

1 Title: Constraining risk narratives: a multi-decadal media analysis of drinking water  
2 insecurity in Bangladesh

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## Abstract

Sustainable development agendas in Bangladesh are frequently framed in the media as being constrained by water insecurity and the decision-making challenges posed by multiple risks of both natural and human origins. This paper suggests, however, that the reverse also occurs: the boundaries of risk narratives constructed by the media serve to mitigate public concerns, reinforce national development agendas, and legitimize structural changes of the dominant institutions. These relationships are explored through a set of risk-discourse filters which merge content analysis approaches with the defining phenomena of risk society theory. Advancing an inventory of 3,211 drinking water specific articles published by the Ittefaq newspaper between 1980 and 2016, the analysis identifies three temporal clusters of discursive behaviors and content focus which contribute an historic perspective of how Bengali newspapers construct, define, and react to multiple water safety crises, specifically cholera and arsenic. The risk-discourse filters suggest that the media's problematization of drinking water remains aligned to nation-building processes and the political narratives of development successes defined by international targets. The results map the discursive distribution of concerns across geographies and risk positions, extending interpretations of how and where blame is allocated. The inventory reveals an identifiable temporal and content pattern of inclusion and exclusion of topics and draws links to the overall institutional dynamics of political and economic change.

## 1. Introduction

In Bangladesh, the national narrative around sustainable development is often distinguished by the collective challenges to manage water variability, maintain service reliability, and reduce safety uncertainties (Paprocki 2018; Black 1990; *The Economist* 2018; van Geen 2008). Global forums of scientific discourse frequently characterize Bangladesh as one of the world's most water insecure nations, a portrayal emerging from a complex confluence of both environmental hazards and unintended consequences of anthropogenic actions (Smith, Lignas, and Rahman 2000; van Geen 2008; Sultana 2012). At the same time, domestic forums of public policy seek to portray Bangladesh as a successful nationalist project, with the state protecting population from environmental dangers and enabling ongoing innovation in development approaches relevant to national and global interests (Faaland and Parkinson 1976; Hossain 2017). These narratives represent a tension between the competing voices contributing to the construction and interpretation of publicly debated drinking water risks. However, it also raises the question of how the public narratives incorporate and mediate the contestation of different spheres of Bangladeshi and international institutions, interests, and information systems.

Bangladesh is located in one of the most densely populated and engineered deltaic plains in the world, a complex physical environment of rivers and man-made canals situated in the foothills of the Himalayas. Academic studies characterize the country by the high levels of climatic variability due to the annual monsoon cycles from the Bay of Bengal (NIPORT 2013). Scientists and experts often contextualize their research as a response to the severity and estimated scale of the depicted environmental crises, from some of the comparatively high global maternal and infant mortality rates in the 1970s related to cholera outbreaks to the public acknowledgement of arsenic contamination in the 1990s (Smith, Lignas, and Rahman 2000; Black 1990). The

79 discovery of naturally occurring arsenic in the shallow aquifer levels attracted international  
80 attention to the uncertainty around who is at-risk, a scale estimated to be in the tens-of-millions  
81 and defined by the specific threshold levels applied (Johnston and Sarker 2007). The extensive  
82 technocratic focus emerged from what Hossain(2017) argues is the global role of Bangladesh as  
83 an aid laboratory of national experimental policy, one which is characterized as repeatedly  
84 achieving multiple development and innovation successes.

85 International newspapers have provided an external voice to legitimize and disseminate these  
86 technical concerns. The widely cited 1998 New York Times article’s description of arsenic  
87 contamination shocked the world with its severe portrayal of the situation by stating:  
88 “Bangladesh is in the midst of what some experts say could be the biggest mass poisoning in  
89 history”(Bearak 1998). Prior to 1971 national independence, water resources were characterized  
90 as a source of prosperity and fertility, an element of the romanticized national cultural identity  
91 labeled *Sonar Bengal*, or Golden Bangladesh (Hossain 2017; Hanchett et al. 2014). Hossain  
92 argues the national narrative around water security was re-framed after independence as a  
93 controllable danger, one which the new state pledged to manage. This reframing connects to  
94 what Black(1990) argues is the state’s dual commitment to rural constituents and international  
95 aid structures seeking to solve a problem, specifically to reduce infant mortality blamed on  
96 cholera epidemics and unsafe water systems. The positive and negative framing suggests a  
97 divergence of how water is problematized between overlapping national development narratives,  
98 one advancing a positive social and political interpretation of water as critical to the nation’s  
99 social and political development, and the other issuing techno-scientific warnings of increasing  
100 exposure to harm and future dangers.

101 Within the continuum of theories on the nature and definition of risk, this paper explores theories  
102 that risks are negotiated through individual and collective processes reconciling definitions,  
103 reproducing awareness, disseminating a specific portrayal of past decisions, and constructing  
104 future dangers (Beck 2009; Luhmann 1990; Lupton 1999; Beck 1992). Beck defines risks as  
105 potentially catastrophic, manufactured uncertainties which are socially constructed, socio-  
106 technically contested, and socio-politically criticized across institutional and discursive dynamics  
107 (Beck 1992; Simon Cottle 1998). This view is predicated on the argument that the concerns,  
108 specifically drinking water in this paper, are a neutral concept until a group or population attach  
109 technical, political, cultural filters to denote ‘good’ and ‘bad’ attributes, or decisions (Ewald  
110 1991; Douglas 1992). This rendering process necessitates mechanisms to make risks imaginable  
111 as they are not experienced (Beck 1992, 28). This occurs across multiple discourse fragments,  
112 bodies of texts, and from multiple discursive planes, or institutional locations from which the  
113 discourse happens (Wodak 2001).

114 Despite a broad consensus around the discursive role in manufacturing risk, communication  
115 studies scholars have identified gaps in the methodological toolkits and definitional frameworks  
116 for comparable analysis. Specifically, Bakir(2010) identifies the need for comparable macro-  
117 view longitudinal studies across multiple socio-spatial contexts to interrogate the historic  
118 evolution and construction processes. Further, Kristiansen(2017) documents that recent  
119 scholarship varies in their definitional understandings rendering empirical methods  
120 incomparable, limiting analysis across spatial contexts and concerns.

121 This paper therefore seeks to understand not only how, but also why, the media renders certain  
122 risks visible and knowable. This builds from Beck’s risk theories to design a replicable approach  
123 for future multi-context comparisons using nuanced risk-discourse filters to identify the factors

influencing the construction and constraints of the public narrative. To do this, the paper attempts to understand how Bangladesh's drinking water narratives evolved within newspapers texts and how discursive tools were deployed to delineate, categorize and exert control over this formation process. This has implications for the allocation of risk responsibility across multiple actors and shaping expectations for collective and private actions to mitigate uncertainty and insecurity.

## 2. Manufacturing risk: A merged framework

The following sections propose a framework which merges two broad areas of academic inquiry: the features defined within Beck's(1992) theories of risk society, and the discursive filters employed within communication studies, specifically by Herman and Chomsky(1988).

### 2.1. Media and discursive analysis framework

Building from critical discourse analysis approaches which provide tools to locate discourse within the broader socio-cultural context, this study narrows in on methods used by communication and media studies scholars to understand how various themes are located within multiple discourse fragments, ranging from formal government policies to techno-scientific papers to print news to audio-visual content to new online social media. These inventory and article coding tools enable comparative analysis of how the public agenda setting processes respond to or are shaped by institutional priorities (Entman 1993; Painter, Kristiansen, and Schäfer 2018). Media studies have focused on what Bakir(2010) described as four key approaches: events, framing, newsworthy, and biases. This paper seeks to expand these content analysis methods into a systematic framework to delineate the context, formation, and contestation of the dominant narratives.

Herman and Chomsky(1988) used critical discourse analysis techniques in the 1980s to generate a critique of media performance. Building on Lippmann's(1922) influential observations that



media discourse is used as a tool to manufacture various forms of social and public consent, Herman and Chomsky argue that the media serves a specific societal purpose of “inculcating and defending the economic, social and political agenda of privileged groups that dominate the domestic society and the state”(Herman and Chomsky 1988, 298). Their critique in the late 1980s, known as the “Propaganda Model”, provided a sharp contrast to the prevailing American liberal-pluralists view of media as guardians of “public interests and watchdog on the exercise of power” (Mullen 2010). This paper acknowledges the relevance of this work for broader political critiques but seeks a different application of their work, focused instead on how the structural elements are utilized to construct risk narratives in a very different institutional context of Bangladesh.

Herman and Chomsky based their work on the assumption that the mass media serves as a “system for communicating messages and symbols to the general populace...that inculcates individuals with values, beliefs and codes of behaviors that will integrate them into the institutional structures of the larger society”(Herman and Chomsky 1988, 1). To that end, their model proposes five main strategies and practices of the mass media: ownership structures, financial revenue sources, bias towards dominant sources of information, flak or negative push back, and use of fear as a control mechanism (Mullen 2010).

This paper builds from the range of structural and discursive tools used to analyze the media. They include the frequency and selection of topics; the length and detail provided to a story; the position and framing of articles within the overall presentation of news; the use of external citations to legitimate concerns; role of experts to filter information; the emphasis and tone to build trust or moderate interest in a topic; and the articles discursive allocation of responsibility and interpretation of action (Herman and Chomsky 1988, 298).

This paper explores the alignment between components of risk theory and media analysis tools. The alignment of these approaches is summarized later in Table 2 and used to define the coding methods for the newspaper inventory.

## 2.2. Defining components of risk society

This paper's analysis is situated within the process which Beck (1992) described as a dynamic competition of rationalities between the organs of public life. Beck, along with other scholars, has argued that public media discourse has historically been a dominant voice defining and propagating risks perceptions (Dean 1999; Anderson 2006; Beck 2006b; Simon Cottle 1998). Beck argued that the risk definition process has the power to influence the macro-evolution of modernization, as well as socio-economic and political development (Beck 1992, 56). Beck further explains the rationality of the techno-scientific approach, which quantifies uncertainty using probabilistic estimates, as a form of future-making that results in controllable and distributable forms of risk imaginaries. Although quantified in language of probabilistic hazards, vulnerabilities and exposures, he argues that most risks remain invisible in the public consciousness until negotiated within a process of collective knowledge production and public legitimization (Beck 1992, 71).

Beck's theories were criticized for not providing empirical or replicable methods explaining the risk formation process within public discourse (Mythen 2005; Simon Cottle 1998). A series of recent articles have sought to address an element of this gap by merging media studies methods with multiple risk theories, although largely focusing on the thematic topic of global climate change and nuclear power (Painter, Kristiansen, and Schäfer 2018; Adger et al. 2001). Several papers, specifically Cottle(2014) and Anderson(2006) extend Beck's analytic framework to deconstruct the discursive process of risk production, while others like McEvoy and

Wilders(2012) offer empirical studies. Although these papers offer important interpretive analysis, they have not generated replicable tools for longitudinal assessments.

Building from previous papers application of Beck's risk features to the construction of public narratives, this paper identifies the following core features from Beck's theories to be integrated into discourse analysis frameworks (Beck 1992; Beck 1995; Beck 2006b; Beck 2013)

- the production and controllability of uncertainties;
- the winners and losers of which topics are identified and debated within risk narratives;
- the definition of safety thresholds and process to secure social acceptability;
- the technical representation and calculability of risks;
- the dependence on experts for legitimization;
- the distributions of "goods" and "bads";
- the allocation of blame and responsibility;
- the recognition or self-confrontation of unintended, or latent side-effects of technological and social innovations.

While this paper uses Beck's original work as its foundational structure, there are several limitations, summarized by Mythen(2007, 799), to address. This paper does not assume uniformity of risk experiences or behavioral responses when using the term public, and it does not seek to explain individual or collective actions. Instead, the paper seeks to understand the strategies used by the media to select and organize the central ideas problematizing drinking water concerns (Dean 1999; Entman 1993; Nisbet and Mooney 2007). The second acknowledges the limitations of Beck's primary focus on the "icons of destruction," including nuclear war, climate change, genetic manipulation, and environmental ecosystem collapses. However,

following from Allan(1999), this paper extends the application beyond Beck’s originally defined catastrophic risks into the drinking water sector. By doing this, the paper argues the growing utility of social theory for interpreting the politics mediating knowledge production and rendering awareness of “new risks” informed by science, negotiated culturally, and filtered through changing national and international political economies.

### 3. Media inventory

#### 3.1. Media context in Bangladesh

Following independence from Pakistan in 1971, the media industry maintained an important role in national development and state legitimization (vom Busch and Carthew 2008; Mahmud 2013). For nearly twenty years after independence the media remained under direct, and indirect, forms of government control, which include censorship of content, monopoly over information, control of revenue, and restricting printing press supplies. By the early 1990s, a political consensus between major parties removed these direct controls to enable more freedoms of press and entry of new publishers and titles into the media market (Mahmud 2013, 40). These changes reflect incentives of political parties to direct campaign messages and market opportunities to expand readership through the growing educated middle-class urban population.

The shifts in the political patronage and increased readership encouraged private investment in media sector. The printed newspaper industry grew from the four government-approved papers in the mid-1970s to over 300 daily newspapers in the late 1990s. By the mid-2000s there were over 1800 newspapers and periodicals published in the country, 90percent of which were also in Bengali (vom Busch and Carthew 2008, 11). The daily print newspapers were competing with a rapidly growing media market of television, radio, and internet. Despite these changes,

newspapers remain politically influential medium for public discourse, continuing to advance national debates and business priorities (Chowdhury 2017).

The heterogeneity of newspapers brought differences in coverage and thematic focus of reporting on drinking water themes. As seen in Figure 1, the United Nations Children’s Fund(UNICEF) provided their daily media inventory, which offered a pre-filtered inventory of twenty-nine newspapers reporting on water, sanitation and hygiene(WASH) between 2014 and 2016. This inventory was compiled by E-Media, a consulting firm in Dhaka, using a daily keyword search to identify all articles pertaining to domestic/drinking water, sanitation, and hygiene. As this was compiled by an outside firm without the researcher’s involvement, the results provide a snapshot of the trends and key issues in the daily news cycle but are not useful for detailed analysis. This UNICEF data guides the selection of which newspaper to inventory for this study.

[Figure 1]

The media clips show an uneven distribution of articles published by different newspapers, suggesting divergent interests and editorial priorities across the major Bangladeshi newspapers. In aggregate, the Ittefaq(total:183) published the largest number of WASH-related articles, followed by the Financial Express(total:151) and the Independent(total:122). Two of these papers are English-language publications, implying a specific target audience of business, international, and educated readers. In comparison, the Prothom Alo newspaper, identified as having the largest circulation as of 2011 (Mahmud 2013, 45), reported 104 WASH-related articles. The UNICEF media inventory suggests that WASH topics are not covered equally across newspaper titles, neither in total number of articles published per year or amount of frontpage stories. The range of coverage contextualizes later analysis and acknowledges the limits of the Ittefaq as just one perspective within the broader social discourse.

### 3.2. Newspaper selection

The Ittefaq newspaper was selected for further analysis due to its prominent role as one of the oldest, continually published, and politically relevant Bangla-language news sources in Bangladesh (Chowdhury 2017). The paper had a reported circulation of 135,350 daily readers in 2011 (Mahmud 2013, 45). It remains a privately-owned newspaper, first published in 1952 by a prominent and founding member of the Awami League, one of the main Bangladeshi political parties. The paper served as a prominent voice in opposition to Pakistani rule, demanding regional autonomy which led to the 1971 attack by Pakistani military on the newspaper's headquarters in Dhaka. As a result, the newspaper became a symbol for the nationalist movement, a sentiment which remains a defining feature of the newspaper today (Chowdhury 2017). As a daily newspaper it remains an influential source of news and editorials, partly aided by its historic symbolism and continued perception of political neutrality relative to other papers.

### 3.3. Inventory methods

The methods for this paper seek to build a longitudinal inventory of newspaper articles to track the evolution of a specific discourse fragment using a content analysis framework described in section 2.1 and summarized in Table 2.

Every hard-copy edition published between 1980 and 2016 was reviewed to identify every article containing references to “drinking water” or water and specific health outcomes of water insecurity including “cholera,” “diarrhea,” and “arsenic” in the title, byline or text. Bengali drinking water-related vocabulary inventory was provided by Hanchett et al (2014) and included, but was not limited to, the Bangla words: *khabar pani* or drinking water; *panir sorboraho* or water supply; *dushito pani* or polluted water; *pani bishuddho* or clear water; and *panir songkot* or water crisis.

The data entry was structured using pre-set choice and integer questions, and then administered in an electronic form using the mobile data entry platform ONA for uploading, editing, and viewing submitted forms. In addition to a literature review on coding design, the form was reviewed by Bangladeshi and international domain experts.

After identifying articles discussing drinking water in the daily newspapers, the coder entered key information including title, date published, position in the newspaper, specific geographic identifiers at divisional scale, and keywords. Each article was coded using a pre-defined list of keywords, with a text options for any unusual or atypical “other” key words. The thematic keywords, 30 in total and fully listed in Table 1, were clustered in thematic categories: physical infrastructure, water quality, functionality and reliability, management and administration, environment and climate, and health outcomes. After reading the article and photographing the text, when permitted by the library, the first reviewer, a research assistant from University of Dhaka, selected all key words (AKW) referenced within the text. This was followed by the same reviewer selecting the main key word (MKW) based on their assessment of the primary subject of the total article text, across both the title and the story body. The English translations of the title were coded based on the primary subject of the title text (TKW) by a separate reviewer who was unfamiliar with the full text of the article.

A subset of the identified Ittefaq articles, 1,507 of 3,211 (46percent of the total), were randomly selected from a list of each month’s identified articles for further coding using discrete questions. The additional coding included the following categories: specific reference to vulnerable groups including women, children and the “poor”; citations to information and data; citations of expert opinion or knowledge; article text directly assigning responsibility to specific actors to address the problem; and text assigning or reporting actions taken in response to problem or topic.

The archival research was conducted between mid-January and October 2017 by a graduate student at the University of Dhaka who was trained on the coding methods. Archival work represented over 160 person-days in the public libraries, translation, and data cleaning. Intercoder reliability was tested after three weeks by a second trained native Bengali-speaking staff member, and a further random sample after three months. The intracoder reliability was tested at two points, after three weeks and a random sample at the end of the study, showing 84percent reliability of main key words. All title translations were checked by main researcher for English-language coherency.

#### 3.4. Data limitations

The process of cataloging the Ittefaq articles presented several challenges, the costliest being the absence of digital archives and restrictions on the number hard-copy editions that could be accessed each week. Although originally intended to begin in 1971, the costs and time restricted the inventory to the years 1980-2016.

There are four other key limitations of this project. One, the restrictions placed by the libraries to photograph or return to articles inhibited further critical discourse analysis of visual symbolism and semantic structures in the full article text. Two, the scope of this initial project limited our ability to undertake comparative analysis with other thematic water topics such as agricultural and natural disasters, or with other modalities of the Bangladeshi media such as internet blogs, social media, television or radio. This limits our conclusions to printed media represented by the Ittefaq, one of the only continuous published text. Three, the research team did not have access to newspaper staff to explore their perspectives on editorial decisions and intentionality behind observed results. Finally, we acknowledge that this content analysis represents one newspaper's publishing decisions and should not be used to interpret readers internalization or behavioral



responses to the represented risks. These limitations do not jeopardize the findings and scope of the analysis; instead they provide opportunities for future studies.

## 4. Results

This following section discusses the empirical results of thirty-six years of the Ittefaq reporting which identified 3,211 articles focused on drinking-water topics. The temporal and content findings are summarized in Table 1.

[Table 1]

### 4.1. Production of concerns and declining coverage

The temporal distribution of the annual and thematic content, shown in Figure 2, provides a multi-year perspective around the construction of drinking water concerns in the Ittefaq. The annual number of articles shows that drinking water topics have been continually reported as newsworthy in Bangladesh, meaning a long-term problematization within the public agenda. Within the year-to-year reporting two spikes of increased coverage occurred during the 1985 to 1988 cholera outbreak and the height of the arsenic crisis in 2000 to 2004. Although a limited portion of the total news cycle, drinking water topics have been sustained for decades within the public discourse, contrasting other studies which identify risk-reporting as contingent upon specific events, such as nuclear accidents or natural disasters (Kristiansen 2017; Anderson 2006).

[Figure 2]

The inventory also reveals that the annual average number of articles declined after a decade of the arsenic discussion. The average number decreased from 97 articles per year between 1980 and 2005 to 63 per year from 2006 to 2016, a nearly 40percent drop. This decline could be explained through a lens of competing risk narratives, including the late 2000s food crisis.

However, the timing suggests reporting fatigue, occurring immediately after a period of extensive policy, research and public debate around arsenic. This proportional decline contrasts the increased policy prominence given to drinking water goals in the same period including release of multiple government policies after 2005 and the global attention by reporting achievement of the Millennium Development Goal(MDG) target on access to improved drinking water sources.

#### 4.2. Constraining concerns around infrastructure and cholera

Beyond annual trends, the discourse analysis filters assess how topics are problematized through selection, frequency and prominence across article titles, subject and text. The Ittefaq inventory revealed an identifiable pattern of inclusion and exclusion of specific themes, summarized in Table 1. The most frequent main subjects over the 36 years, appearing in 52percent of the articles, emphasized diarrhea-related concerns (cholera and diarrhea) and infrastructure sustainability (functionality and reliability). These two topics specifically dominated reporting on drinking water topics between 1980 and 1993, appearing as the main subject in over 70percent of the articles, and 40percent of articles 1993-2016. These two topics reflect what scholars identify as the government's dual priorities: 1)maintaining state legitimacy by providing reliable drinking water infrastructure and 2)gaining international recognition through health system achievements, reducing mortality rates by controlling diarrheal diseases (Hassan 2013; Hossain 2017).

Drinking water infrastructure gained significance during the independence movement when the newly formed government committed to ensure the functionality of handpumps, a political bargain to increase legitimacy with rural populations(Hossain 2018). The Department of Public Health and Engineering(DPHE), supported by international agencies, implemented the programs to increase the ratio of tubewells from 400 people per handpump in 1972 to a target of 135 in

1990 (Black 1990, 19). The Bangladeshi government pursued this state-driven water service provision model for nearly two decades after independence (Black 1990), controlling the production and distribution channels for handpump hardware and providing maintenance services for all public water points through the 1980s. This established a further political interest around provision of rural water services. Despite the increasingly prominence in national policy, tubewells appeared as the main subject in 1.3percent of the articles but were referenced in over 45percent of the article texts. A quarter of the articles in the 1980s focused on place-specific concerns of tubewell functionality, frequently using the same structure in the title: “X number of tubewells are dysfunctional in Y location: scarcity of drinking water.” This presented a controllable concern where the government could respond to specific geographies.

After two decades of tubewell investment programs, the number of functionality articles declined from an average of 21percent of total articles per year from 1980-1992 to 14percent between 1993-2005. The largest drop occurred in the years surrounding the political transition from the Ershad government into competitive party politics in 1991, arguably reflecting end of the post-independence state commitments ensuring tubewell functionality and shift in institutional structure (GoB 1998). Leading into this shift, the international development agencies increasingly placed pressure on the government to demonstrate aid effectiveness (Rizvi 1991). The frequency of stories on dysfunctional handpumps contradicted technical national tubewell surveys which reported over 90percent of public tubewells operational (UNICEF 1993). The declined media reporting on functionality and shift to supply reliability reflects a reallocation of concern to nature. This change in blame occurred in the context of reallocations of responsibility away from the central government for service provision for tubewells and into one around multi-user piped systems.

397 The media coverage in the late 1980s also began excluding explicit references to cholera and  
398 replacing them with diarrhea terminology. Cholera was reported on extensively in the early and  
399 mid-1980s, reflecting the ongoing policy and scientific attention from previous decades.  
400 However, explicit references to cholera sharply declined after 1984, becoming entirely absent by  
401 1990 with only a few exceptions in the 2000s. By 1989, the *Ittefaq* editorial page explained the  
402 shift in vernacular by attributing it to the government: “The same old topic of diarrhea and  
403 cholera needs to be discussed here again because the authorities are not willing to accept that  
404 these deaths are caused by cholera. They use the term diarrhea. But whatever the name of the  
405 disease, a death is a death whether it is caused by diarrhea or cholera”(*Ittefaq* 1989). This  
406 editorial comment implies intentional government intervention over terminology influencing the  
407 way reporting frames concerns for ongoing outbreaks, partially controlled in national  
408 epidemiological surveillance systems which did not differentiate the causes (Siddique et al.  
409 1992).

410 The change in terminology reflects a change in the concern around allocation of blame and  
411 framing severity. Article titles discussing cholera frequently explicitly referenced the number of  
412 reported deaths compared to diarrhea reporting after 1989 which largely focused attention on the  
413 number of reported cases and spatial extent of the outbreak, not mortalities. For both tubewells  
414 and waterborne diseases, the *Ittefaq* reporting reduced the salience for target audiences (Entman  
415 2007). The timing of exclusions aligns with changes in national and international political  
416 agendas, reinforcing Herman and Chomsky’s argument that media places politically-motivated  
417 discursive constraints on the problematization and representation of concerns.

#### 4.3. Positioning arsenic uncertainty and mitigation

Within these macroscale thematic trends, the distribution of where articles are placed within the newspaper sections further constrains the prominence, priority, and emphasis on severity of specific content. Building on what Lippman(1922) identifies as the editorial decisions of selecting which stories are most newsworthy, Herman and Chomsky(1988) use the positionality of articles to explore the constructed importance of specific topics. As seen in Figure 3, the frontpage articles, representing 14percent of the total inventoried articles, were highest in the 1980s, a period when the state had direct and indirect controls over the media industry and the government-led solutions to cholera remained central to national development agendas. However, the number of frontpage articles began to decline after the political transition in 1992. [Figure 3]

This declining front-page prominence contradicts the technocratic portrayals of the severity of the arsenic contamination. The first public recognition of arsenic in aquifers appeared in the *Ittefaq* article in 1993, a decade after concerns were initially identified in public health circles in West Bengal (*Ittefaq* 1993; Smith, Lignas, and Rahman 2000). The coverage of arsenic stories occurred after 1995 in the “country” or national news section, not on the front pages. Although articles described arsenic as a “national panic”(Ittefaq 1996) and coverage represented an increasingly significant percentage of articles between 1996 and 2006 but a relatively limited number of frontpage articles(20MKW, or 7percent of total arsenic articles). During the 1980s and 1990s, frontpage coverage of diarrhea and cholera(185MKW, or 21percent of total cholera/diarrhea articles) and functionality and reliability(79MKW, or 10percent of total stories) was much higher as a portion of drinking water related articles and in number of stories. This suggests a specific discursive approach avoiding emphasis on arsenic, a problem with initially

uncertain causes, poorly measured, chronic largely unseen impacts, and no immediate actionable responses.

Multiple scholars have argued arsenic threatened the narrative of development successes of previous tubewell access narratives (Caldwell et al. 2003; Sultana 2012). It was not until after the national arsenic testing campaigns in 1999 and 2002-2005 that the techno-political development community aligned around specific mitigation approaches, codified in the 2004 Arsenic Mitigation Plan (GoB 2004). However, instead of increasing to interpret and interrogate these findings and national awareness campaigns (Pfaff et al. 2017), the media coverage declined. Media discussion of infrastructure alternatives, such as deep tubewells and piped water, increased slightly after 2005, but not at the rate reflecting the urgency advocated by technical evaluations.

The absence on the front pages of the *Ittefaq* were replaced by articles in the letters section. Starting in 1996 when arsenic articles began being reported more frequently, the number of letters per year surpassed that of the other sections, except “country,” as seen in Figure 3. Qualitative analysis of these articles suggest that they provide a vehicle for citizens to direct concerns to the government entities that manage water services. A quarter of letters explicitly directed requests to the Government’s Water Supply and Sewage Authority (WASA) (106 articles). The main subject of over half the letters addressed issues of infrastructure, including requests for access, repairs, and supply reliability. In contrast to the frontpage and country sections, diarrhea and cholera represented the main subject of 2percent while arsenic appeared in 8percent and unspecified water quality concerns in 12percent. This shifted the direction of discourse expanded the previous linear flows of the media being a risk definer to enable risk consumers to influence the construction and focus of concerns.

#### 4.4. Distribution of social and spatial risk positions

One of Beck's central arguments is that catastrophic hazards have transformed society into an egalitarian distribution of risk, beyond previous models of hierarchical class-based distribution of goods (Beck 2013). Several scholars challenge this view, including Curran(2013), who argues that wealth differentials related to class continue to shape risk distribution and life-chances. The Ittefaq article inventory largely reinforced Beck's view of undifferentiated social risk, rarely allocating concerns to specific vulnerable populations or reports unequal impacts.

This reporting pattern diverges from the dominant agendas of global development goals.

Government policy documents and international agencies explicitly prioritize vulnerable sub-groups, defined as the "ultra-poor," women, and children (GoB 2015; Sultana 2012). Within the Ittefaq articles, "poor" communities were explicitly identified in 3.5percent of the 1,506 coded articles, of which more than half discussed tubewell functionality and reliability before 2005. Specific references to gender appeared in 2percent of the 1,506 articles, with over three-quarters of those articles discussing diarrhea and related health treatments. References to children were found in 7.5percent of the 1,506 articles, with nearly a third published between 1985 and 1988 related to the diarrhea and cholera outbreak. The disconnect between policy emphasis in government publications not reflected in media articles suggests the politics of risk allocation at national levels, not that of exposure or international agendas.

[Figure 4]

In contrast to social categorization, the spatial distribution of stories, seen in Figure 4, reveals more articles were discursively located within urban Dhaka than other region. Among the articles which specifically identified an administrative division(n=2,257), Dhaka appears in 40percent while the divisions of Sylhet and Mymensingh appear in fewer than 5percent. This geographic

focus suggests that events were selected through the lens of what is newsworthy to the readership, primarily urban circulation (Mahmud 2013), despite over 65percent of the population classified as rural in 2016. This spatial pattern is further explained by information biases resulting from more consistent measurement of urban piped water schemes and significant gaps in rural monitoring. The place-specific media coverage was often maligned with technical assessments of exposure, such as low number of articles covering high arsenic risk areas in the Sylhet division or arsenicosis cases disproportionately represented in Dhaka compared to contamination (WHO/UNICEF 2017, 42). The spatial distribution of risk positions appears to be based on media reporting biases, not techno-scientific quantifications of concerns.

#### 4.5. Legitimizing the narrative

Beck argues that national risk imaginaries require the sensory organs of science to render their existence visible and reduce the boundaries of uncertainty(Beck 2006a). Media studies offer approaches to critically evaluate how the press engage expertise to define, legitimize, or cast doubt on specific concerns (Nisbet and Mooney 2007). The Ittefaq articles reinforce Beck's view of a contingent relationship, with nearly two thirds of articles(n=934 out of1,506) explicitly citing data, statistics, study results, or experts within the story text. Almost half(49percent) of those main keywords focused on infrastructure access, functionality or reliability, two thirds of which appeared before 1997, prior to the arsenic crisis.

Reliance on external information for validation varied between topics: arsenic articles were heavily dependent, with 90percent including citations; climate, flood and drought articles had 63percent with citations. These topics contrasted with a lower proportion of cholera and diarrhea articles, 18percent, having citations. While the initial coding method for this article was not



509 nuanced enough to differentiate tone or context of these citations, the results suggest that specific  
510 topics were more reliant on expertise to interpret the uncertainty.

511 [Figure 5]

512 The power to define problems is further reflected by who the article cites to legitimize a concern.  
513 As seen in Figure 5, over 60percent of the article citations identify the source as Government  
514 sources, suggesting the state controlled the flow of information. A further 28percent of article  
515 citations were unattributed, such as “a source” or “an expert,” although declining sharply in the  
516 mid-1990s after the opening of press freedoms and replaced by unattributed article. The  
517 remaining citations(12percent) were attributed directly to NGO and academic sources. Although  
518 articles provided limited direct connection to NGOs, the large percentage of unattributed  
519 citations reflects a possible approach to maintain national ownership of the narrative and  
520 authority with the government. Initial qualitative evidence suggests that many studies and data  
521 are produced with the involvement of international agencies but published and accredited to  
522 Government agencies, thereby reinforcing authority of the government and concealing the  
523 influence of non-state actors in the media. Further study is required but these findings suggest  
524 that the media reinforces the dominant power structures by filtering of sources of information.

#### 525 4.6. Allocating of blame and responsibility: water quality versus health within an agenda- 526 setting discourse

527 Controlling the risk narratives becomes increasingly political as the causation, or blame for, the  
528 concerns shifted from nature to society. Beck(1992) describes this transition as the reflexive  
529 consequences of human decisions and technology. The Ittefaq inventory suggests this self-  
530 confrontation did not occur: articles discussing water quality safety were reported on less than  
531 half as frequently as health-related stories, as seen in Figure 6. Despite the extensive coverage of

diarrhea and cholera, issues of microbial contamination, including sewage contamination and bacteria such as E-coli and *Vibrio cholerae*, appeared in significantly fewer articles: 5percent of the articles referenced microbial topics in the body of the story text; fewer than 1percent of the articles focused on microbial concerns as the story's main subject. Further, ambiguous or multi-parameter water quality articles were more frequent than microbiological stories, specifically increasing after 2005. While this is likely a result of measurement bias with health outcomes more regularly tracked than water quality data, the titles of the water quality articles are structured around ongoing problem identification with blame and responsibility attributed, often explicitly, at public agencies: "Unhygienic WASA water: conflicts between authorities for water"(Ittefaq 1984). This information structure contrasts the reporting approaches on diarrhea and cholera which focus on past events, discussed above. The difference appears to be largely in the temporality and allocation of responsibility, with water quality reporting, not including arsenic, directly implicating the need for collective or public action.

[Figure 6]

This imbalance of reporting on water quality was reversed by the discovery of arsenic contamination, deconstructing the previous risk narratives focused on the ability to manage and control the problem. The uncertainty of source and spatial distribution were reported twice as frequently as articles discussing the health outcomes of arsenicosis: the inverse pattern of diarrhea/cholera to microbial contaminants. This suggests different politics of blame and attention, with titles not directly allocating responsibility. Cholera and diarrhea are reported around the acute symptoms, high certainty of cause and immediate tangibility of danger with clear infrastructure and health treatments options. Arsenic in contrast was debated in a process of reconciling the uncertainty of cause of contamination, and impact of chronic exposure with often

invisible symptoms and limited treatment options. One was represented in reporting as past risks which are controllable while the other focused on unknowns in the future. The varying coverage of water quality factors in newspaper articles constructs different narratives around the causality and controllability of risks, and thus responsibility to act: one perpetuating the previous development narrative of ability to manage human-caused risks while the other shifted blame to nature while solutions were not immediately actionable.

## 5. Discussion

[Table 2]

This section interprets the multi-decadal media content analysis in relation to the politics of the national development agendas. As summarized in Table 2, the empirical results reveal three broad temporal clusters of drinking water narratives identified through risk-discourse filters and content patterns.

### 5.1. Constructing risk narratives 1971-1992

The first period of drinking water narratives in Bangladesh extends from post-independence in 1971 until the public identification of arsenic in 1993, however the Ittefaq inventory starts in 1980 due to archival limitations. This period is characterized by several interlinked concerns underpinning the elite consensus on national development strategies: reducing infant and maternal mortality rates, preventing cholera outbreaks, and increasing tubewell infrastructure access (Hassan 2013). The Ittefaq reporting constructed a narrative around these topics by problematizing cholera and diarrhea cases and public service delivery of infrastructure functionality. These concerns reflect international development targets which structured development aid based on national measurement of indicators which were publicly monitored. The construction of these risk narratives by the media, predominantly citing government

authorities as sources of information, reinforced the central state's legitimacy and aligned to the agreed responsibility structures by framing the issues as controllable problems.

The political and institutional reforms of the late 1980s are reflected in the specific content and discourse shifts of the Ittefaq. While macro indicators, such as infant and maternal mortality, continued to improve, major cholera outbreaks and non-functioning tubewell infrastructure undermined the narrative of cost-effective development interventions. Simultaneously, pressure was mounting on the Ershad government from international agencies to demonstrate program effectiveness and justify continued flows of foreign aid, funding critical to the state authority through a patronage system (Rizvi 1991). The national press, remaining under the government's direct and indirect controls during this period, reinforced the state's interests by shifting content production, specifically explicitly identifying cholera in articles and gradually shifting from functionality of tubewells to supply reliability problems. This represents a change in salience of waterborne concerns by replacing reporting on the number of cholera-related deaths with stories describing diarrhea as number of cases being treated.

The media behavior in this period suggests that while risk priorities reflected broader international targets of improved access and reduced mortality, the narrative was constructed to advance national state interests. The control over information distribution and definitions of what is measured further limited public contestation of risk severity. These risk-discourse filters reveal the constrained ability and interest of the media to extend the problematization, counter state priorities, or interpret techno-scientific assessments.

## 5.2. Deconstructing the narrative: 1993-2005

The second period is characterized by the disruption of a controllable narrative by the public acknowledgement of arsenic in 1993. The announcement aligns with the introduction of

601 competitive party politics, national elections, decentralization of service responsibility, and  
602 increasing press freedoms reliant on new non-state revenue sources. The period is defined by the  
603 socio-technical negotiation to deconstruct previous narratives of tubewell infrastructure and  
604 groundwater safety, interpret the uncertainty of spatial risk distributions, and render arsenic into  
605 a manageable concern. These uncertainties challenged previous political arrangements and  
606 corresponding narratives focused on distribution of infrastructure and health services.

607 While global drinking water goals increasingly emphasized on-premise infrastructure systems,  
608 decades of tubewell growth created a paradox for media and policymakers as the scope and scale  
609 of arsenic increased concerns of potential exposure. This threatened previous development  
610 agendas, including attainment of the Millennium Development Goal target based on definitions  
611 of improved infrastructure access. The discourse filters reflected this tension: the media rarely  
612 emphasized arsenic concerns on the front page despite many articles in the national news section,  
613 diminishing the salience and contrasting previous cholera reporting. This resulted with a  
614 contrasting construction of arsenic severity: a crisis in description but not in priority allocated  
615 through discourse filters.

616 Further, reporters continued to predominantly cite government sources despite major  
617 international aid agencies and academic investments trying to grapple with the cause, uncertainty  
618 of spatial distribution, and mitigation options to the arsenic contamination. The discourse filters  
619 suggest that in the early 2000s more articles had no information or experts cited than articles  
620 with government officials, suggesting a temporary aversion to allocate responsibility in the face  
621 of uncertainty. Without an immediate solution and high uncertainty, this suggests a discursive  
622 approach to interpret the new risk without undermining the national ownership of previous  
623 development successes.

### 5.3. Reconstructing a controllable narrative 2006-2016

The most recent period from 2006-2016 is characterized by the divergence of media and policy emphasis on drinking water and re-alignment of content problematization around new multidimensional development targets. With greater freedoms of press and new advertising incentives, the direct link of media and state interests eroded from previous decades. This period shows a sharp decline in total number of drinking water related articles. While decline might reflect these shifting media incentives or other priority concerns however it clearly contrasts the public sector attention allocated to drinking water in a range of new policies and renewed international commitments. This could also suggest a widening gap between national politics and international development narratives with Ittefaq focused on domestic audiences. If true, this implies drinking water remained on both agendas but was diminished in domestic agendas.

Despite the decline in media attention, both bodies of text problematized a more heterogenous set of concerns, particularly water safety and quality, supply system reliability, and sustainable management of multiple infrastructure types. This content shift mirrors the evolution of Sustainable Development Goals definitions of drinking water security entering national narratives. The decline of arsenic coverage after 2005 contrasted academic and civil society concerns of increasing exposure suggests limited media interpretation of risk severity. This period suggests the narrative was reconstructed to interpret complexity of water safety reinforcing a model where blame is allocated to nature when outside of immediately controllable problem-solution paradigms.

### 5.4. Implications of risk discourse filters and a constrained national narrative

There is a large body of academic literature on arsenic and cholera research spanning decades in Bangladesh quantifying exposure, vulnerability, and responses, however there is limited inquiry

647 around how the media's discursive filters interpret and position these concerns. The empirical  
648 results suggest that key concerns are represented differently between the Ittefaq and technical  
649 literature, a known occurrence in climate-related discourse analysis but one which has not been  
650 interpreted in the context of drinking water security(Boykoff and Boykoff 2007). The contrast is  
651 most evident in the problematization of cholera and arsenic: despite ongoing identification of  
652 exposure by technocratic studies the media, under government influence, excluded cholera from  
653 public discourse and delayed public recognition of arsenic for a decade after initial discovery.  
654 This avoided directly challenging the development narratives of achieving near universal access  
655 to improved drinking water infrastructure. This further implies that the Ittefaq did not perform  
656 the function of a conduit of development communication aimed at behavior change such as well-  
657 switching promoted by NGO's. The result limited public self-confrontation around the side-  
658 effects of infrastructure decisions and provision-based models.

659 The findings advance what Bakir(2010, 13) identified as gaps in longitudinal, historical,  
660 contextual and interpretive methodologies to trace risk narratives at macro levels. The analysis of  
661 Ittefaq newspaper uncovers how various levels of the development institutions and governance  
662 transitions exert direct and indirect influences over the construction of drinking water security  
663 narratives to shape the political meanings. These findings reinforce Herman and Chomsky's  
664 view that media is influenced by dominant interests, which in this context is the dual pressures of  
665 national and international development agendas. While the state's role appears to be dominant in  
666 shaping the media's narrative, the indirect influence of NGOs and international organizations  
667 requires further consideration in future work and coding. The significant number of unattributed  
668 expert quotes suggests discursive positioning of other actors disguising their role and influence  
669 while reinforcing the Government's authority and responsibility.

The results further identify the importance of discursive allocation of blame and risk responsibility in shaping the political interests to control the overall narrative. Future work has been identified to expand the theoretical and pragmatic implications for risk-response dynamics across multiple texts, and the political meanings for state authority and management instruments. The initial assessment suggests a limited political willingness for what Beck(2006a) describes as reflexive governance, or the avoidance to prioritize and reframe concerns if they implicate failures or unintended consequences of previous policy decisions. In the case of Bangladesh, this questions the successful government tubewell campaigns and recent growth private markets. This reinforces Beck's view of the contingent relationship between risk representations and politics of national identities: reflexive risk threatens narratives of state control over development power relations. The identified risk-discourse filters contextualize why certain risks are problematized while others are reframed or prioritized differently, including the reframing of previous concerns into opportunities. These findings reinforce that risks narratives are political in construction and meaning.

## 6. Conclusion

The previous institutional approaches to managing drinking water security in Bangladesh were challenged by the uncertainty of arsenic distributions and redefinition of cause-effect relationships between nature and society. An empirical and longitudinal analysis of one of the oldest continually published newspapers in Bangladesh provides unique insights into the declining frequency and prominence of attention placed on drinking water security. The results show some unexpected divergences between technical, political, and media narratives. First, newspaper coverage of drinking water declined at the same time as completion of national programs for arsenic mitigation and the recognition of the country's early achievement of MDG



693 drinking water targets; second, the media explicitly excluded “cholera” in article texts to shift  
694 salience of the concern from mortality to treatability; third, the articles used risk reporting to  
695 reinforce state legitimacy by citing government sources and information, diminishing the  
696 prominence and role of NGO and civil society voices; and finally, the descriptive depiction of  
697 arsenic as a crisis was not reflected on the newspaper’s front pages, constraining the portrayal of  
698 severity and exposure. These discursive behaviors reflect the dominant construction of problems  
699 as controllable through technical and health solutions. Beck’s theories help explain why arsenic  
700 challenged this previous narrative through the high uncertainty of distribution, contested  
701 allocation of blame, and lack of immediate mitigation options which wouldn’t undermine  
702 previous achievements of tubewell infrastructure provision.

703 This analysis provides further insights into the institutional transitions across the three identified  
704 temporal periods in Bangladesh, revealing a contested narrative between technocratic estimates  
705 of exposure and the socio-political discursive process to render risks visible. The application of  
706 risk-discourse filters advances several broader findings: the production and framing of drinking  
707 water security is linked to political and economic development agendas; the discursive practices  
708 used by the media reinforce the state’s authority and control over the definition process; and the  
709 media’s distribution of social and spatial concerns diverges from technical estimates of exposure  
710 and stated public policy priorities. These specific media approaches are significant for how  
711 blame and responsibility are allocated within wider governance transitions. The results extend  
712 Beck’s framing of risk politics by identifying the limitations of the current institutional designs  
713 to engage in the discursive process of self-confrontation around reflexive risks, a perspective  
714 increasingly important for achieving drinking water security.

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## Figure Captions

*Figure 1: Summary of 29 national Bangladeshi newspapers coverage of water, sanitation and hygiene topics from 2014-2016. Data provided by UNICEF-Bangladesh.*

*Figure 2: This summarizes the annual variation in the total number of drinking water articles published per year and the proportional distribution by thematic cluster identified within the Ittefaq Newspaper from 1980 until 2016.*

*Figure 3: This compares the annual variation in the positionality of drinking water articles across the four main sections of the Ittefaq Newspaper, 1980-2016.*

*Figure 4 This map presents the number of drinking water articles explicitly referencing specific districts and the thematic distribution within the Ittefaq Newspaper from 1980 until 2016. Size of pie chart represents number of articles.*

*Figure 5: This compares the annual variation in the source of information cited within the drinking water articles from the Ittefaq Newspaper, 1980-2016.*

*Figure 6: This compares the annual variation of coverage of water quality and health specific articles by main key word in the Ittefaq from 1980- 2016*

*Table 1: Summary of inventory findings by thematic cluster using Main Key Words.*

*Table 2: Interpretation of newspaper inventory using risk-discourse filters by period of the narrative.*