Chapter 27
The Notion of the Global Water Crisis and Urban Water Realities

Antje Bruns and Fanny Frick

Abstract The global water crisis is often alluded to in scientific papers and geo-political discourse. However, the lack of a proper definition of what the term 'water crisis' means has been routinely overlooked, as much as are the reasons why it is assumed to be truly global in nature. Such generalisations and simplifications in both science and policy alike may lead to governance responses that are not fully applicable. In the following chapter we examine the relation between initially framing a problem (water crisis), and introducing policies and management principles that reflect such a situation. We will start by exploring the emergence of global water crisis in the 1990s. We then contrast these findings by examining how the urban water crisis in Accra, Ghana has worsened over time, although there is enough water to go round. We conclude with a plea that crucial socio-political perspectives within hydrology be reinforced, since these are the very factors—occurring within different spatio-temporal scales—that are often overlooked in research into water-related global change.

The Emergence of the Water Crisis and Its Implications for Water Governance

The notion that water is in crisis emerged with the publication of two key books in the early 1990s: in 1992, the Worldwatch Institute published Sandra Postel's *Last Oasis Facing Water Security*. One year later, Peter Gleick edited a review of the state of the world's freshwater system entitled *Water in Crisis*. Ever since these global crisis claims were made, awareness of a threat to water security and the so-called 'crisis' itself has increased steadily among both researchers and

A. Bruns (✉) · F. Frick
Humboldt-Universität zu Berlin, Unter Den Linden 6, 10099 Berlin, Germany
e-mail: antje.bruns@geo.hu-berlin.de

A. Bhaduri et al. (eds.), *The Global Water System in the Anthropocene*,
Springer Water, DOI: 10.1007/978-3-319-07548-8_27,

politicians. The necessity of rethinking what is actually meant by the term 'water crisis' is often overlooked. Instead, many divergent phenomena have come to be described as part of its definition (Linton 2004; Trottier 2008; Srinivasan et al. 2012). Threats to water security are predominantly described as consequences of growing demand and environmental degradation (e.g. Vörösmarty et al. 2010). Later assessments have exhibited differing views as to the specific drivers of the crisis (Srinivasan et al. 2012).

The problem with any unreflecting use of such language is that there is a lack of neutrality in the descriptions upon which discourse is based. The opinions become modified and even biased owing to local custom, when, for example, defining a scientific research question, when developing policy responses, or in journalistic reporting. Since these practices are not isolated, but involve interactions between various actors, previous assumptions are constantly being reproduced, particularly in the established settings of interpretive communities (cf. Fairclough 1992; Bourdieu 2001; Adger and Benjaminsen 2001; Belina and Dzudzek 2009). This means that wherever a problem has been determined to exist, the solution is also to a large extent a predetermined one: as Linton (2004) points out, discourse on the global water crisis as initiated by Postel (1992) and Gleick (1993) was based entirely on the research of a small group of Soviet scholars. While the overall crisis talk soon began to be reproduced, the scientific basis that initially gave rise to the definition of a global water crisis was hardly ever questioned (Linton 2004). What is more, critical alerts to uncertainties that had been made by Gleick in his publication became overlooked over time (ibid.).

Broader discourse on the environmental crisis, a precedent of water crisis, gave rise to a series of restrictive environmental policies into the 1990s. Despite the measures taken to control environmental degradation, however, deterioration continued, and the so-called "crisis" grew worse. By the turn of the millennium, assessments of the low effectiveness of environmental policies led to a paradigm shift in politics, from regulatory law to cooperative governance. The Water Framework Directive in Europe is a prime example of this shift (Bruns 2010). In practice, however, the same old preconceptions as to what the issues are, still tend to dominate, because alternative ways of assessing a problem are seldom part of any planned shifts in governance (Manuel-Navarrete et al. 2009; Bruns 2010; Stoett 2012). Yet what has been rather under-examined in governance research thus far are cross-scale interactions (Agrawal 2001) and questions of power (Swyngedouw 2009; Kenis and Raab 2008).

As European experiences while implementing integrated management approaches have shown here, participative and cooperative governance processes cannot simply be enforced, but tend rather to emerge from the interaction of actors at different scales that depend on stakeholders' norms and values (Bruns and Gee 2009; Bruns 2010). Since the participative approach invited NGOs and private stakeholders to become involved in decision-making processes, this paradigm also raises concerns as to the legitimacy of these decisions (Bruns 2010). The shift in

Table 27.1 Numbers and origin of articles analysed

	Web of science	Scopus	Total articles analysed
Articles on the urban water crisis	27	54	70
Articles on the global water crisis	23	100	83

Some articles appeared in both search engines and are not counted twice; and some articles were thematically unsuitable

regulating water resources away from top-down management to more integrated management methods became, nevertheless, a universal paradigm that has influenced water policy in countries around the globe (Shiva 2003; Bakker 2009). There is hence reason enough to believe that global discourse on the water crisis is far more related to Western water management paradigms (which is inspired itself by modern hydrology) than to specific water problems in the so-called Global South.

Methods

According to the school of critical discourse analysis, discourse can be considered a social practice, reflecting the (re)production of social relations of power and domination. Hence discourse analysis can be applied as a method for analysis of societal conditions (Fairclough 1992; Belina and Dzudzek 2009). This type of discourse analysis looks at how texts are used in the production of hegemonic definitions and ideologies. A critical discourse analysis was performed within our urban water crisis case study of Accra, Ghana, based on a literature review (context analysis) and a textual analysis of key policy documents addressing the crisis in Accra. In order to interpret the influence of scientific framings of the water crisis in the (re-)production of urban water realities in Accra, the production of discourse on the global and the urban water crisis was assessed by comparing narrative elements across 153 peer-reviewed scientific articles (analysis of text production processes and interpretations). The corpus of analysis was defined in searches for *global water crisis* and *urban water crisis* in the titles of original research articles. To identify these articles the search engines Scopus and Web of Science were used. A coding scheme was developed to analyse the occurrence of narrative elements covering the following aspects (i) methods (empirically based on primary versus secondary data, or on conceptual methods), (ii) scale of analysis (household, city, regional, global) and (iii) proposed solutions. Narrative elements were identified mainly from the abstracts of the articles, since it is there that the argument is most concise. When analysing them, the four-eye principle was adopted in order to ensure methodological consistency in qualitative assessment (Table 27.1).

Urban Water Realities: The Case of Accra (Ghana)

Water governance policy in Accra was shaped considerably by early post-developmental government strategies adopted in the 1960s. After independence, the Ghanaian government's focus on water infrastructure was placed on rural areas and on poor neighbourhoods within urban areas. The aim was to reverse the urban bias in infrastructure provision that had dominated colonial planning. Provision of infrastructure was seen as a key factor in socio-economic development, and planning this without foreign intervention became symbolic of independence and modernity (Bohman 2010). In the early 1960s, the first government body to manage urban water supply and sanitation, the Ghana Water and Sanitation Corporation (GWSC), was set up, its objective being to guarantee "the provision, distribution, and conservation of the supply of water in Ghana for public, domestic and industrial purposes; and the establishment, operation and control of sewerage systems for such purposes" (Ghana Water and Sewerage Corporation Act 1965).

Among the largest infrastructure projects early in independence was the Akosombo Dam on the Volta River—the main source of fresh water in the region. Designed to supply Ghanaian industry and households with power (Volta River Development Agency Act 1961), the dam has produced one of the largest artificial lakes in the world (Bohman 2010, p. 36) and has brought multiple environmental and socio-economic impacts that have had unexpected effects on the wider region (Gyau-Boakye 2001; Karley 2009). Unintended consequences, such as changes in rainfall patterns, caused an accelerated migration to the city in the early years of independence (Karley 2009). As the urban population rapidly expanded, the extension of water supplies and distribution in urban areas was put high on the agenda in the government's seven year development plan 1963–1970 (Bohman 2010). Pricing policies did not receive the necessary consideration, and GWSC operated without achieving cost recovery.

Subsidies to support sector development were first granted to the government by the international community (via the World Bank) in 1969 and 1974, paving the way for international influence in the design of Ghana's water governance throughout the following decades (Bohman 2010). Early international community recommendations were to decentralise GWSC's responsibilities and to restructure the tariff system (Bohman 2010). Water infrastructure and service levels deteriorated during economic recession in the 1970s and 80s, and by 1990, a third of the facilities had broken down, with the rest operating below capacity (Fuest and Haffner 2007; Bohman 2010). In response to the economic crisis, the international community pressured Ghana to broaden its markets in the late 1980s. By means of structural adjustment programs (SAP) implemented to meet requirements set by the IMF/World Bank, the water sector was restructured to facilitate service provision by the private sector and local government. While urban water management remained under the authority of national government, rural water and sanitation was delegated to local authorities (Fuest and Haffner 2007; Bohman 2010).

This devolution coincided with an international wave of direct investment in Accra, likewise facilitated by SAP. Combined with obscure land ownership, the sudden pressure for economic development fuelled an informal market in land plots (Yeboah 2000; Owusu 2011). The city grew largely unchecked (Accra's population almost doubled from 863,000 in 1980 to 1,674,000 in 2000 (UN Habitat 2011)), and many plots were sold without adequate water and sanitation infrastructure (Yeboah 2000). The devolution of water authority was hindered by a lack of financial resources in local government (Bohman 2010). As a consequence, an increasingly segregated urban pattern emerged—described as the "dual structure of the city"—from the "uneven spatial distribution of potable water supply in different residential sectors within the city [with a sharp contrast between] planned high and medium-class residential areas on the one hand and low-class residential areas which constitute the rest of the residential areas" (Songsore and McGranahan 1993, p. 19). Meeting the water challenge was no longer a public health concern, but had more importantly become an economic interest among competing international investors. Plans for private sector participation were contested by a national coalition of NGOs arguing that a contract would favour "the interest of private water operators rather than Ghanaian water consumers" (Bohman 2010, p. 107).

Despite efforts made by the government of Ghana and supporting donors, the institutions established were unable to handle Accra's uncontrolled growth: In 2002, the proportion of urban Ghanaians with access to potable water was equal to, if not lower than it had been before the sector reforms. Unstable water supply had become a constraint on economic activity and on international investment in the country, and was therefore thought a major limiting factor in achievement of Ghana's vision of becoming a middle income country by 2020 (Fuest and Haffner 2007).

In 2005, a private operator (Aqua Vitens Rand, AVRL) was selected for a five-year management contract with GWCL to supply urban water, in contrast to the initial plans for private sector engagement in the water sector which had anticipated a lease contract. The shift in the design of private sector participation followed international investors' declining interest in the water sector. It reflects, moreover, a shift when considering "the possible potentials, risks, and gains from private sector involvement among investors, governments, and donor agencies" that followed the global "1990s wave of privatisation" (Bohman 2010, p. 118, 10). Objectives of the agreement between Ghanaian government and AVRL were the expansion of urban water supply, protecting the access to and affordability of water supply for low income consumers, cost recovery, adequate investment flows, and integration of the private sector (Darteh et al. 2010). However, the contractor's activities remained largely without effect: at the end of the first decade of the 21st century, "only 51% of the population has direct access to utility water supply services", while the rest of the population relies on informal connection to the GWCL system, tanker services, or alternative systems in communities on Accra's outskirts (Adank et al. 2011, p. vii). Another paradox remains: those relying on informal water supplies have to pay higher prices than those employing the formal

system (ibid.). Today, Accra's water is managed through the Ghana Urban Water Company Limited, a sub-agency of GWCL that was created in absence of a successor to AVRL. While the Volta river discharge is more than enough to serve the city, "even when considering a potential drop in river flow caused by climate change and increased use of water upstream in the basin" (Adank et al. 2011, p. vii), adequate infrastructure and services to secure access to water and sanitation in Accra are lacking (ibid.).

In Bohman's analysis (2010) of sector reforms until 2005, she finds that under international influence, the water sector in Ghana has been reformed by a "shift from […] 'filling the gap' [through subsidies] to 'managing scarcity' [through staff development and integrated management approaches]" (ibid., p. 116), triggered in turn by a shift away from public health concerns and towards the broader concern of socio-economic development. This is mirrored in the World Bank's description of water as "the silent crisis in Ghana" (World Bank 2007, p. 13). The Bank continues to consider its interventions an achievement towards economically viable urban water management: "the Bank has actively engaged government and other stakeholders over the last 10 years, and this dialogue has resulted in the introduction of the private sector in the management of the urban water utility" (World Bank 2007, p. 47). In Ghana's National Water Policy (2007), the World Bank description of water crisis as a threat to economic development is upheld (Ghana National Water Policy 2007, p. 9). The transferal of guiding principles of donors' agendas into National Water Policy is evident in its promotion of selected integrated water resource management (IWRM) principles, including an emphasis on the private sector's role in providing water services that is repeated throughout the document: "The Government of Ghana is determined to halt the falling trends in water supply coverage and quality and resume a programme of expansion and improvement. This requires consistently high levels of investment and increasingly private (local and foreign) sources" (Ghana National Water Policy 2007, p. 30).

It becomes clear from the Accra study that water management and governance have been repeatedly restructured since the middle of the 20th century. Only 12 years after independence, the international community became involved in water policy design. Throughout this period, restructuring has been strongly encouraged and supported by international organisations (such as the World Bank) and companies. One could say the city has become a playground for international organisations testing modern paradigms of development assistance in the donors' darling of Sub-Saharan Africa. Today, since restructuring has shown little impact, companies are withdrawing their interest in investing in the system.

The lack of practical instruments for pro-poverty and sustainable water resource management (as stated, e.g., by Groenfeldt 2010) may originate in the plagiarising of donor strategies without assessment specific social and political contexts (because reforms were implemented without adequate participation: Fuest and Haffner 2007). Most importantly, the particular roles of informal structures in specific local conditions (such as the land tenure system) have long been disregarded.

Looking at the history of Accra's water governance since independence, it appears that no alternatives to Western paradigms for safeguarding water security currently enter policy design.

The Notion of a Water Crisis in Academia

Since global ecopolitics is generally based on scientific research (Stoett 2012; Turner and Robbins 2008) it is worthwhile to look at academic literature published on the topic, as is done in this chapter. Within the urban water situation in Accra—influenced by Western paradigms as described—two questions are of major interest: firstly, by whom and how is the water crisis in internationally policy-shaping discourses framed? And, secondly: Is there a difference in the framings of the global and the urban water crisis, respectively?

A brief look at research areas contributing to study of the water crisis reveals that the hard core of natural sciences (Geology, Environmental Sciences, Water Resource Studies and Engineering) leads the field in expertise. By contrast scientific disciplines which engage with people, cultures and the institutions they build to regulate the resources are clearly in the minority. This is surprising and even more so since principal themes accompanying the water crisis are of societal and political nature—as acknowledged by the majority of the analysed articles (see Table 27.2) (Fig. 27.1).

Research on both urban and global water crisis is informed to a large extent by secondary empirical data. Primary research is mainly carried out at the city or household level, while many articles explore the global water crisis on a very generic, more conceptual level. We found that studies on the global water crisis tend to generalise, up-scale and transfer their findings, in an attempt to provide knowledge beyond the specific analysis. A separation between disciplines is thus detectible, in methods and data that accompany different spatial scales of analysis. This divide may also explain why governance related aspects are predominantly discussed on the city level, and large scale technical and universal managerial solutions tend to dominate studies of the global water crisis.

Review of worldwide research into the urban aspect of global water crisis reveals that the scale employed in many articles as to where the crisis occurs is poorly defined. While the scale of the approach is quite clear in research referring to urban crises, the exact nature of global crises remains unclear. The poor attention to scale in global change research has already been addressed by O'Brien (2011), who stressed that scales function as an ordering system between different scientific disciplines, and thus may hinder full understanding of global environmental change. If the global water crisis is in fact the aggregate of local, individual water crises, then regional to global datasets are suitable neither for studying the crises, nor indeed for deriving governance solutions. In terms of water security,

Table 27.2 Summary of key results on framings of the 'urban water crisis' and the 'global water crisis' in peer-reviewed academic literature

Item	Urban water crisis	Global water crisis
Employed methods	Most frequent method: interpretation of secondary source empirical data (28/67), followed by primary source empirical data (19/67) and conceptual approaches (17/67); least often: lab-based approaches (7/67)	Most frequent: secondary source empirical data (39/83) and conceptual assessments (29/83). Least often applied: modelling and primary source data (11/67 each)
Household level	Six of the seven articles looking at household level were based on primary source empirical data	
Scale of analysis	Most frequent scale of analysis: city level (44/69)	Supra-national or non-specific scales dominate (33 and 34 out of 84, respectively)
Focus of analysis	Many articles (more than half—38/69) referred to more than one aspect of a water crisis. The most abundant framing was related to socio-economic problems (40/69), followed by policy-related challenges (36/69) and engineering and infrastructure (28/69)	The global water crisis was framed (analysed) most often in the context of policy issues (34/84), followed by socio-economic issues (31/84) and infrastructure/engineering challenges (26/84)
Type of solution	Primary source empirical data-based analyses predominantly led to governance recommendations (8/18)	Technical recommendations outweighed other types of recommendations slightly
	Analyses involving modelling approaches most often led to recommendations with regard to management	

such research does not address questions of environmental justice, or the dichotomies between rural and urban areas that are key to cross-scale governance (cf. Stoett 2012).

Science-Policy Interface

Key global environmental governance policies and frameworks refer to well-cited academic literature, such as the body of work analysed in this study. The frameworks and guidelines influencing national and local water policies are identical. As water governance in Accra shows, many countries and cities are obliged to integrate international frameworks in local decision-making, particularly when they depend on financial assistance from international donors. At the same time, neither Accra as a city nor Ghana as a whole have had any freedom to experiment with strategies of water governance without international intervention. Besides

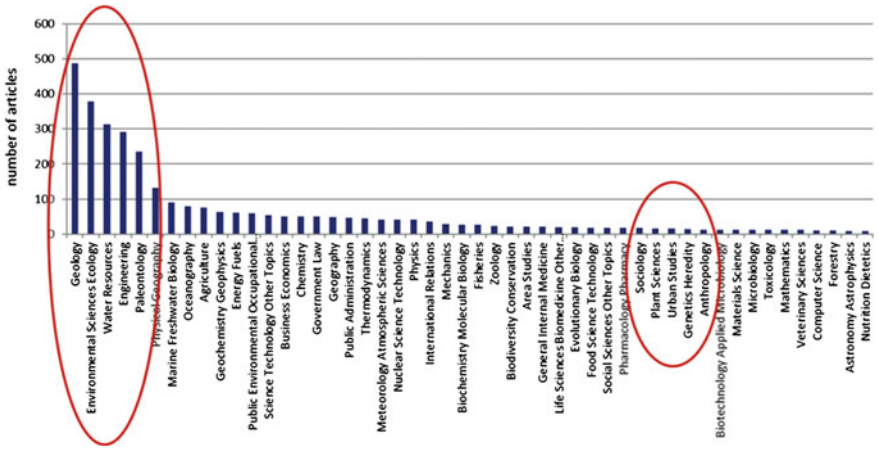

Fig. 27.1 Research areas of articles exploring the water crisis. Data from a web of science search

this, local research has long been strongly influenced by Western scholars (and continues to be so, as the brain drain mainly to Europe and the United States is ongoing (Takyi and Addai 2003)). While these internationally influenced frameworks, technical and management interventions have largely failed, local coping strategies that have been developed were not meaningfully included in national water governance strategies. So, in the case of Accra, the reproduction of discourse appears mostly unidirectionally top-to-bottom, from global to national to local level.

The above hints at a crucial gap in the interface between science and policy: Accra demonstrates several challenges that are peculiar to urban water governance. The sheer amount of research done on urban water crisis indicates that scholars are very much aware of the particular features of urban water, whilst only a limited number appear to assess the urban water crisis using primary data. Findings are often generalised. As a result, policy-makers either have to collect their own data, or rely on blueprinting solutions from elsewhere without adequate localised knowledge. Review of policy documents about Accra reveals no meaningful alternative to the dominant framing of the water crisis. Critical studies of water governance in Accra do exist (for instance, Yeboah 2006; Fuest and Haffner 2007; Adank et al. 2011), yet water governance policy shows that such research has had little to no influence on policy decisions on the national and city level.

Instead, our study revealed simplistic interpretations and reproduction of the crisis narrative in water policies inspired by managerialism. Both scholars and policy-makers alike have failed to take adequately into account water's multiple facets as "socio-physical constructions that are actively and historically produced, both in terms of social content and physical-environmental qualities" (Swyngedouw 2009, p. 56).

Towards a Shift to Critical Social Science in Water Research

We showed that mostly Western scholars, large international donors, and alliances between them claim to be capable of defining the water crisis as well as of knowing how best to solve it (by the adoption of IWRM principles). In shaping and promoting the universal discourse on the 'water crisis' in this way, the international water research and developing assistance community has become a 'hydro-hegemon' (Zeitun and Warner 2006), unintentionally implementing strategies that often trigger competition and exploitation rather than cooperation—as shown in the example of Ghana's water governance system. While policies were reframed and governance structures revised, clear definitions and goals of IWRM were however often lacking, or the Western paradigms involved stood in conflict with existing values, norms and practices (see also Agyenim and Gupta 2012). As a consequence, reforms were only partially implemented, and sometimes even triggered adverse change, instead of bringing about true integration and participative development of the water sector.

Although the water crisis is in fact a governance crisis (Pahl-Wostl et al. 2010) which was also stated in many articles analysed in this study, studies of the socio-political nature of water are rare and even more importantly those available tend to gloss over the power of hegemonic narratives (e.g. Sivipalan et al. 2012).

The overall lack of critical socio-scientific studies in water research, their restriction to smaller scales of analysis in contrast to global studies on the water crisis, and a dearth of truly interdisciplinary cross-scale studies contribute to a fragmented understanding of coupled socio-hydrological cycles. We therefore suggest reframing traditional hydrology and strengthening critical perspectives political ecology can offer. Such a new framing of society-water-interactions in the Anthropocene would disentangle how current and historic water governance is related to social power and how this is shaping the 'water crisis'.

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