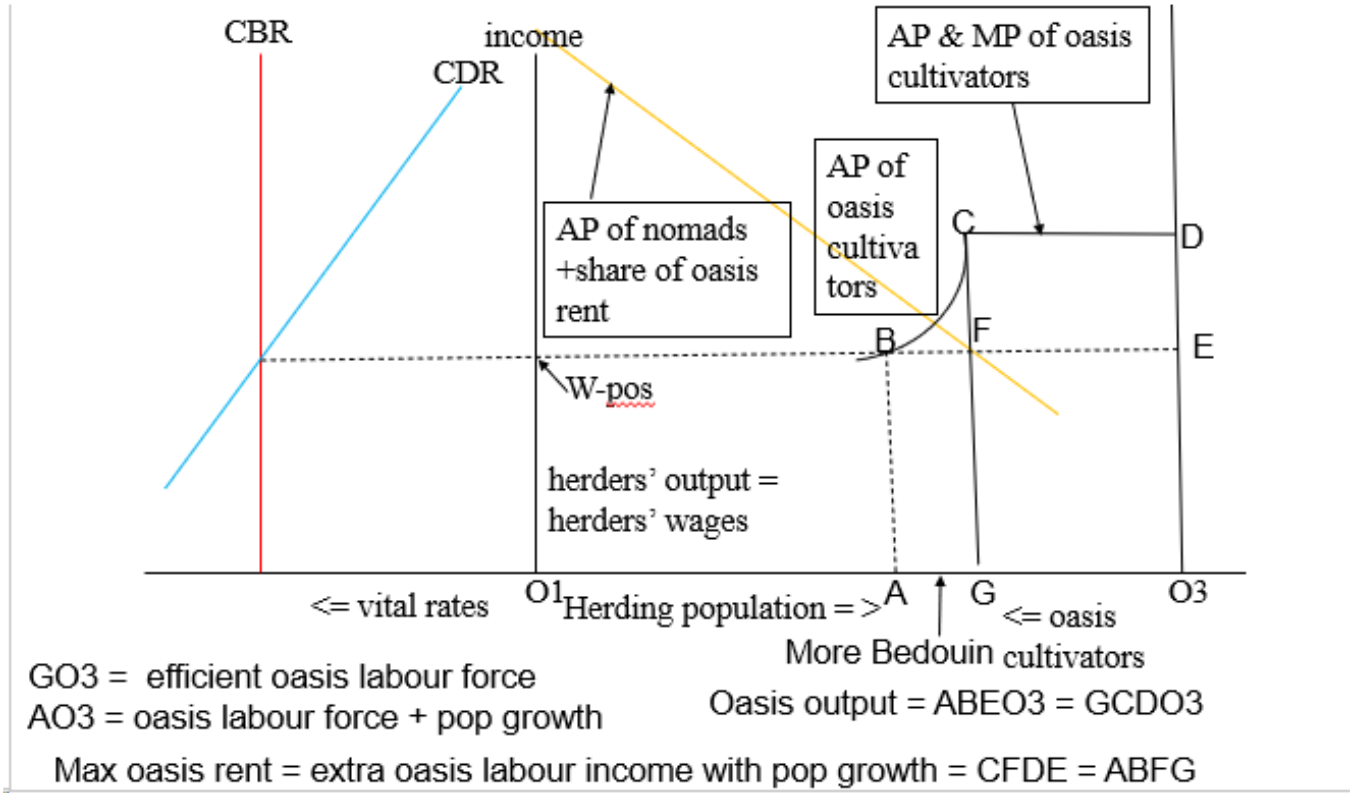
Equilibrium if the Oasis is Private Property and the Sheikh is resident



Note: (1) Oasis land now commands rent–so inequality can rise.
(2) agricultural employment in the oasis falls
(3) the oasis cultivators who were forced out of agriculture became a proletariat.
(4) the diagram is affinities to Cohen and Weitzman (1975).

Figure 5

Equilibrium if the Oasis is Private Property and rent is divided amongst Bedouin tribesmen



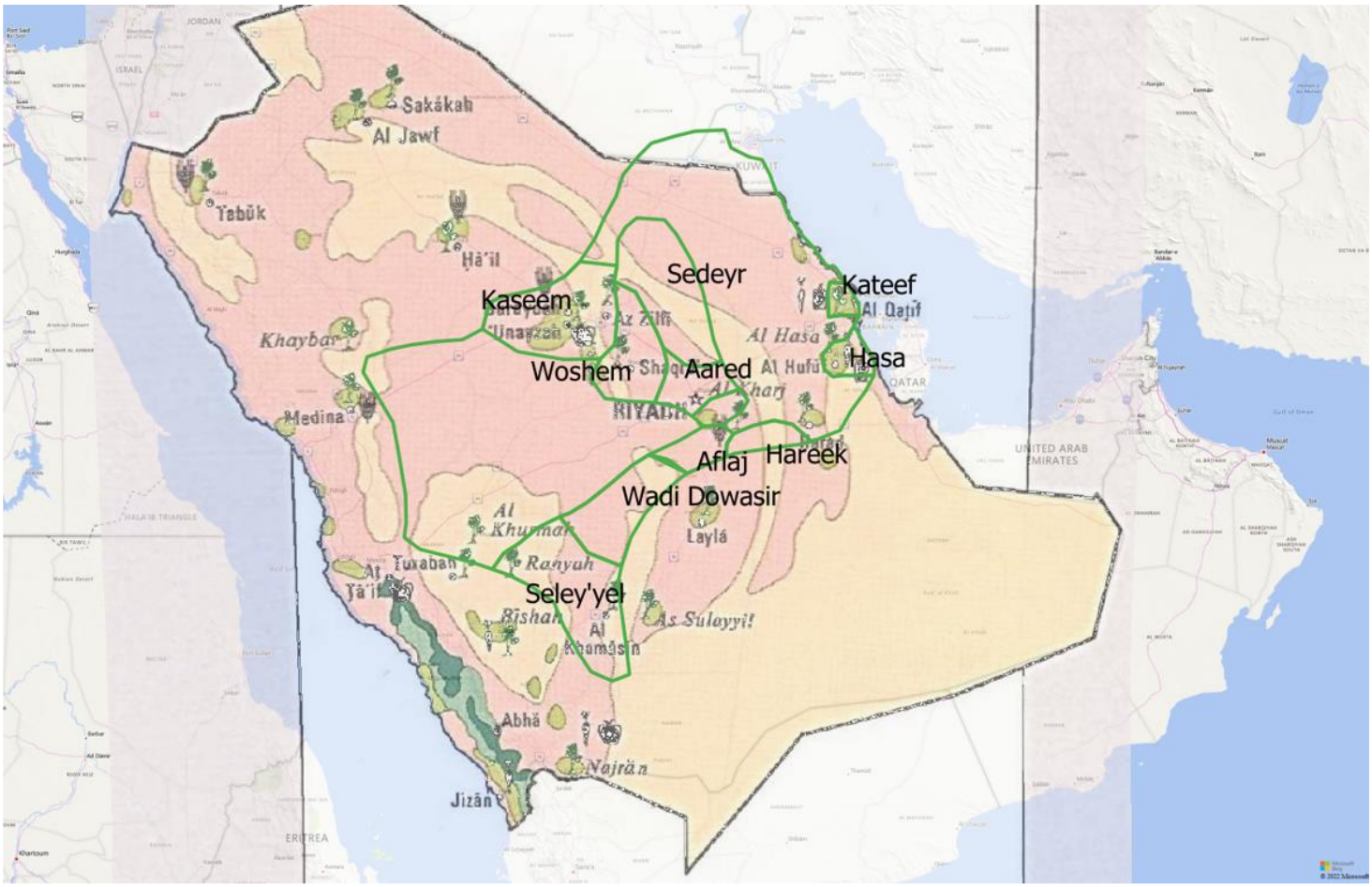
Note: (1) Oasis land now commands rent and it goes to the Bedouin tribe

(2) Bedouin incomes rise–represented here by a rise in the average product of their labour which now includes a share of the rent.

(3) Bedouin population expands to G where AP plus rent share = W-pos

Figure 6

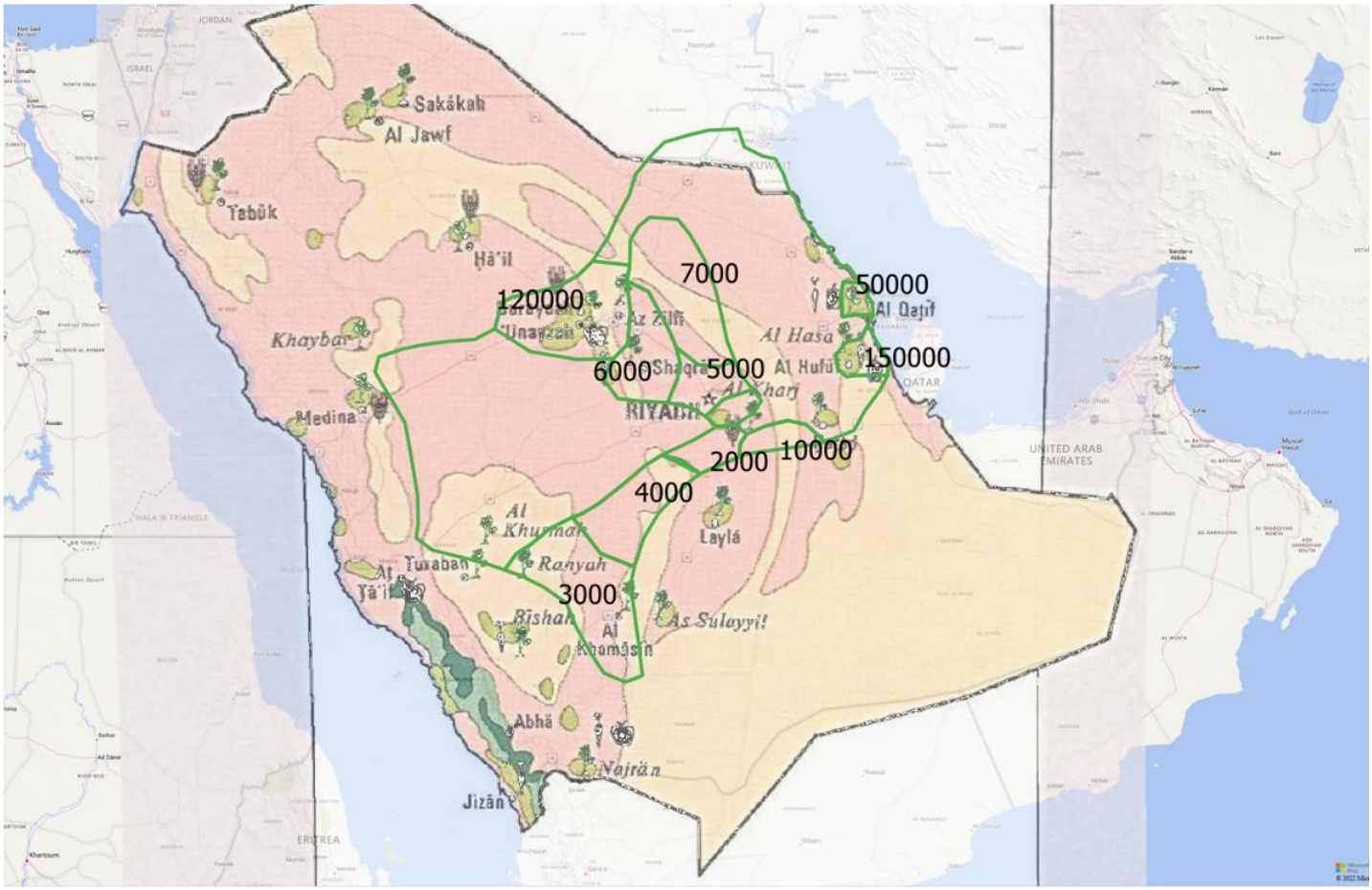
Approximate boundaries of the Second Saudi Kingdom and its Provinces



Note: Boundaries are shown by green lines.
Source: Palgrave (1871, foldout map).

Figure 7

Taxes Collected in Each Province in Rials



Note: taxes are in Rials. One Rial is approximately equal to one dollar.
Source: Palgrave (1871, p. 300).

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