

Sustainable Urban Water System Transitions Through Management Reforms in Ghana

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Abstract Despite decades of water reforms, Ghana’s struggle to achieve sustainable urban water system is deepened by complex interactions of multi-layered political, socio-economic and managerial characteristics, leaving a rationing system of water supply in major cities like Accra. Using a multi-level perspective framework, the paper examines the dynamics of urban water system transition through management reforms. The study showed how external pressure at the landscape level influenced policy direction within urban water regime through the implementation of neo-liberal economic policies, paving way for resistance and grassroots innovation at the niche level. The implementation of such policies in the reform process did little to help achieve the desired sustainable urban water system goals. The paper suggests a blend of public and private financing with support for grassroots to improve urban water system management. However, subsequent urban water policy reforms must be informed by knowledge of social, economic, and political realities rather than imported generic “best policies and practices” that often conflict with local realities.

Keywords Multi-level perspective · Reforms · Policies · Management · Transition · Urban water system

1 Introduction

Ghana’s recurring urban water deficit crisis over the past decades has evolved from a simple technical challenge into a complex multi-faceted interaction of political, economic, and social realities deeply enmeshed in the water system. The rapidly growing urban population and

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industrial water demand are putting massive pressure on the aging urban water infrastructure to increase water supply. Worsening the situation is the recurring power crisis which has severely impacted portable water production, while extreme climatic conditions, and pollution contribute to water sources decline and water quality in river basins. The water crisis has not spared the capital city, Accra, where water demand far exceeds available supply, leaving a rationing schedule, with more than 60 % of the city's residents with few hours of water supply and 10 % with no access (Kessey and Ampaabeng 2014).

In responding to the crisis, the Government of Ghana (GoG) embarked on a transition process, involving the implementation of fiscal, regulatory and institutional reforms, with funding support from lending institutions such as the World Bank and International Monetary Fund (IMF) (Hirvi and Whitfield 2015). Fundamental to the reforms was the implementation of neo-liberal economic policies recommended by the lending institutions and regarded as panacea for establishing a financially self-sustaining water sector, capable of attracting private capital investment (Obeng-Odoom 2012b).

Implementing water reforms has been a highly contested process, generating intense debates and power interplay among actors, with socio-economic consequence on urban water service delivery. Despite the massive financial investment in reforms, government's goal of transforming the urban water system into an efficient and financially self-sufficient entity has not fully materialised. The key questions are: what are the political, economic, and social forces militating against the achievement of sustainable urban water system in Ghana? What are the multi-level drivers shaping reforms in urban water system? Who are the multiple actors involved in the reform process and what are their interests and power relations?

The paper employs the multi-level perspective (MLP) framework to analyse the changing dynamics in Ghana's urban water system at three levels of interaction- the regime, niche and landscape levels. Using excerpts from Accra, the paper explores the urban water regime's struggle to implement policies, following pressures from landscape drivers. In doing this, the paper examines the political, economic, social, technical and managerial features of the current urban water system, actors' interactions and their influence water supply and management. The framework offers an important starting point by providing insights into multi-level analysis of the interaction between actors, networks, technologies, institutions, and processes within the urban water system in Ghana.

The application of MLP framework has mainly focused on socio-technological regimes in developed economies, with little emphasis on politics inherent in interactions and processes within existing systems. Attempts have been made to advocate for more politically-oriented studies on sustainability transitions (Meadowcroft 2011). In this paper, we apply the MLP framework in a developing economy context with minimal technological advancement, highlighting the socio-political aspect of urban water regime in Ghana. The paper brings a novel perspective on sustainability transitions in urban water system through management reforms in Ghana.

1.1 Multi-level Perspective: a Critical View

In understanding and unravelling the complex dynamics and interactions between the different elements in water management, several analytical frameworks have been developed. For example, Bandaragoda (2000) developed a framework for Institutional Analysis of Water Resource Management in River Basins. Its novelty lies in focusing on transparent policy processes of parastatal organizations, mode of water-service delivery and environment for

collective action in managing common pool resources in river basins and its implications for sustainable livelihood (Kurian 2004). The Institutional Analysis and Development Framework (IAD), developed and built upon by Ostrom (2011) provides an approach to understand the policy process by drawing a systematic path for analysing institutions that govern actions and outcomes with collective arrangements. The United Nations Development Programme (UNDP) developed the Institutional and Context Analysis (ICA) framework, which emphasised on institutional and political factors, and processes regarding national and external resources use in a given context, and their impact on implementing programmes and policy advice (UNDP 2012). This framework explores the responses of different actors, confronted with both incentives and constraints, and how these interactions influence the prospects of programme success.

In multi-level analysis, Pahl-Wostl et al. (2010) developed the Management and Transition Framework (MTF), which supports analysis of urban water governance regimes and transition processes towards adaptive management. It deals with characterising social system (actor network, institutions, and governance), the behaviour of individual actors, and interaction between social and ecological systems. In understanding the internal processes that facilitate or constrain policy implementation, the Contextual Interaction Theory (CIT) assesses multi-actor process, involving interaction between key actors who decide the path and outcome of the process (Bressers and de Boer 2013).

These frameworks have proven useful for the analysis of institutions, policies, processes, and interactions among actors, however, their limitation is their inability to fully account for the wider environment that influence transition or change within the system, emergence of technologies, and innovation from the grassroots. The Technological Innovation System (TIS) Framework has been used for understanding the complexity of matured or emerging technologies, diffusion of new and radical innovation in and beyond sustainable transition context (Markard and Truffer 2008). However, the TIS framework fails to make a clear distinction between internal and external factors.

The MLP framework goes beyond multi-level analysis to capture how opportunities are created for emerging technologies to breakthrough and, simultaneously allow innovation to have a wider impact by shaping socio-technical landscape and regime. Its novelty lies in providing a better understanding of the system approach to transition by effectively integrating various theoretical strands to analyse change processes, detailing how incumbent regimes are shaped by external driving pressures and innovations at the landscape and niche levels respectively (Geels 2011).

Despite its growing popularity, the MLP has provoked a barrage of criticisms. Berkhout et al. (2004) and Genus and Coles (2008) have questioned the delineation of various levels of MLP, in particular defining the object of analysis in the regime. Other authors have criticised the particular emphasis on regime as the principal focus of analysis at the expense of the landscape and niche levels, which are regarded as “derived concepts” (Van Driel and Schot 2005). In response, Geels (2011) argued that the MLP is actually flexible with no prescription for a narrow or broad regime but rather important to constituting a regime is the definition of scope, subject matter and demarcating the object of analysis, following which the analytical levels can be operationalised.

As a “protected space” with emphasis on internal processes, some authors have questioned the restrictive nature and the capability of the niche to spearhead new technologies and transitions in a socio-technical system (Raven et al. 2012; Seyfang and Longhurst 2013). The landscape is regarded a “garbage can” or “black box” lacking the dynamism to

accommodate many different contextual needs and aspects that do not fit in regime or niche (Whitmarsh 2012). The paper notes the lack of emphasis on how dynamics of an unstable regime compel change and reorganisation of events at the landscape level.

The MLP is criticised for the narrow focus on the socio-political aspects of transition, in particular the role of agency of actors, politics and power while paying much emphasis on the technological process (Genus and Coles 2008; Foxon 2013). While conceding to a limited focus of certain types of agency such as power struggle, rational choices and cultural dimensions, Geels (2011) remains insistent about the presence of agency, power and politics in the MLP framework, arguing that “trajectories and multi-level alignments” in socio-technical transition are always enacted by social groups. Regardless of the criticisms, the MLP is constantly evolving, integrating constructive suggestions and critiques to become a robust and yet adaptable framework for sustainability transition analysis. Proponents maintain that the MLP cannot be restricted to a mechanical or methodological procedure for analysis of complex and multi-faceted transitions, and therefore it will always embrace creativity and subjective interpretation (Geels 2011). All these insights offer a point of departure for the study of transition in urban water system management in Ghana.

2 Analytical Framework

2.1 Multi-level Perspective (MLP)

Essentially, how do we unravel the complexity of an underperforming urban water system to understand the challenges confronting Ghana’s transition pathway towards sustainable urban water management? As an important theory in transition studies, the MLP first developed by Rip and Kemp (1998) and conceptually expounded by Geels (2005, 2010, 2011) and others (Berkhout et al. 2004; Grin et al. 2010) provides a framework to understand the processes of change and interactions within a system at three levels of interactions—the regime, landscape and niche. The regime comprises dominant institutions, rules, norms structures and technologies that define a particular socio-technical system. The niche represents a “protected space” where radical innovations emerge. The landscape forms the wider external environment that influences change dynamics at the regime and niche levels.

The main change dynamics happen within and between the regime and niche levels, where interaction may be synergistic or antagonistic (Geels and Schot 2007). Though change is incremental, the regime is stabilised by various lock-in mechanisms such as sunk investments, favourable subsidies, bureaucracy, power relations that constrain flexibility and opportunities for radical change (Whitmarsh 2012). In this paper, the regime represents the institutions, policies, and structures that control the urban water system in Ghana. At the niche level, actors have the liberty to create radical change, with much less restriction from dominant institutions and the status quo to address societal problems, as well as influence regime and landscape pressures (Geels 2010). Here, grassroots innovation occurs and social coalitions strongly contest water reforms and attempt to influence policy discourse and practices within existing urban water regime. The landscape represents socio-economic, cultural and environmental context in which actors and institutions are situated. Events at this level are shaped by global trends, macro-economic patterns, political cultures, and other world views that are beyond the direct control of the regime and niche (Grin et al. 2010). At the landscape level, lending institutions such as the IMF and World Bank shape dominant economic and political

discourses, and influence the implementation of neo-liberal economic policies such as subsidy withdrawal, full cost recovery, decentralisation and privatisation in the water regime in Ghana.

The MLP provides a very useful and adaptive analytical framework that integrates different conceptual and theoretical strands to make sense of change process of policies, actors, structures and institutions governing urban water system and service delivery. The MLP has successfully been applied in historical and contemporary transitions studies in diverse areas such as transport sector (Geels 2005), water management and governance (Van der Brugge and Rotmans 2007), low carbon pathways (Geels 2012), among others.

3 Methodology

3.1 Data Sources

The paper employed mainly qualitative but also quantitative data from both primary and secondary sources. The paper consulted a wide range of secondary data sources including: project reports, policy documents, annual reports, project proposal, contract agreements, memoranda, workshop proceedings, among others from the Ministry of Water Resources, Work and Housing (MWRWH), Ghana Water Company Limited (GWCL), Water Resources Commission (WRC), Public Utility Regulatory Commission (PURC), the Ghana Statistical Service (GSS) and Water and Sanitation Monitoring Programme (WSMP). Other sources of data included: external project documentation from the World Bank and International Monetary Fund (IMF), as well as scientific journals. Through detailed analysis of these documents, the paper analyses the political, economic, social, technical and managerial features of the urban water system and explore the historical trajectory of water management, looking at the challenges and reforms that were implemented.

The paper also extracted important data on different modes of water service delivery, water consumption patterns and different users from the “Sustainable Water Improves Tomorrow’s Cities Health” (SWITCH) project (2009), civil society organisations such as Integrated Social Development Center (ISODEC), and the National Coalition Against Privatisation of Water (NCAP).

3.2 Learning Alliance Platform

Actors in the water sector were engaged through an interactive National Level Learning Alliance Platform (NLLAP). As a creative platform that brings together multiple actors from government agencies, research institutions, private sectors, and civil society, the NLLAP offers a learning and knowledge sharing opportunity for actors to improve sector engagements and to deliver efficient and sustainable services in the water and sanitation and health (WASH) sector in Ghana. The NLLAP which is characterised by multi-level institutional and multi-stakeholder processes to action research and implementation is informed by the Learning Alliance (LA) model (Verhagen et al. 2008). Grounded in the theory of change, the LA model is based on the assumption that different stakeholders on a platform will cooperate, learn and share experiences in an action research process to develop solutions [for urban water service delivery], that bring about lasting change (IRC and Triple-S 2014). The NLLAP has proven useful in understanding the connections between policy, implementation and organisational behaviour. In using this approach, the study gained access to vital data and information on how

the politics and external forces at the landscape level contributed to instability at the regime level in the form of policy reforms, organisational changes and management mechanisms, which in turn triggered the emergence of local and national coalitions that opposed the reforms in regime and resisted pressures from the landscape level. As a means of triangulating data from literature and the NLLAP, the study engaged in individual dialogues, and narrative walks, in which different actors shared knowledge and expertise with the researcher (Jerneck and Olsson 2013).

4 Results and Discussion

4.1 Characteristic Features of Urban Water System in Ghana

Ghana's urban water system of represents a mix of technical, political, institutional, and socio-economic characteristics that interact at multiple levels to create a complex and dynamic system for water supply, delivery and management. The existing state of affairs often promotes sectoral approach to water management, with several overlapping areas of responsibilities which account for politics, power contestation and sometimes institutional conflicts (Agyenim 2011).

4.1.1 Management and Political Aspects

The management structure of Ghana's water system is based on a top-down model, with power vested in the President of Ghana to make ministerial and top managerial appointments (MWRWH 2009). The Ministry of Finance and Economic Planning (MOFEP) is mandated to raise funds and approve loans for water sector infrastructural development while MWRWH implement national water policy and oversee activities of GWCL, the sole producer of pipe water; the Public Utility Regulatory Commission (PURC), and the Water Resources Commission (WRC). In the history of Ghana's water sector, strong political interferences have characterised top managerial appointments at the GWCL and PURC (Hirvi and Whitfield 2015). Three scenarios of political interference have shaped management with the urban water sector: (1) strong political allegiance of top management appointees to the government in power; (2) change in government usually comes with new ministerial and managerial appointments, with some appointments based on political connections rather than merits or competency; and (3) long-term retention of top position rests on the ability to forge a "harmonious relation" with incumbent government. These create avenue for corruption, political manipulation, restricted independent decision-making, job insecurity, and uncertainty in water institutions. For instance, between 1987 and 2007, up to eight changes occurred in the managing director position at the GWCL (ibid). Current water management is dominated by asymmetrical power relationships and politics, deeply intertwined in the broader socio-political and economic context, which make water management inherently political (Mollinga 2008).

4.1.2 Legislation and Policy Aspects

Ghana's legislative instruments for water management are quite recent. Reforms in the water sector resulted in two landmark legislative instruments—the Water Resources Commission Act 552 and Public Utility Regulatory Commission Act 538, which led to the establishment of the WRC and PURC in 1996 (Bohman 2012). These instruments defined the functions of the WRC

and PURC, and provided regulatory frameworks for policy formulation, water service provision, quality standards and monitoring, tariffs settings, and conflict management (MWRWH 2009).

The 2007 National Water Policy (NWP) was the first water policy since the development of national public water supply systems in 1928 (Bohman 2012). The policy provides a framework for water governance, focusing on three key strategic areas including water resources management, urban water supply and community water supply and sanitation. Inspired by Ghana's Growth and Poverty Reduction Strategy (GPRS), Millennium Development Goal (MDG) target on adequate access safe and potable water, and the 1992 Dublin water principles, the policy prioritises safe and adequate water as fundamental right for all people while recognising the economic value of water and its services (MWRWH 2007).

4.1.3 Social Aspect

The NWP highlights the principles of equity and pro-poor access to safe and adequate water supply, particularly to densely populated, low-income urban households. However, improving water service delivery to about 60 % of low-income urban population without pipe connection remains a major challenge (Obeng-Odoom 2012a). Against this backdrop, the GWCL created the community-based Local Water Boards (LWBs) which serve as intermediaries between the GWCL (producer) and communities (consumer) in water service delivery to unconnected urban areas in Accra (Morinville and Harris 2014). The LWB model demonstrates certain aspects of polycentric system of governance, representing a formal institution fashioned to regularise informal water service provisions through participation and involvement of communities in urban water decision-making (Ostrom 2012). By operating water tanker and vendor services, the Boards purchase bulk water from the GWCL and distribute to their communities at a negotiated fixed price. Despite the growing popularity, LWB model failed to significantly improved access to affordable water supply, as water charges remained expensive for low-income urban households (Morinville and Harris 2014).

4.1.4 Economic Aspect

Until recently, water service delivery in Ghana was heavily subsidised by the government with the intent to fulfil the fundamental rights of providing safe and adequate water to its populace. However, the need to rethink water subsidies, compelled by the push to treat water as economic good, resulted in the promotion of water privatisation as a solution for improving operational efficiency, financial viability, and private capital investment in urban water services delivery (World Bank 2005). The current water policy treats water as both social and economic good. A difficult challenge for the current regime is striking a balance between providing water as a social good to low-income urban households and implementing neo-liberal economic strategies of full cost recovery, tariffs adjustment and water privatisation.

4.2 Applying MLP in the Urban Water System in Ghana

4.2.1 The Regime: Mounting Pressure from the Landscape

Ghana's water regime came under a major landscape influence following a prolong drought in 1959, which resulted in water and sanitation crisis. A World Health Organisation's (WHO) study on water sector vulnerability and health risk led to integration of water and sewage sector

and subsequent establishment of the Ghana Water and Sewerage Corporation (GWSC) in 1965, a State funded utility for water supply and sanitation in urban and rural areas (GWCL 2015).

In 1968, the government requested a US\$3.5 million loan from the World Bank to expand urban water infrastructure and sewage systems in the Accra-Tema Metropolitan Area (ATMA), and to improve the operations and organisational capacity of the GWSC (World Bank 1969). The loan facility began an era of sustained financial dependence on external landscape actors such as the World Bank and IMF. In 1983 and 1994, the government received loan facilities from the IMF and World Bank to embark on two major water sector restructuring projects. Driving the need for external capital injection was: (1) the failing water supply infrastructure and poor financial and managerial capacities of the GWSC; and (2) the harsh global economic crisis that has crippled the government to undertake water supply infrastructural expansion projects. By agreeing to the loan terms, pressure mounted on the regime to implement comprehensive institutional and organisational reforms, as well as implement conditional market-oriented policies including subsidy withdrawal, full cost recovery, and tariffs adjustments. Also becoming apparent were the diminishing State control of urban water system, and the rising dominance of landscape influence on policy directions in water service delivery. For the government, it seemed convenient to rely on external policies in shaping its development agenda, in the absence of national water policy and strategies until the late 1990s as noted by Amenga-Etego (2003).

These reforms and investments rarely reflected in the desired improvement in urban water system and performance of the GWSC in water service delivery. The GWSC was unable to break-even in its operations, with continued losses due to poor revenue mobilisation, high non-revenue water, deteriorating infrastructure, and a backlog of capital work (World Bank 1989). The consequence was that, almost a decade down the line, almost 30 % of the urban water system had become dysfunctional (Halcrow 1995).

Despite the poor performance outcomes that created instability in the regime, the landscape actors namely the IMF and World Bank maintained the momentum for urban water reforms using carrot (financial aid) and stick (making water privatisation a condition) approach (Hirvi and Whitfield 2015). Proponents argued that water privatisation held the key to untangling the operations of public entities from political interference, while improving accountability and efficiency, based on impartial and efficient market principles (World Bank 2005). The privatisation idea, rooted in neo-classical economic theory, regards free market as the most suitable option for yielding the best possible economic outcomes such as reducing poverty, closing the equity gap, and reducing rural and urban disparity (Schydlofsky 1995). Opponents argued that privatisation does not account for the underlying political and socio-cultural concerns that shape public utilities in delivering social services such as water supply. For Amenga-Etego and Grusky (2005), privatisation was a political manipulation by multilateral lending institutions and donors in the developed north seeking the financial interest of their own corporate citizens in developing south. This assertion reflected the case of Ghana's urban water reforms as foreign firms dominated the water privatisation process.

In pushing the privatisation agenda, a World Bank funded feasibility study, conducted by a foreign firm, Halcrow recommended to the government a Lease Arrangement, which was acclaimed to offer competition between operators, full cost recovery and the best financial returns (Zaato 2014). Another foreign firm Louis Berger was tasked to develop a business framework for implementing the Lease Arrangement. The two outputs formed the strategy behind the implementation of water privatisation, later referred to Private Sector Participation

(PSP). Despite its recommendations, the Halcrow report also raised some contradictions that appeared to cast doubt on the real intent of the PSP implementation as noted by Adu-Ampong (2013). The report while advocating for PSP identified urban water sector challenges as internally structured problem peculiar to the GWSC. This problem the report reckoned could be resolved by establishing effective monitoring mechanisms for expenditure, revenue mobilisation, and improving quality standards and customer preference. The diagnosis and subsequent solution by the report therefore raised suspicions, given that it was sponsored by the World Bank, which was bent on seeing through the implementation of the PSP according to Amenga-Etego (2003).

4.2.2 *The Regime Change: from Public to Private Sector Participation*

The government's approval to implement the PSP arrangement under the reform process marked an important shift in urban water management in Ghana. A highpoint of the PSP implementation was the decoupling of urban water from rural water service delivery. The aftermath was the conversion of the GWSC into a limited liability company, the Ghana Water Company Limited (GWCL) to manage urban water, and the establishment of the Community Water and Sanitation Agency (CWSA) to manage rural water and sanitation (MWRWH 2007). This separation seemed like a ploy to implement PSP targeting the economically viable urban water sector, leaving the poor and undeveloped rural water sector, though one major problem identified by the Halcrow report was the low rural water access (40 %) compared to 93 % urban access. Making water problem an urban one provided the incentive for private sector engagement in a commercially viable sector (Adu-Ampong 2013).

The implementation of the Lease Arrangement stalled following allegations of corruption, lack of transparency and accountability levelled against the government in awarding the long-term Lease Contract. A stand-off between the government and the World Bank resulted in accusations, doubt and even threat of funding withdrawal. Ultimately, the government was compelled to recommence bidding and awarding for the Lease Contract. A change in government did little to hamper the pursuit of PSP agenda. With modifications, the new government opted for a 5-year Management Contract (MC) as it became obvious that expected funding from the Bank under the lease option would not materialise (GWCL 2010). The MC was touted a viable PSP strategy for delivering efficient and effective water service, bringing about improved performance, satisfaction and willingness to pay for quality services (World Bank 2004). It signalled a change in the urban water regime following a landscape pressures from the World Bank and IMF. Nonetheless, it remained to be seen if the regime change was stable enough to sustain the new arrangement and interactions between public and private sector actors.

Following a transparent bidding process, the 5-year MC was awarded a private foreign company, Aqua Vitens Rand Limited (AVRL), to operate urban water supply services in Ghana. A total of US\$120 million, with contribution of US\$103 million grant from the World Bank with, a counter-funding of US\$12 million from the Ghana government and US\$ 5million from the Nordic Development Fund was approved to implement new reforms (GWCL 2010). Under this arrangement, the "AVRL (the Operator) was responsible for operating existing and future assets of GWCL (the Grantor) in designated areas on daily basis to deliver portable water, while GWCL was responsible for monitoring AVRL's operation and performance as well as raising capital. This arrangement, critics argued seemed dubious given that GWCL was labelled incompetent to manage, raising questions about their capacity to effectively monitor the implementation of a sophisticated contract (Agyeman 2007).

In sum, the continuous physical and economic losses in urban water system, and non-performance of public entities justified the case for PSP implementation. The shift towards PSP was not only informed by Ghana's history of water reforms, but formed part of a larger global vision for private sector engagement in water management, backed by multilateral lending institutions and bilateral donor agencies (Whitfield 2006). These landscape actors succeeded in pushing the PSP policy into regimes by combining persuasion and pressure through financial aid and loans to borrowing countries.

4.2.3 The Niche: Opposing Landscape Pressure to Shape the Regime

The landscape pressure did not only influence changes in urban water regime, but also triggered a niche experiment. From the socio-political perspective, the rise of social groups against private sector engagement became widespread following sustained increase in water tariffs began as part of the PSP implementation. Leading up to the implementation of the MC, various social interest groups and civil society actors joined forces to form the National Coalition Against Privatisation of Water (NCAP) to oppose the implementation of PSP. According to the World Development Movement (2005), the NCAP mounted one of the fiercest opposition in the history of water sector privatisation in Ghana. In articulating their position, the Coalition rejected the dominant role of foreign firms and private capital investment in urban water, arguing that the obsession to make the urban water sector profitable through foreign private capital injection spelt doom for the majority urban poor, who were incapable of paying high tariffs. The Coalition denounced the imposition of water privatisation as a condition for accessing IMF/World Bank loans, and contested the justification of guaranteed efficiency by private operators.

By devising a mix of strategies, the Coalition became a strong force, mobilising consumers and actors with the country and beyond to dispute alleged positive outcomes of water privatisation (Adu-Ampong 2013). They engaged government directly by providing evidence of poor outcome of water privatisation, drawing cases from Cote D'Ivoire, Gabon, Guinea and Senegal which suggested very limited evidence on improved water service delivery and poverty reduction (Hall et al. 2005). The Coalition persuaded strategic and eminent persons to convince government to change its stance on MC implementation. Using the media, they sensitised and created awareness to build critical masses to put popular pressure on government. They also lobbied international organisations and advocacy groups to gain external support and consolidated voice. Aimed at promoting international solidarity, the Coalition persuaded the World Bank and IMF through a petitioned letter to free Ghana from loan conditionalities such as PSP. The Coalition rather proposed a public-community-partnership model that emphasised on decentralised system of water provision in localities, giving more power to communities to manage water service delivery from the public utility.

From the transition perspective, pressures from the IMF and World Bank to ensure the implementation of PSP created more instability in the regime, and allowed niche level opposition to pressure on the regime. Despite the strong opposition, the government proceeded to implement the PSP. Nonetheless, the Coalition played an essential role in the suspension of the PSP at the early stages, and influenced further modifications before implementation (Fuest and Haffner 2007). This effort signifies the contribution of social practices as an equally basic driving force for system transitions, which may in turn influence a change.

4.2.4 *The Regime Change: Opportunity for Niche Experiment*

From a socio-technical perspective, the regime, under existing landscape pressures, is willing to embrace innovations that do not create or require a massive transformation in the established socio-technical system (Van den Bergh et al. 2011). The production and supply of water in 0.5 l plastic sachet has become grassroots innovation sensation, gaining legitimacy, and permeating the market to become an important drinking water source for almost 9 % of Accra's urban population (Stoler et al. 2013). There is a widely held belief about the high quality of sachet water, though cases of low quality sachet water products have been reported (Sarpong and Abrampah 2006). The GWCL raised serious concerns about the source of raw water, as majority of sachet water producers draw water from the high pressure zones (HPZ) of the GWCL pipe network, often creating artificial water shortage downstream.

With approximately 3000 sachet water producers in Accra according to the national Daily Graphic (2014), sachet water has emerged as a strong niche innovation response to the urban water regime crisis, reaching areas unconnected by the pipe network. The growing drinking water demand leaves a huge gap for sachet water production to fill. Yet, there are several implications regarding the growing dependence on sachet water production. First, sachet water producers continue to hijack direct access to pipe water, depriving consumers of cheaper portable water. Second, the growing perception of the high quality of sachet water is dimming consumers' confidence in the water quality supplied by GWCL, and third, the growing sachet water market has permitted profiteering and influx of low quality products, making monitoring of quality standards a challenge. Nevertheless, sachet water production as a grassroots innovation has proven beneficial by providing reliable supply and access to portable water.

4.2.5 *From Private Sector Back to Public Sector Management*

The performance of AVRL in urban water services delivery came under rigorous public scrutiny following the non-renewal of the AVRL's contract by the Government in 2011. Drawn from quantitative data from the GWCL backed by multi-level discussion from the National Level Learning Alliance Platform (NLLAP), the paper presents an analysis of AVRL's performance during the contract period which prompted the contract non-renewal. Table 1 presents physical, financial and economic indicators (2006–2010) for Accra. From 2006 to 2010, the volume of treated water produced was up by 10 % while the amount of treated water billed and sold to consumers was up by almost 19 %. The revenue generated from water service delivery showed an increase of about 60 %, with net operating surplus posting an increase of 75 % during the contract period. The positive revenue outcome was attributed to over 50 % increase water tariffs rather than efficiency improvement. Matching the increased water revenue was the operational cost which increased by almost 60 % during the period affecting the profit margin. A critical target that remained unachieved was the 5 % annual reduction in non-revenue water. Non-revenue water maintained a year average of 50 % of the volume of treated water produced annually during the contract period. In sum, the performance of AVRL in achieving operational efficiency, full cost recovery and financial self-sufficiency was progressive but unimpressive.

The progressive performance outcome of urban water system in Accra was overshadowed by the generally poor performance of the entire urban water system in Ghana. Audited account of AVRL's operation in all 80 urban water systems showed a disappointed record of losses in

Table 1 AVRL performance indicators for urban water service delivery in Accra (2006–2010)

	Unit	2006	2007	2008	2009	2010	(%) Variation
Production							
Raw water abstract	M m ³	232.60	231.20	229.80	246.00	258.70	10.09
Treated water produced	M m ³	211.80	214.20	215.80	231.70	244.60	13.41
Water sold and billed	M m ³	100.10	103.90	107.70	112.30	122.80	18.49
Average daily production	1000 m ³	580.30	586.70	589.50	634.79	668.30	13.17
Average water tariff	GH¢/m ³	0.56	0.67	0.94	0.93	1.17	51.98
Production loss	%	8.9	7.4	6.1	5.8	5.4	64.81
Daily capacity utilization	%	74	75	75	79	82	9.31
Revenue							
Total income	M GH¢	57.00	69.40	102.30	106.60	146.00	60.96
Water revenue	M GH¢	55.90	68.70	100.70	104.30	143.20	60.96
Total collection	M GH¢	53.40	61.40	93.80	101.10	130.20	58.99
Collection ratio	%	0.95	0.89	0.93	0.97	0.91	4.49
Non-revenue water	%	0.53	0.52	0.50	0.52	0.52	2.13
Net operating surplus	M GH¢	9.00	13.40	12.70	18.80	36.40	75.27
Production cost							
Operating cost	M GH¢	48.00	57.80	89.60	87.80	109.60	56.20
Electricity cost	M GH¢	14.60	17.10	32.80	22.60	29.80	51.01
Chemical cost	M GH¢	5.40	5.50	5.90	9.70	10.00	46.00

M- Million; GH¢1 equivalent to US\$ 0.29 (Data source: GWCL)

total revenue collected, net operating income, rate of revenue collection and non-revenue water. At the end of 2006, AVRL recorded a total loss of GH¢53 million. In 2007, losses were similar to the previous year. However, the Company returned to the positive by recording a net operating surplus at the end of 2008, which was mainly due to the increase in water tariffs. The AVRL's performance in 2009 was rather mixed. With a surplus of GH¢45 million, AVRL posted a net operating deficit of GH¢124 million owing to high cost of operation. In financial and economic terms, the performance of AVRL in managing the urban water systems in Ghana was deemed unsatisfactory. In technical and operational terms, the records showed a dismal performance of AVRL to substantially improve the efficiency of urban water service delivery, water supply coverage, water sales and significantly reduce non-revenue water. Water losses due to leakages, broken pipes and illegal connections contributed to more than half of the total volume of treated water produced and sold. On these accounts, the Government of Ghana ranked the performance of AVRL as unsatisfactory and decided against renewing the MC after expiration.

The AVRL strongly refuted the accusation of non-performance, arguing that its tenure as water manager has rather improved water service delivery and redeemed the poor image of the GWCL. The AVRL raised serious limitations such as governance issues, lack of financial independence, procurement malpractices, over-invoicing, corruption, tariffs adjustment autonomy, that crippled by its inability to operate effectively (Zaato 2014). For example, water tariff adjustments were set by the PURC, which was still prone to political interferences and manipulations. Such arrangement undermined the AVRL's capacity to make the sector financial viable.

By mid-2011, the MC arrangement was discontinued and a new entity, the Ghana Urban Water Limited (GUWL) was established as an interim measure to replace the AVRL. This development somehow vindicated NCAP's stance and heightened criticisms over the failure of PSP. Nonetheless, it became obvious that landscape actors did not favour the discontinuation of MC and were fixated towards pursuing the PSP policy. This move accounted for the establishment of the GUWL instead of transferring AVRL's functions back to GWCL. Following pressure from the grassroot actors, and several deliberations, the government with support from the World Bank approved GUWL integration into GWCL in 2014. This turnaround from private sector to public management thus placed GWCL in a tough position to prove its worth. In the nutshell, the 'private sector good' and 'public sector bad' debates failed to recognise the dynamic characteristics of each form, being it public or private, thus proving costly for PSP implementation (Shang-Quartey 2014).

5 Conclusion

Ghana's water sector has undergone a series of institutional, fiscal and regulatory reforms with loans and aid support mainly from the World Bank and IMF. These loans and aid facilities are often burdened with "conditionalities" that compelled the implementation of neo-liberal economic policies which targeted private sector engagement in water management. The implementation outcomes has been unsuccessful in achieving sustainable water management due to misguided ideology based on successful experiences from the developed world, and the failure to critically examine the socio-cultural and political context in which these policies were implemented. The implication was a return to public sector water management following 5 years of private sector participation in urban water management.

The study has shown that in moments of crisis, opportunities for change and innovation are likely to occur. Landscape pressure from external actors influenced water reforms and policy direction in the regime, which opened up the space for niche innovation in urban water service delivery. Socio-politically, bottom-up initiatives such as NCAP made significant impact in contesting urban water regime practices and dominant discourse at the landscape level. Socio-technically, the emergence of sachet water production has proven to be a viable niche innovation with the potential for scaling up, provided there is conducive institutional and policy backing.

The interactions among the regime, niche and landscape levels seem to suggest that, an alternative strategy that combines public and private financing with domestic interest can lead to efficient and financially viable urban water system. While reforms are imperative in existing urban water system, they must be based on realistic targets and be informed by knowledge of the social and political realities of the specific countries rather than the imported generic "best practices" that have been implemented without success in the past.

Compliance with Ethical Standards

Disclosure of Conflict of Interest The authors declare that they have no conflict of interest.

Research Involving Human Participants and/ or Animals This paper does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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