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**ENSURING AVAILABILITY AND SUSTAINABLE MANAGEMENT
OF WATER AND SANITATION FOR ALL**

**WaterPower: studying physical and socio-political
factors in water security**

A. Bruns, M. Kondra, R. Alba, J. Akubia, L. Bartels, F. Frick & K. Schulz (Germany)

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This briefing paper presents the initial findings as well as the integrative approach of the project WaterPower. WaterPower is a four year research project that is currently in its second year. The project combines multiple scientific perspectives to study how social and biophysical factors are interacting to shape the various uses and flows of water in Accra. The city of Accra has been chosen as a case study due to its status as a coastal capital in the global south where major global trends such as climate change and rapid urbanization intersect. Water as a natural resource, we content, is not only of great importance for the sustainability of ecosystems and socioeconomic systems. Flows and uses of water are also bound to questions of politics, security and accessibility. However, in spite of these interrelated social and biophysical challenges we maintain that Water Studies as a field of research is still surprisingly disciplinary in its approach and scientific outlook. This briefing paper therefore pursues a twofold objective. On the one hand, we seek to show how the WaterPower research approach can contribute to a more integrated understanding of Water Studies in an urban context. On the other hand, we present our initial findings on how individual and collective capacities for responding to the multiple water-related pressures at hand can be strengthened. In sum, we emphasize that an ongoing and intensive exchange with stakeholders, policy-makers and interested parties in Ghana is essential for WaterPower's integrative approach.

Shortfalls and dis-connects in water studies

Despite the growing awareness of the interconnected nature of water, the field of Water Studies remains fragmented with negative implications for proposing solutions to the water crisis and policies. Traditional boundaries between scientific disciplines and the persistent divide between the natural and the social sciences contribute to this overall fragmentation. At the same time, however, the field of Water Studies must retain its internal diversity, as it has to engage with social and ecological processes that differ vastly in their temporal, spatial and administrative scales. Matching these different scales under conditions of rapid and uneven urbanization, while still remaining flexible enough to adapt to the interconnected risks of social and environmental change thus presents a key challenge for scientists and policy-makers alike. Particularly in view of the widening gap between science and policy, we argue that an integrated approach to Water Studies can contribute to addressing critical water-related issues and the challenges of achieving water security.

However, before introducing the integrated approach to Water Studies that we seek to advance within WaterPower, we point to a number of shortcomings that run the risk of inhibiting a more balanced analytical approach to Water Studies in the urban sphere. Particularly with regard to urban water security, we identify a concrete overemphasis in contemporary scholarship on water supply in socially disadvantaged urban areas, whereas informal market dynamics and the related social dynamics in middle income areas tend to receive considerably less attention. Another analytical imbalance exists, so we argue, due to the strong emphasis on networked infrastructure, while the multiple and inventive ways of serving people with water from wells, tankers, water vendors are often fading into the background (see Adank *et al.*, 2011). Overall, there is very little research available that explores how co-existing systems of water supply interact or conflict. Lastly, we maintain that access to land, water and infrastructure (e.g. sanitation) has seldom been studied from a

comparative perspective, particularly in relation to pervasive processes of peri-urbanization, which still remain under-conceptualized. Based on these initial considerations, we now proceed by illustrating how these shortcomings are addressed in the context of WaterPower.

Inter- and transdisciplinary project approach

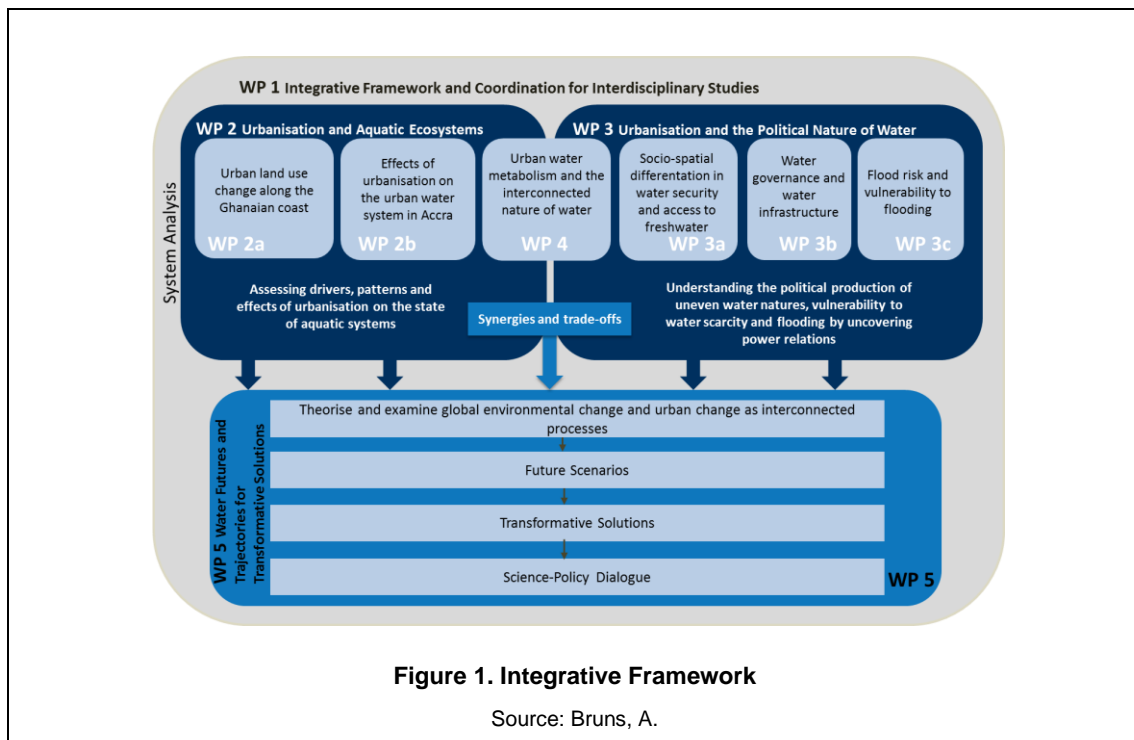
Given the complex dynamics of global environmental change, urbanization and water security, a inter- and transdisciplinary approach is being employed in order to study the relation between these phenomena. WaterPower conducts research by drawing on different disciplinary perspectives that help to develop an integrative understanding of Water Studies. At the same time, the knowledge that is available outside of academia also needs to be acknowledged. Therefore, we employ a transdisciplinary approach which builds on the expertise of local and national stakeholders while addressing sustainability challenges of resource governance and (urban) development in the water domain. Thereby WaterPower expects to contribute towards achieving the water-related *Sustainable Development Goals* (Goal 6; UN-Water, 2015) and create a dialogue platform for political and non-political actors towards achieving a water secure future.

WaterPower's research aims and methodology

WaterPower draws on insights from political ecology, environmental justice and governance research to illuminate the relationship between biophysical and sociopolitical processes in the context of urban water security (Bruns, 2014). Given its role as an essential resource for the livelihoods of urban and peri-urban dwellers, for the preservation of ecological systems such as coastal wetlands and river systems, and for the sustainability of urban metabolism as a whole, water offers an entry point for understanding the complex interactions between human and environmental systems, and between technology and society. Water is also a way to study the impacts of global processes such as climate change and urbanization in the local water sphere and their effects on the everyday life of urban society. Therefore, WaterPower analyses the urban water sphere by integrating social and natural science approaches that allow for a comprehensive understanding of water dynamics. The project fosters an integrated understanding of human-environment dynamics that combines multiple disciplines as well as academic and non-academic knowledge.

As a field research area, WaterPower mainly focuses on Gama, while particular attention is given to coastal areas. Since population increase has put the coastal urban areas of Accra under increasing pressure, the coast has undergone rapid changes. These rapid changes in the coastal zone of Accra are characterized by different biogeographic conditions, which makes the coastal zone a suitable site to study the effects of urbanization patterns on resources and ecosystems (Schermer *et al.*, 2013; Oteng-Ababio *et al.*, 2011). At the same time, WaterPower acknowledges that the study of water flows in urban areas is inherently bound to questions of politics and access to resources (Bakker *et al.*, 2008). Thus, in-depth studies of access practices, infrastructure, governance regimes and historical as well as socioeconomic processes are carried out. Lastly, a focus on environmental risks and adaptation strategies complements the project by taking flooding as a case study.

To be able to achieve these multiple aims of the project, WaterPower adopts a mixed methods approach, including social scientific research as well as natural science approaches and the modelling and analysis of geospatial processes. These mixed methods are being applied collectively in the general work packages illustrated in Fig. 1. The overall integrated approach also guides the theoretical and analytical framework. In sum, the project aims to develop an integrative approach and coordinate interdisciplinary studies with particular focus on: spatial mapping and modelling with application of geo-information technology; exploring the urbanization and associated changing land use dynamics on aquatic ecosystem with political-actor based perspective; analysing urban water flows and everyday practices of water access; assessing the dynamics of land accessibility and ownership; exploring the influence of governance in water infrastructure and assessing flood risk areas and the vulnerability of Accra's coast to flooding.



Initial findings

An initial literature review shows that academic research on the urban water often draws from blurry definitions of the so-called ‘urban water crisis’ (Bruns and Frick, 2014). This has important impacts on urban water security as proposed solutions are often technically oriented based on pre-existing models taking local realities and everyday practices only into limited consideration (see also Pieterse, 2011; Ernstson *et al.*, 2013). Thus, the first step within WaterPower project was to carry out in-depth qualitative field research in different locations within Accra and its metropolitan area. Some initial findings are illustrated below. A second on-going phase of the project includes the integration of the initial qualitative findings with environmental assessments and mapping of coastal urbanization using remote-sensing techniques. With this approach the authors are seeking to contribute to a multidimensional understanding of the ongoing socio-environmental processes in Accra.

Interviews with (peri-)urban residents and multiple water providers in combination with field observations and expert consultations revealed a mismatch between everyday practices and policies, partly confirming the findings of the initial literature review. For instance, for the case of water supply, only limited knowledge seems available on the everyday practices of water selling and vending in Accra and their role in meeting the daily water needs of both, poorer and richer strata of the urban population. Although well-known as an alternative source of water supply, these sources ‘beyond the pipe’ receive only limited attention in urban water policies. Similarly, dichotomies between local strategies and policy prescriptions become apparent when analyzing flood risks and adaptation. In this case, findings show that understandings of urban flooding should look at the wider interactions of multiple risks and vulnerabilities, including violence, lack of water supply and flooding, together with migration and limited access to land. Moreover, empirical research pointed toward the key role of urban dwellers in ‘providing for themselves,’ particularly in the absence of state facilitated infrastructure and services. This is the case, for example, in the fast growing peri-urban areas of Accra where water self-supply is common and residential water providers emerged. In sum, these findings show that new insights can be gained from a more locally-oriented understanding of how urban dwellers secure not only their water needs but also their livelihoods. Such an integrated understanding is possible only by studying water security from multiple perspectives, for example within the wider context of rapid urbanization and global environmental change. A transdisciplinary research approach based on regular consultations with stakeholders, collaboration of researchers from multiple disciplines and frequent field visits thus offers the opportunity to foster an integrated understanding of social and environmental challenges for water security in an urban context.

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Contact details

Antje Bruns is Professor for Sustainable Development and Governance at the Geography Department of the University of Trier, Germany. Her work examines political dimensions of environmental and resource governance in the context of climate change response. Antje’s theoretical interests span political ecology, environmental studies, and debates over development and sustainability transformations.

Antje Bruns
University of Trier, Faculty of Regional and
Environmental Sciences,
Governance and Sustainability Lab
54286 Trier, Germany
Phone: +49 651-201 4550
Email: brunsa@uni-trier.de
<http://www.waterpower.science/>

Maria Kondra
University of Trier, Faculty of Regional and
Environmental Sciences,
Governance and Sustainability Lab
54286 Trier, Germany
Phone: +49 651-201 4011
Email: kondra@uni-trier.de