

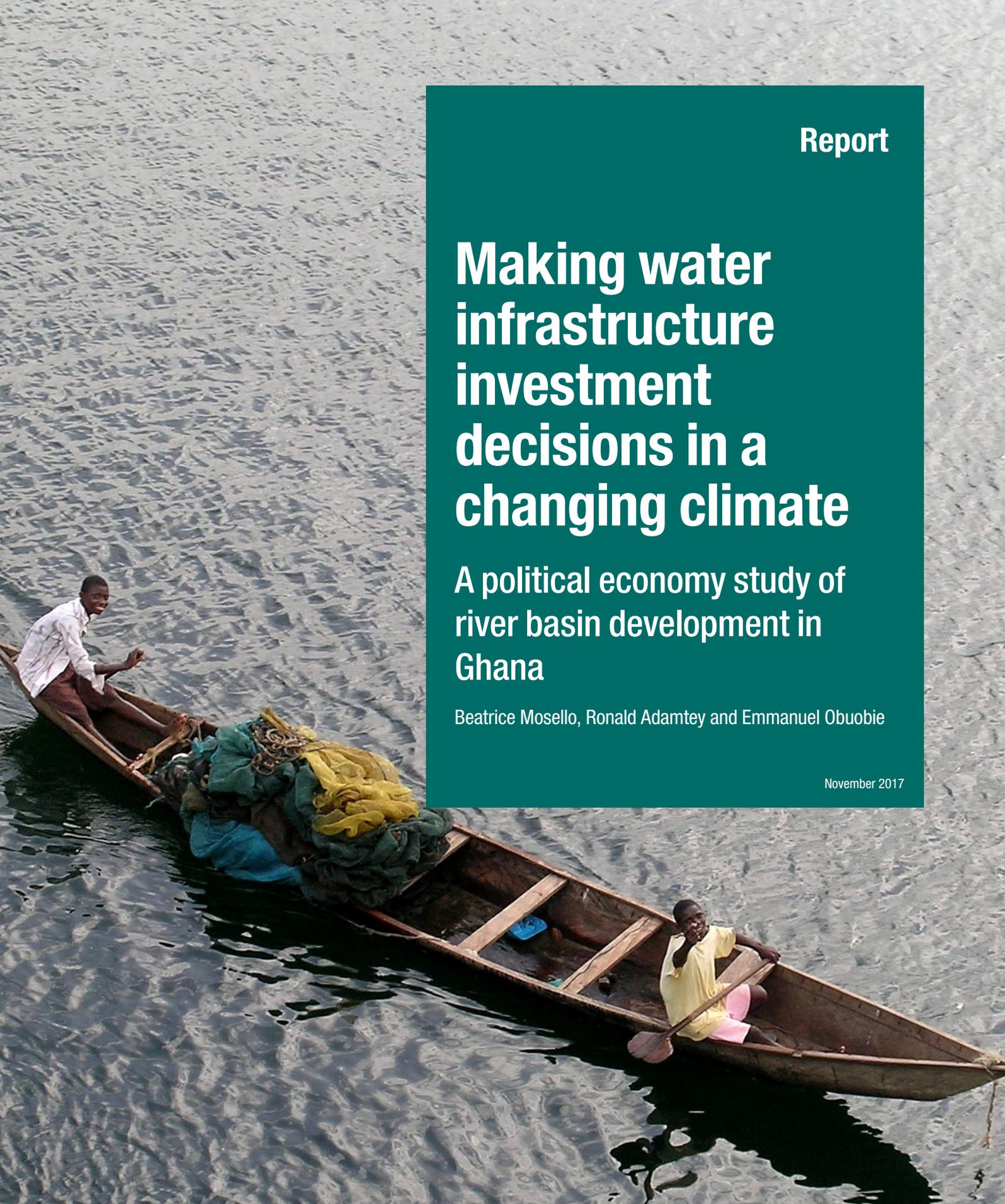
Report

Making water infrastructure investment decisions in a changing climate

A political economy study of river basin development in Ghana

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All quotations from interviewees are anonymous. Any errors or omissions are our own.

This work was undertaken as part of the Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes (WISE-UP to Climate) project. The project is generating knowledge on how to implement mixed portfolios of built water infrastructure (e.g., dams, levees, irrigation channels) and ‘natural infrastructure’ (e.g., wetlands, floodplains, forests) that contribute to poverty reduction; water, energy and food security; biodiversity conservation; and climate resilience at a landscape scale. ‘WISE-UP to Climate’ aims to demonstrate the application of optimal portfolios of built and natural infrastructure developed through dialogue with stakeholders and decision-makers at multiple levels (local to national) to identify and find consensus on trade-offs. The project also seeks to link ecosystem services to water infrastructural development in the Volta River Basin (Ghana, principally, and also Burkina Faso) as well as the Tana River Basin in Kenya.

The project is a global partnership led by the International Union for Conservation of Nature (IUCN) and involves the Council for Scientific and Industrial Research - Water Research Institute (CSIR-WRI); African Collaborative Centre for Earth System Science (ACCESS), University of Nairobi; International Water Management Institute (IWMI); Overseas Development Institute (ODI); University of Manchester; and the Basque Centre for Climate Change (BC3).

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For further details about the project, visit: www.waterandnature.org or www.iucn.org/water_wiseup

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Acronyms

AF	Adaptation Fund	MoFA	Ministry of Food and Agriculture
ADB	African Development Bank	MTDP	Medium-Term Development Plan
AFD	Agence Française de Développement (French Development Agency)	MWRWH	Ministry of Water Resources, Works and Housing
AWF	African Water Facility	NCCAS	National Climate Change Adaptation Strategy
CBOs	Community-based organisations	NCCP	National Climate Change Policy
CWSA	Community Water and Sanitation Agency	NDC	National Democratic Congress
DAs	District Assemblies	NDPC	National Development Planning Commission
DPs	Development Partners	NEDCo	Northern Electricity Distribution Company
EC	Energy Commission	NGOs	Non-governmental organisations
EPA	Environmental Protection Agency	NPP	New Patriotic Party
ES	Ecosystem Services	NSEZ	Northern Savannah Ecological Zone
ESIA	Environmental and Social Impact Assessment	NTFPs	Non-Timber Food Products
FSL	Full supply level	PEA	Political economy analysis
GCF	Green Climate Fund	PMD	Pwalugu Multipurpose Dam
GDD	Ghana Dams Dialogue	PPP	Public–Private Partnerships
GDP	Gross Domestic Product	PSC	Project Steering Committee
GEF	Global Environmental Facility	RBBs	River Basin Boards
GGF	Ghana Green Fund	RCC	Regional Coordinating Council
GIDA	Ghana Irrigation Development Authority	SADA	Savannah Accelerated Development Authority
GoG	Government of Ghana	UNDP	United Nations Development Programme
GSGDA	Ghana Shared Growth and Development Agenda	UNEP	United Nations Environment Programme
GSOP	Ghana Social Opportunities Project	UNFCCC	United Nations Framework Convention on Climate Change
GWCL	Ghana Water Company Limited	VBA	Volta Basin Authority
GWSC	Ghana Water and Sewerage Corporation	VRA	Volta River Authority
IGF	Internally Generated Funds	WACDEP	Water, Climate and Development Programme
IFIs	International Financial Institutions	WASH	Water, Sanitation and Hygiene
INDCs	Intended Nationally Determined Contributions	WB	World Bank
IWRM	Integrated Water Resources Management	WISE-UP	Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes
MESTI	Ministry of Environment, Science, Technology and Information	WRC	Water Resources Commission
MLRD	Ministry of Local Government and Rural Development	WUAs	Water Users Associations
MMDAs	Metropolitan, Municipal and District Assemblies		
MoF	Ministry of Finance		

Executive summary

Key messages

- This report presents the results of a political economy analysis of decision-making over river basin management and development in Ghana. It is aimed at identifying entry points for natural infrastructure as a solution for climate change adaptation and sustainable development.
- In Ghana, decisions over water resources management prioritise water for hydropower generation and irrigation development. Built infrastructure remains the privileged form of investment also for risk mitigation/prevention. There is little awareness of natural infrastructure and its benefits.
- Climate change is increasingly a concern, and the Government of Ghana is showing commitment to adaptation and mitigation solutions, partly under pressure from and with the technical and financial assistance of development partners. Adaptation measures, however, continue to be primarily taken at the local level.
- Our analysis identified three entry points for natural infrastructure solutions: i) development of long-term development strategies at national and subnational levels; ii) taking advantage of opportunities for cooperation at the basin level and international climate finance; and iii) investing in awareness-raising and capacity-building for environmental management and protection at the local level.

In many developing countries, investments to harness water resources for development have tended to focus on built infrastructure such as large dams for irrigation and hydro-electric power production. Who truly benefits from these investments, and who pays their costs, however, remains unclear. Also unclear is the extent to which the health of ecosystems, and the services they provide to people and the environment, is considered. The Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes (WISE-UP) project aims to demonstrate how natural infrastructure can be combined with built infrastructure in balanced and optimal investment portfolios to deliver economic and social development, while ensuring that people and the environment adapt to the impacts of climate change.

Under the WISE-UP project, we conducted a political economy analysis to explore the contexts within which decisions about river basin development are made in Ghana and Kenya. Our goal was to understand the bottlenecks to introducing natural infrastructure solutions in water management and development strategies, and to identify solutions to address them. This report outlines the findings for Ghana, where we focused on the Pwalugu Multipurpose Dam (PMD), an infrastructure project proposed to meet the economic and development needs of Northern Ghana. While, to date, a decision on the realisation of the PMD has not been officially made, we examined the drivers and constraints underpinning the decision-making process over its construction and operation. Our methodology consisted of interviews with key respondents in government, donor organisations and civil society at the national and local levels.

Over the past two decades, Ghana has achieved impressive gains in terms of economic growth, as well as living standards, public health and educational attainment. These developments have been driven by key economic reforms, aimed at the structural transformation of the economy from agriculture into services and industry, and also favoured by the intensification of gold and crude oil production. The urban population has increased rapidly, mostly because of internal rural–urban migration. Today, however, Ghana is suffering the consequences of serious external and internal macroeconomic shocks. Poverty and inequalities remain high, especially in the north of the country.

Water features prominently in the key strategies driving the country's economic growth and development, such as Ghana's Shared Growth and Development Agenda 2014-2017. Ghana has a comprehensive policy and regulatory framework for water resource management and investments, under the umbrella of the 2007 National Water Policy. In the last decade, the Government of Ghana has also invested in creating the institutions for addressing climate change both in mitigation and adaptation terms. However, Ghana still struggles to meet the basic food, water, sanitation and energy needs of its population. Rolling power blackouts are common, and there is discontent with living standards, rising taxes, fuel prices and utilities. Situations of water scarcity and environmental pollution are becoming increasingly visible, and risk becoming aggravated, if not opportunely recognised and addressed. We wanted to understand how to introduce change into Ghana's governance framework for water management and development, moving towards

promoting and implementing more sustainable and climate-resilient infrastructure investments.

The first bottleneck to introducing change in the decision-making process over water infrastructure in Ghana lies in the difficulty of implementing the policies and regulations that are already in place. We found several reasons for this ‘implementation gap’, ranging from the lack of monitoring of compliance by different actors with existing rules and regulations, to poor coordination and data sharing between agencies and ministries. Funding is the major constraint, especially in districts. Government agencies at all levels also suffer from significant gaps in terms of the human resources and expertise they have at their disposal, and staff turnover is high.

Concerted action among all stakeholders involved in decision-making over built water infrastructure projects is required in order to include considerations over the preservation of ecosystem services and climate change adaptation. However, we noted limited coordination both between relevant stakeholders at the national level, and among stakeholders at national and local levels. This was due to the existing competition between agencies over projects and interventions, and for the funding that comes with them. Our respondents saw international climate finance as a potential solution to increasing the financial resources available to ministries. But, to date, cumbersome bureaucracy and a lack of administrative and technical capacity have been major obstacles to accessing these funds.

In Ghana, political support is another important motivation for action at both local and national levels. Typically, politics plays an important role in determining one’s position and appointment, and in setting the agenda – what some commentators have defined as ‘Ghanaian party politics’. This can represent an obstacle to including considerations of natural infrastructure and climate change adaptation in built water infrastructure projects. Often, in fact, politicians in key positions use built infrastructure projects as ‘vote winners’ to obtain the favour of the electorate. We also found that the Ghanaian media and civil society play an important role in holding decision-makers to account.

Through our analysis, we identified several opportunities to overcome these bottlenecks and to support positive change in water governance, with a view to leveraging greater recognition and including natural infrastructure in investment planning and policy-making.

- 1. Implementing long-term development strategies at national and local levels:** The case for natural infrastructure solutions for climate change adaptation should be made with those actors at the national level that are mandated with implementing long-term development plans and goals. Rigorous research, communicated through accessible policy briefs and presentations of results at key conferences and events, is needed to ‘make the case’ for natural infrastructure with ministries and high-level government representatives. Champions are also needed to push these issues through the political process, for example by calling for their inclusion in development plans, and for a monitoring system with sanctions and rewards for implementation at national and local levels.
- 2. Taking advantage of opportunities for cooperation at the basin level, and of international climate finance:** Through the Volta Basin Authority, Ghana could open and engage in dialogue with its neighbours to agree on mutually beneficial infrastructure investments. Basin-level cooperation would allow the country to receive technical assistance to explore the benefits of natural infrastructure projects. Engaging development partners in discussions over natural infrastructure solutions for climate change adaptation would also open access to international knowledge, technology and funding. For example, development partners could support Ghana in its efforts to access climate finance funds through capacity-building and technical assistance.
- 3. Investing in awareness-raising and capacity-building of local communities and the public for environmental management and protection:** It is essential to build awareness among the public about the potential of natural infrastructure to mitigate the impacts of climate change, and to lead to a more sustainable management of water and other natural resources. This can be done through television, radio, newspapers and other media channels. Civil society organisations should also be empowered to raise people’s awareness and lobby the government to pay adequate attention to the environment. Finally, our results highlighted the importance of working with local governments and traditional authorities as they are generally in closer contact with communities, and hence better suited to understand their needs and demands.

1. Introduction

1.1. The WISE-UP project: investigating natural and built water infrastructure

In the 21st century, climate change and natural resource degradation pose some of the most urgent and unprecedented risks to the global economy (NCE, 2015). Patterns of human development including land use change, industrialisation, urbanisation, expansion of commercial agriculture and population growth also impact on growth and development (Vörösmarty et al., 2005). The poor, whose livelihoods often depend on natural resources and ecosystems, are disproportionately affected (Dercon, 2012).

Water is the primary channel through which societies will feel the impacts of climate change and environmental degradation. Water, in fact, is an input for industry, energy production and agriculture, and supports human welfare. But water also generates risks: droughts, which undermine food security and agricultural production; floods that devastate infrastructure and lives; and waterborne diseases, which affect human health. Water scarcity can drive conflict, political instability and migration (see WEF, 2016).

Rivers are an essential water source, and healthy river ecosystems provide important services to humans. Thus, the questions of how to manage rivers for multiple benefits and how to mitigate risks are critical to water security and other policy priorities, such as poverty reduction and climate adaptation (Tickner et al., 2017). To date, responses have focused primarily on built infrastructure to store and regulate water; dominant water security discourses have tended to depict the environment as a rival water user to people, as well as a source of risks (Parker and Oates, 2016).

Some authors have advocated a more integrative and nuanced approach – one that recognises diverse societal and biophysical contexts, embraces uncertainty, and is based on principles of adaptive management and equity (Zeitoun et al., 2016). This requires a better understanding of how, and for whom, water security can be realised in complex settings and across scales, given the inevitable trade-offs between different water uses and users (Mason and Calow, 2012; Zeitoun et al., 2016; Parker and Oates, 2016). It also requires greater recognition of the role of the environment in securing resilient outcomes – a recognition that, to date, has been largely overlooked by both research and interventions/policies for water resources management.

The ‘WISE-UP to Climate’ (WISE-UP) project was conceived to address this gap by demonstrating natural

infrastructure as a ‘nature-based solution’ for climate change adaptation and sustainable development. The project is generating knowledge on the use of mixed portfolios of built water infrastructure (e.g. dams, levees, irrigation channels) and natural infrastructure (e.g. wetlands, floodplains, watersheds) in the Volta River Basin in Ghana and Burkina Faso, and the Tana River Basin in Kenya. Its approach combines decision-support models, economic valuation, and political economy analysis to illustrate and quantify the trade-offs of different investment portfolios and their impacts on actors at different scales, from community to national-level interests. WISE-UP thus offers decision-makers a range of tools and approaches to assess investment options, with a view to optimise the range of benefits to society that river basins and their ecosystems can provide.

1.2. Understanding the political economy of decision-making

The WISE-UP project recognises that, alongside technical considerations, due attention must be given to the political and economic context and existing governance arrangements, if water resources are to be managed equitably and sustainably. In this paper, we present the results of one of the components of the WISE-UP project, which investigates the political economy dimensions of decision-making over water infrastructure investments in Ghana. We examine underlying drivers, incentives and constraints to understand how stakeholders interact in pursuit of their interests. Our goal is to identify opportunities, such as they exist, for the project to support positive change in water governance, with a view to leveraging greater recognition and inclusion of natural infrastructure in investment planning and policy-making. The same political economy dynamics can influence policies and decisions on adaptation to the water-related impacts of climate change.

In the first chapter, we introduce our research approach and methodology. In chapter 2, we provide some background information on Ghana’s current development plans and trajectory, and we examine the extent to which they take water resources into account. We also introduce the Pwalugu Multipurpose Dam (PMD) project, which served as a case study for our political economy analysis. In chapter 3, we present the results of our research, organised around three areas: i) the key actors and institutions, and

the relations that govern their actions; ii) the ‘rules of the game’, or the formal and informal policies, laws and regulations that drive the decision-making process; and iii) the logics and mechanisms of the decision-making process, or the way in which objectives are set and interventions are designed and implemented. In chapter 4, we describe the bottlenecks that, based on our analysis, limit the capacity of the political system to integrate environmental and climate change considerations into the planning and implementation of built water infrastructure projects. In conclusion (chapter 5), we outline the entry points to promote alternative approaches to river basin management and development in Ghana.

1.3. Research approach and method

The acknowledgement that politics matters has been one of the trademarks of international development thinking and practice over the past decade. Several authors have argued that political and economic factors intrinsically influence whether and how reforms happen, and that technical or managerial factors alone cannot explain poor development performance (Fritz et al., 2009; Hudson and Leftwich, 2014). This holds valid also for water resources management and development, which have been described as ‘political processes, characterised by shifting political alignments and contestations’ (Molle, 2009). Mechanisms for dispute resolution, differentials in access to resources, and social or political structures shape power relations, interests and positions, and therefore decisions, stakes and claims to water resources (Cabral, 1998; Madison, 2007).

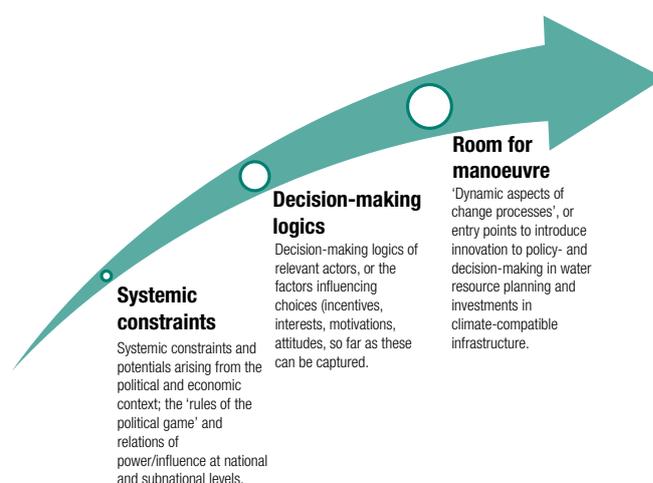
Political economy analysis (PEA) has emerged as a useful approach to understand national and sectoral dynamics surrounding policy-making and implementation. PEA provides a ‘systematic approach to analysing relationships between key structural factors (such as historical processes and environmental issues), institutions (formal and informal rules, norms and arrangements) and actors in a given country or sector context’ (Jones, 2015; Booth, 2015). PEA methods are founded on the premise that ‘institutional and structural features of the context in question shape the incentives facing relevant stakeholders and therefore their behaviour, leading to particular sector outcomes’ (Harris and Wild, 2013). Such analysis can be used to support more politically and culturally feasible development strategies, helping to set realistic expectations of what can be achieved (Mcoughlin, 2014), and is especially necessary where weak governance is an issue (Fritz et al., 2009).

The research conducted in Ghana follows the approach to political economy analysis adopted by the Africa Power and Politics Programme, led by the Overseas Development Institute (ODI).¹ Accordingly, development progress in Africa is achieved by ‘working with the grain’ of norms and

realities in the region – or by identifying and supporting the institutional arrangements capable of delivering public goods in the relevant cultural, social and political context. Research, therefore, should account for cultural and social aspects, as well as political and economic ones. Drawing on the methodology used in a study of the Ugandan road infrastructure sector (Booth and Golooba-Mutebi, 2006), we applied a ‘layered’ approach to conceptualising and analysing the research problem (see Figure 1).

We investigated both formal institutions and informal arrangements and interactions that shape decisions,

Figure 1: The layered approach to political economy analysis in WISE-UP



Source: Authors, re-adapted from Booth and Golooba-Mutebi (2009).

determine outcomes and facilitate (or block) decisions, in line with the policy agenda that the WISE-UP project aims to promote. We started from the assumption that, at present, there is insufficient inclusion of the concept of natural infrastructure in planning and decision-making processes for climate change adaptation and water resources management, as well as no economic valuation of ecosystem services.

Our approach was ‘issue-based’, meaning that we focused on an issue presenting difficult water management problems for apparently political reasons (e.g. resulting from conflicting interests or institutional/governance weaknesses). For Ghana, we identified the Pwalugu Multipurpose Dam (PMD) project. An example of built infrastructure conceived to contribute to Ghana’s economic and development needs, the PMD project allowed us to: i) map the key actors involved in and influencing the decision-making process at basin, sector, national and international levels; ii) explore trade-offs between water uses and allocations; and iii) study the political dynamics that guide decision-making on water infrastructure investments,

1 See: www.institutions-africa.org/

towards identifying the barriers to, and opportunities for, introducing changes in policy- and decision-making.

The research questions that guided this study were the following:

- How are decisions regarding the development and management of the river basin made, and by whom?
- How are these decisions justified, negotiated or contested by different actors? What are the underlying incentives and drivers?
- Are trade-offs identified and managed when making infrastructure investment decisions?
- To what extent, and in what ways, is natural infrastructure considered?
- To what extent, and in what ways, is climate variability and change considered?
- What opportunities exist to promote alternative approaches to river basin management and development?

Our methodology for data collection consisted of a review of the literature on water resources management and river basin development in Ghana, and a rapid survey of the current national policies and strategies in relation to the relevant sectors (water, energy, agriculture/food, environment and climate change). We then conducted four separate sets of key informant interviews with actors at the national level in Accra, at the regional level in Tamale and Bolgatanga, and in the Talensi and West Mamprusi districts in the Upper East and Northern regions, where the PMD project will be located once built (see Table 1).²

We selected participants purposively to capture relevant viewpoints, knowledge and experience. We analysed the content of the interviews qualitatively to identify emerging themes of relevance to the research questions. Secondary data included project documents, reports, relevant research papers and grey literature, and news stories. Triangulation was important to capture diversity in opinions, to explore

issues in sufficient depth and to verify facts. Stakeholders were given opportunities to discuss and feed back on the research findings through bi-annual ‘Action Learning’ forums.

We organised our findings around the six categories of incentives proposed by Harris and Wild (2013) (see Box 1), which explain why certain problems persist, and what can be done to overcome them, looking at the systemic constraints and logics that characterise the decision-making process on a given issue.

Box 1: Six categories of incentives

- **Coherence:** The degree of coherence in policies and processes for implementation – in terms of whether they are applied (or can be expected to be applied) in a uniform and integrated manner across time, space and groups of people.
- **Oversight:** The extent to which oversight systems effectively link actors along the service delivery chain, expose them to incentives and sanctions set by others, and permit them to deploy incentives and sanctions for others.
- **Autonomy:** The capacities and scope to come together to solve shared problems locally, or to act individually.
- **Rents:** The availability and distribution of rents i.e. the potential for actors to derive a benefit without contributing productively.
- **Credibility:** The extent to which competitive advantage, political or otherwise, can be obtained by making and fulfilling commitments to an electorate or another power base.
- **Moral hazard:** The degree to which risk-takers are insulated from the consequences of their decisions.

Source: Harris and Wild (2013)

Table 1: Primary data collection in Ghana for the political economy analysis

Timeline	Key informants	Topics	Total interviews
April 2014	Actors at national level	National policy, institutional and political context for water / river basin management and development	14
December 2014	Actors at national level	Actors’ priorities and plans for the development and management of water resources in Ghana	8
February 2015	Actors at regional, district and local levels	Exploring stakeholder decision logics, incentives, behaviours and constraints; understanding who is affected by, and who has influence over, the project	14
June 2015	Actors at national level	(as above)	9
April 2017	Actors at national, regional, district and local levels	Addressing gaps in information and missing stakeholder perspectives	18

² A list of institutions and stakeholder groups consulted can be found in Annex 1. Example interview questions are provided in Annex 2.

2. Setting the scene: Ghana and the Pwalugu Multipurpose Dam

2.1. Water as an essential ingredient for Ghana's ambitious development plans

Over the past two decades, Ghana has achieved impressive gains in terms of economic growth, as well as in living standards, public health and educational attainment (Molini and Paci, 2015). It has become a middle-income country well before the set target of 2020 (Government of Ghana, 2010b). These developments have been largely driven by key economic reforms, aimed at the structural transformation of the economy from agriculture into services and industry, and also favoured by the intensification of gold and crude oil production (Molini and Paci, 2015). The urban population has increased, mostly because of internal rural–urban migration. By 2012, Ghanaians were equally split between urban and rural areas, as compared with 1991 when 70% of the population lived in rural areas. Urbanisation is likely to have facilitated the process of structural transformation, for instance by enabling higher-quality education to reach a larger share of the population (ibid.).

Today, however, Ghana is suffering the consequences of serious external and internal macroeconomic shocks, including the rupture of the West African natural gas pipeline in 2012 (causing an increase in the cost of oil imports), the highly volatile export price of gold, and the depreciation of the Ghanaian cedi, leading to a sharp increase in inflation rates (from 8.8% in 2012 to 17% in 2014) (Molini and Paci, 2015). Inequalities in household consumption have widened between 1998 and 2005 as the consumption share of the poorest quintile of the population declined steadily from 6.8% to 5.7%, while the share of the top quintile of the population increased from 44.8% to 46.6% (ibid.). In addition, large spatial disparities persist – the highest levels of poverty are registered in the north of the country, while the Greater Accra, Ashanti and Brong

Ahafo and Western regions have enjoyed decreasing poverty rates for the past 20 years (Cooke et al., 2016).

Water features prominently in the key strategies driving the country's economic growth and development. For example, Ghana's Shared Growth Development Agenda 2014-2017, driving the Government of Ghana's (GoG) investments in the medium term, highlighted the importance of improving service delivery in water, promoting land and water management to increase agricultural productivity, and protecting water bodies and ecosystems from pollution and destructive activities (Government of Ghana, 2014). Ghana's National Water Policy (2007) provides the framework for the sustainable development, management and use of Ghana's water resources to improve health and livelihoods and to reduce vulnerability while assuring good governance for present and future generations (Government of Ghana, 2007). Water also features as a key ingredient for the development strategy of economic sectors such as irrigation, hydropower generation, industry, as well as the environment (see Table 2, overleaf).

Infrastructure investments have been a high priority of the GoG in the last decade, particularly for the irrigation, power and transport sectors.³ Every ministry develops its infrastructure plans within the framework of the Medium-Term Development Plans (MTDPs) for the period 2014-2017, and submits them to the National Development Planning Commission (NDPC). The NDPC oversees the coordination of sectoral plans towards achieving a long-term vision of 'an industrialised, inclusive and resilient economy, an equitable, healthy and disciplined society, well-planned and sustainable communities, and effective, efficient and dynamic institutions'.³

The newly elected (December 2016) government of President Nana Akufo-Addo of the New Patriotic Party (NPP) also put forward ambitious plans for economic and social development. The president's campaign was based

3 Information from key interviews conducted between April 2014 and April 2017 in Ghana.

Table 2: Ghana – policy priorities and development targets in relation to key sectors/themes (as per sector-based medium-term plans 2014-2017)

Sector	Policy priorities	Development targets
Agriculture and food security ¹	<p>Reducing vulnerabilities and sustained productivity improvement.</p> <p>Poverty reduction and wealth creation.</p> <p>Increased marketed output.</p> <p>Maintenance of natural resources and ecosystem integrity.</p> <p>Sustainable modernisation of food and agriculture.</p> <p>Promote irrigation development.</p>	<p>20%-50% increase in productivity of major commodities.</p> <p>25%-60% increase in incomes in cash crop, livestock and fish culture.</p> <p>50% increase in marketed output.</p> <p>100% of stakeholders reached.</p> <p>25% increase in technologies adopted in value chains.</p> <p>Develop and promote appropriate and affordable irrigation schemes including dams, boreholes and other water harvesting techniques for different categories of farmers and agro-ecological zones.</p> <p>Promote private sector participation in irrigation development, management and utilisation.</p>
Water supply	<p>Ensure sustainable management of water resources for increased access to safe, adequate and affordable water for all.</p> <p>Promote sustainable development of infrastructure facilities in the areas of flood control systems, drainage, coastal protection works.</p> <p>Adopt integrated water resources management.</p> <p>Enhance capacity to adapt to climate change impacts and mitigate the impacts of climate change in the water sector.</p>	<p>Rural population with access to safe drinking water increased to 75% by 2017.</p> <p>Urban population with access to safe drinking water increased to 82.9% by 2017.</p> <p>Valid water abstraction permit holders increased to 100% by December 2017.</p> <p>Volume of raw water abstracted by permit holders sustained at 500 million m³/year by 2017.</p> <p>Number of water use permits granted increased to 550 by 2017.</p> <p>Number of drilling licences granted increased to 300 by 2017.</p> <p>Number of basin management structures established increased to 9 by 2017.</p>
Infrastructure	<p>Establishment of Ghana Infrastructure Fund.^a</p> <p>Energy production, diversification, distribution.</p> <p>Exploitation of natural gas for electricity generation.</p> <p>Transport (roads, rail, airports, ports, Volta Lake Transport system).</p> <p>Public-Private Partnerships (PPP) promotion.</p>	
Economy (GSGDA 2014-2017)	<p>Achieve a per capita income of at least \$3,000 by the year 2020, accompanied by the necessary infrastructure and socioeconomic transformation.</p> <p>Over the medium term, per capita income is projected to reach at least \$2,400 by 2017, with a projected non-oil average real GDP growth rate of at least 9.6% per annum, and oil-included average real GDP growth rate of at least 10.6%.</p>	
Energy	<p>New legislation to be put in place for: renewable resources development/oil and gas administration, management of petroleum revenues, development of procedures and criteria for competitive licensing.^b</p>	<p>The energy sector vision is to develop an 'Energy Economy' to secure a reliable supply of high quality energy services for all sectors of the Ghanaian economy and to become a major exporter of oil and power by 2012 and 2015 respectively.^c</p> <p>Universal electricity access by 2020.</p> <p>Expansion of hydro, oil and gas, renewables.</p>
Industry	<p>Accelerate technology-based industrialisation with strong linkages to agriculture and other natural resource endowments.</p>	<p>Promote PPP.</p> <p>Encourage Local Economic Development based on the resource endowments of districts.</p> <p>Link industrialisation to Ghana's natural endowments – agriculture, oil and gas, minerals and tourism.</p> <p>Promote salt production as a strategic industry and link it to oil and gas sector.</p>
Climate change	<p>Promote, regulate, integrate into the wider economy, increase exports, minimise social conflicts, address environmental issues, improve availability of geological information, attract more local capital, ensure adequate consultations with other sectors, enhance the capacity of the mining sector.</p>	<p>To achieve a socially acceptable balance between mining and the physical and human environment and to ensure that internationally accepted standards of health, mine safety and environmental protection are observed.</p>
Environment	<p>Commitment to mainstream biodiversity issues into sector programmes to facilitate the development of relevant biodiversity policies, awareness-raising and research.^d</p>	<p>Address erosion and desertification.</p> <p>Protect biodiversity corridors.</p> <p>Buffer zone policy.^e</p> <p>Inventory of wetlands (and promotion of decentralised and participatory wetlands management).</p> <p>Environmental flow requirement.</p> <p>Reduce coastal erosion.^f</p>

Source: National Development Planning Commission, <https://www.ndpc.gov.gh/downloads/39/>

^a As foreseen in Ghana's Shared Growth and Development Agenda 2014-2017.

^b From: Ministry of Energy (2010)

^c Ibid

^d Government of Ghana (2010a)

^e Ministry of Water Resources Works and Housing (2011)

^f Government of Ghana (2010) and Government of Ghana (1994)

on a commitment to create jobs and move Ghana to the forefront of industrialisation efforts in West Africa, address the ‘toxic issue’ of corruption, and exploit the country’s bauxite and oil resources.⁴ The president promised at least one factory in each of the 216 districts across the country (‘1-District-1-Factory’), and at least one small dam in each village especially in the Northern region of the country, to revitalise its long-suffering agriculture sector (‘1-Village-1-Dam’).

Water resources remain at the heart of the GoG strategy for economic growth and transformation. New industries and the mining sector will require increased amounts of water for hydropower generation; a swelling urban population will demand more, cheaper and reliable electricity, as well as water and sanitation services; and irrigation will need a boost to improve agricultural outputs, especially in the Northern Sahelian regions. While Ghana has developed ‘broad reach national infrastructure backbones, including power, water, communications, and transport’ (Foster and Pushak 2011: 4), challenges remain in terms of the quality of this infrastructure and the reliability of the services it provides, particularly in the water and power sectors. Rolling power blackouts are common, and there is discontent with living standards, rising taxes, fuel prices and utilities. Situations of water scarcity and environmental pollution are becoming increasingly visible, and risk becoming aggravated, if not opportunely recognised and addressed.

2.2. The Pwalugu Multipurpose Dam Project: history and present

2.2.1. Addressing the development needs of Northern Ghana

As part of the GoG’s proposals for infrastructure development as a motor of economic growth and transformation, the construction of a multipurpose dam is planned on the White Volta at Pwalugu, at the border between the Talensi District in the Upper East Region and the West Mamprusi District in the Northern Region. Together with the Upper West Region, the Upper East and the Northern Regions constitute approximately 40% of Ghana’s total land area and host 17% of the country’s total population (see Figure 2 overleaf). The climate in this area, also known as the Northern Savannah Ecological Zone (NSEZ), is characterised by alternating wet and dry seasons. The rainy season occurs between May and October; the dry season from October to March. The amount of rainfall

recorded annually varies between 785 millimetres and 1,100 millimetres, and is erratic spatially and in duration. The White Volta River floods its banks annually, leaving behind alluvial deposits that provide excellent soils for agriculture and flood recession farming. Maximum daily temperature reaches 45°C in March/April, while minimum daily temperature drops to 12.8°C in August (Mul et al., 2016).

In the NSEZ, soils are suitable for cereal cultivation and moderately good for grazing. Land uses in the floodplains consist of irrigated crops, wetland vegetation and uncultivated woodlands and rangelands. On the uplands, land uses are agriculture, cultivated savannah woodlands, rangelands and settlements. The major crops that are cultivated in this region are guinea corn, maize, millet, rice, soya beans, groundnuts, cotton, yam, cowpea and sorghum. In the Upper East Region, there are numerous small dams, dugouts and irrigation facilities where farmers can cultivate onions, tomatoes, peppers and rice during the dry season. Trees like acacia, mango, baobab, shea nut, dawadawa, neem and cotton also play a key role in the economy due to their commercial values (EEMC et al., 2014; key interviews).

A harsh environment, combined with the lack of significant investments and attention to Northern Ghana’s development needs, has resulted in high poverty rates. While almost everywhere else in Ghana has seen a significant reduction in poverty between 1992 and 2013, the Upper East, Upper West and Northern regions have made comparatively little development progress.⁵ The Northern region has experienced the smallest improvement in overall poverty levels since 1992. Since the 2000s, the GoG has devised a package of interventions aimed at reducing poverty in these regions, including partnerships in agro-based industries, development of irrigation facilities to support all-year production, provision of extension services, new varieties of crops, and the establishment of manufacturing industries to improve agriculture and food production.⁶

2.2.2. The Pwalugu Multipurpose Dam: history of the project

The PMD project is part of a package that the government is proposing to boost the economic development of the northern regions of Ghana. The original plans for the project were on the table as far back as the 1960s, but were abandoned following the overthrow of President Kwame Nkrumah.⁷ The Volta River Authority (VRA) re-proposed the PMD project in the 1980s, after a devastating drought

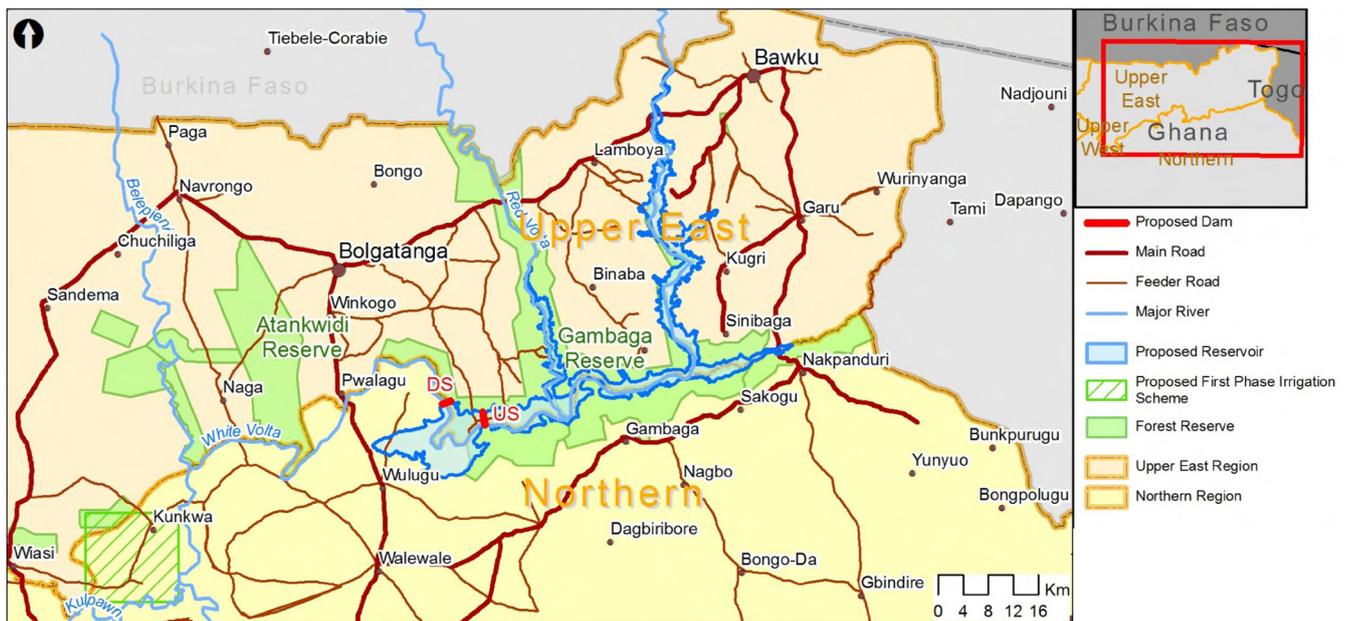
4 See: <https://www.brookings.edu/blog/africa-in-focus/2016/12/13/ghanas-new-president-jobs-jobs-jobs/>.

5 As of 2006, both regions have made important progress: poverty has declined from 72.9% in 2006 to 44.4% in 2013 and from 55.7% to 50.4% in the Upper East and Upper West regions, respectively (Cooke et al., 2016).

6 Information from key interviews conducted in Accra between April 2014 and April 2017.

7 Information from key interviews conducted in Accra in April 2014.

Figure 2: Pwalugu project zone



Source: EEMC et al., 2014.

hit Ghana. In 1993, the VRA commissioned a consultancy firm, Coyne et Bellier, to carry out a pre-feasibility study of four potential hydropower sites. The study recommended proceeding with studies of the Pwalugu site, which was considered the most favourable in terms of cost/benefit ratio, social and environmental impacts, irrigation areas and flood control potential. However, in the context of the economic reform process that Ghana underwent under the guidance of the International Finance Institutions (IFIs), plans for the PMD fell through once again.

To fuel its ambitious plans for economic growth of Ghana, in the face of rising complaints over power shortages, and to secure victory at the 2008 elections, the then President John Atta Mills contracted a loan of \$525 million from Brazil for the construction of the PMD and the Juale Dam in the Northern Region. The government later abandoned the projects, and diverted the funds for the construction of the Eastern corridor road.⁸ But this at least did put the PMD back on the table. In 2012, the Agence Française de Développement (AFD) gave a loan to the GoG for €50 million for the retrofit of the Kpong hydroelectric dam, operated by the VRA. A component of the financing was earmarked for supporting the VRA to launch technical, environmental and social feasibility studies for the Pwalugu multipurpose project, conceived as ‘a key driver for the development of Northern Ghana’.⁹ In 2014, Mott-Macdonald, a British consultancy firm, submitted the Environmental and Social Impact Assessment (ESIA) of the PMD to the VRA. In July

2015, Tractabel Engineering and the VRA submitted a draft feasibility study to the Project Steering Committee.

However, in November 2016, the Steering Committee raised concerns regarding the protection of several critical habitats, the cost of the design of the dam and the power plant, as well as the benefits it would provide in terms of flood protection. As a response, the VRA commissioned Tractabel to conduct complementary studies to further investigate the irrigation and flood reduction potential of the project, as well as alternative options that would reduce damage to critical ecosystems. At the time of writing (April 2017), the specific focus of the studies was still under discussion between the AFD, the VRA and the Steering Committee. It is also still unclear who will finance the construction of the dam, and when and if the feasibility study will be approved. Key respondents highlighted bilateral and multilateral donors’ reluctance to concede further loans to Ghana, given its unstable macroeconomic and fiscal situation.

2.2.3. Purpose of the PMD

The PMD aims at ‘improving the economy of Northern Ghana’ according to evidence from official documentary sources, supported by interviewees (VRA, 2015; key interviews). It will do so by developing the hydro-electric power generation potential, leading to an increase of the country’s total power and energy generation capability. It will also develop the irrigation potential of the White

⁸ See: <https://www.ghanastar.com/news/700m-needed-to-build-pwalugu-multi-purpose-dam-sada/>.

⁹ Information from key interview with representative of government conducted in Accra in April 2014.

Volta plains, and mitigate the flood impact downstream of the reservoir. The details of the benefits and impacts of the project are summarised in Table 3 (overleaf).

The feasibility study of the PMD estimates that the total cost of the project will be around US\$ 700 million. To take full advantage of the potential of the site, the Steering Committee selected a FSL at 170 m asl. Under these conditions, the total energy generation is estimated at 210 GWh/year, with firm energy capacity at 21.7 MW and an installed capacity at 70 MW. The irrigation scheme will extend over a gross area of approximately 20,000 hectares (ha) for supply with gravity located on the left bank of the White Volta River. An estimate of 112,225 people living in the communities of Kpasenkpe, Walewale (district capital), Wulugu and Wungu will benefit *indirectly* (evidence added) from the irrigation project. The irrigation scheme will be used for the cultivation of rice and tomatoes primarily, but also leafy vegetables, onions, high value export crops, chilli peppers and sugarcane. An additional 4,000 ha of land area are reserved for irrigation through pumping.

The Pwalugu Dam will also play a significant role in the downstream flood reduction due to the large capacity of its reservoirs. Reservoir simulations showed that around 70% of the yearly floods can be controlled by the dam even without any specific operation rule. In turn, flood management can have positive implications for agricultural development. Benefits in terms of water supply to Walewale, fishery and tourism development are likely to be negligible. The feasibility study did not express concerns related to the environmental flow, which will pass through the turbines most of the time, and a specific outlet will be provisioned in case of an extended stop of the two units. The impact of climate change on the runoff was estimated to be between a 29% reduction and a 5% increase for the 2050 horizon. Flood peaks are likely to increase by 13 to 30% over current values. These projections have been considered in the reservoir simulations, and thus also in the selection of options for the PMD presented by the feasibility study (see Table 4, page 18).

2.2.4. Prospected impacts of the dam on ecosystems and livelihoods

About 80% and 60% of the population in the Talensi and West Mamprusi districts, respectively, live in rural areas. Farming is a widespread activity; about 97% of households in the Talensi district and between 85% and 70% in the West Mamprusi district engage in some form of agricultural practice (irrigated, floodplain, or rainfed). Other economic activities are hunting and forestry. The White Volta River and floodplain, forests, shrubs and woodlands, and natural

ponds also enable various livelihood activities, including farming, fishing, livestock watering, collection of wild fruits, and provision of water for domestic use. Most of these ecosystem services are dependent on the seasonal flows of the White Volta River.¹⁰

During the lean season, at the end of the dry season, when limited income is generated from agriculture, ecosystem services provide the main income source and serve as coping mechanisms for communities. For example, fishing in the ponds becomes a key economic activity, and communities have put in place a fishing regime for the ponds to ensure that the maximum income can be generated from fishing when it is most needed. Non-Timber Food Products (NTFPs) such as sheanuts and dawadada also act as 'safety nets' contributing to food security; these products are consumed at home or sold for disposable income. The cash is re-invested to buy food, pay children's school fees, or buy diesel for pumps to practice irrigated farming.

The Bagré dam in Burkina Faso, upstream of the area where the PMD is planned, has significantly impacted the natural flow of the White Volta River. On the one hand, it provides dry season flow, which people use for domestic purposes when other sources of water (boreholes) are scarce and for dry season irrigation. On the other hand, Bagré's unregulated releases have washed out crops and caused loss of human lives in the Talensi and West Mamprusi districts. Climate change is also having an impact on the ecosystems on which local communities depend. Community members indicated that rainfall was more reliable in terms of amounts, timing and duration in the past (Mul et al., 2016). Climate change may further increase variability in rainfall, and hence variability in the flow of the White Volta River. This can result in less reliable flooding, more extremely low flows, as well as more extreme flood flows (Mul et al., 2016).

In another study conducted in the framework of the WISE-UP project, Mul et al. (2016) noted that local communities in Arigu, Bisigu and Pwalugu were moderately aware of the dam project ("*about 60% of all participants in the focus group discussions knew about the proposed Pwalugu dam*"). They have "*high hopes*" that the dam benefit the communities. For example, they expect it to provide a year-round availability of water, which would enable women to practice dry season farming, and men intensive dry season farming. Due to its high storage capacity, it is also anticipated that the Pwalugu dam will mitigate some of the floods coming from Bagré. However, the PMD can also negatively impact on flood recession farming, irrigated farming, and fishing in the riparian

10 Based on focus group discussions with three communities at the villages of Pwalugu, Arigu and Bisigu, where the PMD will be located, Mul et al. (2016) identify 3 categories of ecosystem services (ES)-based livelihood activities: 1) activities directly reliant on ecosystems – floodplain, ponds and river- that exist due to the seasonality of the White Volta River such as flood recession and irrigated agriculture, fishing in ponds and the river, livestock grazing in the flood plains, and near the ponds in the dry season, and water collection from the river; 2) forest-based activities, which indirectly rely on water-based ES, such as the collection of Non-Timber Forest Products (NTFPs) and construction material, and charcoal making; and 3) Not river-flow dependent ES-based activities such as rainfed agriculture and off-farm employment.

ponds – the three activities that contribute to most of the households’ income in the studied area.

As the dam operating rules are crucial to the maintenance, enhancement or failure of the water-based ecosystem services on which communities rely, it is

important to understand the process that leads to deciding over them. This will allow us to identify the entry points that exist to incorporate natural infrastructure concerns, towards fostering climate-resilient and sustainable development at the national as well as community levels.

Table 3: Potential impacts of the PMD

Nature of impact	Sector/impact area	Expected impacts
Positive impacts	Irrigation	-95,000 ha irrigated if irrigation is priority – and no hydropower -47,000 ha irrigated if hydropower is priority
	Flood control	Will help to maintain low water levels in rivers and other reservoirs in the White Volta Basin in the event of a flood
	Hydropower generation	With energy as priority and Full Supply Level (FSL) set at 172m above sea level (asl), the total power generation could be 205GW/year, with an installed capacity of around 56MW, given a firm power output of around 24MW.
	Capture fisheries and tourism	-fish catch -tourism
Negative impacts	Natural physical processes	-changes in the hydrological conditions of the trans-boundary river system; -effects from and for other dams, e.g. Bagré, Kpong and Akosombo; -noise from traffic during construction, blasting, drilling and excavation; -emissions and dust related to earthworks, traffic movements, loading and unloading of materials, stockpiling of spoil; -waste generation; and traffic to transport building materials, excavated materials, infrastructure components and plant items
	Local communities	-the loss of land and agricultural soils resulting in relocation and economic displacement; -occupational health and community health risks; immigration and induced development; -flooding of shrines, trees, wildlife habitats and rocks in the reservoir area; -change in tranquillity of the surrounding landscape
	Local ecology	-the loss of habitat from direct inundation and induced development; -transformation of the river to a reservoir; -changes in the hydrological conditions and river habitat; -dam acting as a barrier to the migration of fish and other aquatic lives; -changes in water quality and sedimentation releases

Source: EEMC et al. (2014)

Table 4: Selected options for feasibility studies.

Item	Selected option
Dam axis	Downstream site
Dam type	Dam Type 3 which is a composite dam of RCC, Earthfill and Rock-fill is the preferred choice.
Full Supply Level	170 m asl
Type of Spillway	Investigate: 1) Gated spillway; 2) Gated plus ungated
Emergency Spillway	Due to the large volumes of excavation required, the construction of emergency spillway at its current proposed location will not be prudent. No further studies should be carried out for the emergency spillway.
Transmission Line Route	Option 1 as recommended by GRIDCO
First Phase Irrigation Location	Left Bank of the irrigation area. Both gravity and pumping irrigation should be considered. In this case, the canal should be sized enough to irrigate the maximum area available at the left bank.
Irrigation Crops Repartition	Mixed cropping is recommended. The following are the crops that are proposed for the irrigation studies in relation to soil types and location: Rice Tomatoes: Fresh market tomatoes, cherry tomatoes, and processed tomatoes Leafy vegetables Onions High value export crop, e.g. butternut squash Chilli pepper: birds' eye for export and local pepper Sugarcane should be considered. However, the area for sugarcane plantation would have to be large enough to yield economic benefit.

Source: VRA, 2015.

3. Built infrastructure in Ghana: a political economy analysis

We use the PMD project as a case study to understand the decision-making process around water management and development in Ghana, and identify entry points to introduce mixed portfolios of infrastructure investments – both natural and built. While the other components of the WISE-UP project examined ecosystems through their hydrological and economic value, our study aimed at highlighting the actual and potential ‘political value’ of natural infrastructure in decision-making: how can natural infrastructure become part of the options assessment and decision-making process over water resources management and development?

3.1. The decision-making process over built water infrastructure step by step

As a first step in our analysis, it is useful to briefly describe how the decision-making process over built water infrastructure projects, such as dams, occurs in practice. If we look at the two major dams of Ghana, Akosombo and Kpong, we note several characteristics of the decision-making process that are relevant to our study (see Box 4 for the full story of the two dams).

First, both projects were realised thanks to the strong commitment and perseverance of the political leadership (and particularly Prime Minister Dr Kwame Nkrumah, in the name of ‘economic development’). Second, the major impediment to the realisation of the dams came from their financial and technical viability, and not environmental or human concerns. Third, the socio-environmental implications of the dams have been examined in the 1990s, after the dams’ negative impacts on the surrounding environment and communities had become evident, and more awareness and guidelines for safeguards were available at the international level.

The infrastructure planning process in Ghana follows five phases.

Box 2: Different types of ecosystem services (ES)

The focus of the WISE-UP project is on ecosystem services that are related to water flows. McCartney et al. (forthcoming) identify two types of ecosystems:

- **Type 1 ecosystems** comprise of headwater catchments providing water fluxes at crucial times of the year. In highly seasonal climates, such as those observed in sub-Saharan Africa, this is often the baseflow generation during the dry season. This is influenced by changes in land use and cover, as well as the occurrence of natural wetlands in the landscape, which can act as a water regulator (Lacombe and McCartney, 2016).
- **Type 2 ecosystems** are located along the main river and are dependent on the river flow. Changes in the flow, therefore, affect the benefits derived from these ecosystems. Riparian vegetation, wetlands and floodplains derive their benefits from the natural flow regime, and changes due to, for example, construction and operation of an upstream dam, may have dire consequences to the benefits provided by ecosystem services.

In the Volta river basin, some of the type 2 ecosystems also provide type 1 ecosystem services. For example, the seasonal flooding of extensive floodplain also regulates the river flows, buffering the peaks and providing baseflow during the dry season.

1. **Project identification:** The first phase coincides with the identification of the project to be undertaken. This happens based on master plans, which lay out options of suitable sites for hydropower, irrigation and other water-related infrastructures in each river basin. The development of these plans is a multi-sector exercise and, apparently, there has been considerable consensus over the master plans in Ghana.¹¹ However, many large projects, such as the Bui dam, were in fact conceived decades ago. It is not clear to what extent these ideas were revisited in the planning process. It is also not clear how far plans are regarded as set in stone, or whether they provide for adjustments when conditions - or priorities - change.
2. **Feasibility studies:** Once a project has been identified, pre-feasibility and feasibility studies are undertaken. Environmental and social impact assessments are prepared and discussed by a panel composed of experts representing all relevant agencies. Together, the panel makes recommendations and can approve, reject or request alterations to the project. Several key informants presented a rosy picture of this process, in which the panel members come to a balanced decision and address any problems in project design early on for course correction. However, the key informant interviews also suggested that it was difficult for the Environmental Protection Agency (EPA) to deny permission for a project on environmental grounds if that project was in line with a priority government agenda.
3. **Environmental and social assessments:** The EPA can insist on consultations and public hearings on proposed projects. Socio-economic studies are also conducted during the project development process. The key informant interviews revealed divergence in views on the purpose of these studies and consultations. Investors see them as informing communities to the project and mobilising them to participate, while the EPA agreed that they can also influence project design. However, interviewees argued that, despite some consultations at local level, communities 'certainly cannot stop projects' and 'cannot really hold authorities to account'.
4. **Water permit:** For any water-using infrastructure, the Water Resources Commission (WRC) must issue a permit. So far, the institutions we consulted reported that they rarely have problems getting permits from the WRC, as Ghana does not currently experience severe water scarcity. The WRC cited one example where a permit was refused to a government sugarcane plantation, proposed in an area of the White Volta which

already suffered from dry season shortages. It seems that the main reason why the WRC could convince the government to abandon the project was because it showed its negative impacts on hydropower generation.¹²

5. **Funding sources:** Finally, once the project has been approved, the government needs to find the funding to realise it. All the ministries and their departments and agencies have four potential sources for funding infrastructure projects, as well as development interventions more broadly: i) the Consolidated Fund of the Government of Ghana; ii) Internally Generated Funds (IGF) raised by the relevant municipal and district assemblies; iii) Special Funds from the Ministry of Finance; and iv) donor funds.¹³ For municipal and district assemblies, funding sources include the District Assemblies Common Fund, the District Development Facility, budgetary allocations or transfers from central government, and IGF (Asante et al., 2015).

3.2. Actors, relations and drivers of the decision-making process over built water infrastructure in Ghana

3.2.1. Key actors in the water and water-related sectors in Ghana

When Ghana gained independence in 1957, various institutions were established to manage the water resources of the country. The VRA was the first of these institutions in 1961, with a mandate to generate electrical power and maintain the Volta Reservoir. The Ghana Water and Sewerage Corporation (GWSC) was the next major water management institution created in 1965, and charged with the provision, distribution, and conservation of the nation's water resources for public, domestic, and industrial purposes. Although the GWSC was given priority over other water authorities, the VRA maintained exclusive rights over the Volta Lake and rivers (Mensah 1999; MWH, 1998b in: Mul et al, 2015). The Ghana Irrigation Development Authority (GIDA) was created in 1977 to develop irrigation schemes for farming, livestock improvement, and fish culture. There was no provision to ensure cooperation between the GIDA, VRA, and GWSC (Mensah 1999; MWH 1998a, 1998b in: Mul et al, 2015).

This rather scattered and uncoordinated institutional framework for water resources management was reviewed in the 1990s. The 1992 Constitution provided for the

11 Information from interviews with representatives of government, conducted in Accra in April 2014.

12 Information from interviews with government representatives conducted in Accra in April 2014.

13 Development Partners (DPs) can follow the normal government financial channels, and these funds are captured by the government's budget. Alternatively, they can disburse funds directly to sector ministries; these are captured in the government's budget where sector ministries report to the Ministry of Finance (MoF). In some cases, grants from DPs are disbursed directly to projects and programmes operating outside government systems (Asante et al., 2015).

Box 3: The Akosombo and Kpong dams

Originally proposed before independence in 1949, the Volta River Project, of which the Akosombo and Kpong dams were the flagship components, stalled multiple times over financial issues. Prime Minister Dr Kwame Nkrumah was perseverant in seeking funding for the construction of the Akosombo Dam, initiating discussions with the British government and two aluminium companies. An American consultancy firm reassessed the project's engineering aspects and costs in 1959, and recommended a design that would have allowed to generate more power for less capital. This was a satisfactory conclusion for the aluminium companies, which were assured they could build an aluminium smelter at Tema.

It took over 18 months to find interested investors. Two American companies promised to invest in the aluminium business if the Government of Ghana managed to persuade the World Bank and the United States of America to finance the power project in Akosombo. Once the World Bank confirmed the economic and technical feasibility of the scheme, both the governments of the United States and the United Kingdom made provisional earmarks for the dam, and so did the Government of Ghana. Valco committed funding to construct the smelter project. After 11 years of negotiations, in May 1960, the Government of Ghana finally called for tenders for the dam and power station (which were eventually awarded to an Italian consortium, Impreglio). It also passed the Volta River Development Act, establishing the Volta River Authority to supervise the construction and operation of the dam.*

The Akosombo dam and the formation of the Lake Volta displaced about 80,000 people; the resettlement process, leading to the creation of 52 new townships under the VRA Resettlement Trust Fund, was subject to harsh criticisms mostly as it ignored the social and cultural impacts of displacement (see e.g. Gordon, 2006). In addition, the problems caused by the Akosombo and Kpong Dams in the Lower Volta, linked with health issues, poor farming yields due to the loss of seasonal flooding, and lack of employment have been practically ignored until the mid-1990s. Partly, these problems were caused by the absence of environmental impacts assessment regulations at the time of the construction of the dams. Since then, the Government of Ghana passed various pieces of legislations to set up environmental and social impact assessment procedures. Global initiatives including by the World Commission on Dams, the adoption of the Equator Principles by financial institutions have also contributed to pushing for such safeguards to be put in place and respected.

Source: Authors.

* From: http://www.ghanaweb.com/GhanaHomePage/history/akosombo_dam.php.

establishment of an appropriate legislative, policy and institutional frameworks for the sustainable development and management of Ghana's water resources. Following the international blueprints set by the principles of Integrated Water Resources Management (IWRM), the GoG thus redefined the status and mandates of many water-sector institutions. For example, it established the Ghana Water Company Limited (GWCL) and the Community Water and Sanitation Agency (CWSA), and tasked them with urban and rural water supply, respectively. The Environmental Protection Agency (EPA) was created in 1994 for the general protection of the environment. In 1996, the WRC was mandated to regulate and manage Ghana's freshwater resources and coordinate water-related policies (Dorm-Adzobu & Ampomah, 2013).

Until recently, the Ministry of Water Resources, Works and Housing (MWRWH) was the principal government ministry responsible for overall policy formulation, planning, coordination, collaboration, monitoring and the

evaluation of programmes in the water sector. Its Water Directorate was set up in 2004 to serve as the focal point for coordination of the water and water-related sectors for policy harmonisation. In 2007, it enacted a National Water Policy covering water resources management, and urban and rural water supply.¹⁴ In January 2017, the new government of President Nana Addo Dankwa Akufo-Addo created the Ministry for Sanitation and Water Resources, taking on responsibility for water management from the MWRWH, and for sanitation from the Ministry of Local Government and Rural Development (MLRD).¹⁵

In line with the decentralisation reform initiated in the 1990s, water resources management and planning functions have also been transferred to the river basin level. River Basin Boards (RBBs) have been set up to encourage the active involvement of regional and district institutions (Agyenim, n.d.).¹⁶ RBBs are composed of local government, water users, Non-Governmental Organisations (NGOs), traditional authorities and other relevant bodies. They

14 Ministry of Water Resources, Works and Housing. (2007). National Water Policy. Accra: MWRWH.

15 Information from interviews conducted in Accra in April 2017, and confirmed by the press, e.g. <http://citifmonline.com/2017/01/24/coniwas-lauds-creation-of-ministry-of-sanitation-and-water-resources/>

16 RBBs have been established for the Densu, White Volta, Ankobra, Pra and Tano Basins, although only the White Volta Basin Board is currently operative.

have the task of developing an IWRM plan which serves as a ‘blueprint’ for prioritised actions and measures to address the specific water-related problems of each basin (Dorm-Adzobu & Ampomah, 2013). At the local and river basin levels, it is important to also acknowledge the self-governing structures made up of the District Assemblies, NGOs, Community Based Organisations (CBOs), and other civil society groups. For example, in some small towns, District Assemblies and private operators have established partnerships to manage municipal water services (see also: Nyarko et al. 2011).

A detailed list of actors in the water sector is presented in table 5 below.

3.2.2. Key actors and initiatives on climate change adaptation in Ghana

Ghana has a comprehensive policy and institutional framework setting out roles and responsibilities for acting towards climate change adaptation and mitigation. Since 2010, the Ministry of Environment, Science, Technology and Innovation (MESTI) has developed a series of policy documents aimed at promoting climate-compatible development. For example, the ‘Ghana Goes for Green Growth’, a discussion document on Ghana’s national engagement on climate change, set the stage for the development of Ghana’s climate change strategy (GoG, 2010a). Ghana’s National Climate Change Policy (NCCP) was developed in 2012 (but formally launched in 2014) as a complementary document to the Ghana Shared Growth and Development Agenda (GSGDA) II, Ghana’s medium-term national development policy framework (2014-2017). The National Climate Change Committee led the process, with technical support from the MESTI and the EPA. The vision of the NCCP is “*to ensure a climate-resilient and climate-compatible economy while achieving sustainable development through equitable low carbon economic growth for Ghana*” (MESTI, 2013). The policy document places significant emphasis on integrating adaptation across a range of different sectors that are important for the country’s development progress. It also includes social

development as a theme, indicating the GoG’s consideration of differential vulnerabilities to climate change in its adaptation action.

In parallel with the development of the NCCP, in 2012 Ghana released a National Climate Change Adaptation Strategy (NCCAS), which covers the period 2010-2020. Preparation of the NCCAs was supported by the Climate Change and Development – Adapting by Reducing Vulnerability programme, funded by the Danish Ministry of Foreign Affairs and jointly led by the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP). MESTI is in charge with the implementation of the NCCAS. Its objectives and types of interventions are aligned with those of the NCCP. Although information from key respondents indicated the process has started, it remains unclear how and when the NCCAS will evolve into a formal National Adaptation Plan (NAP) under the United Nations Framework Convention on Climate Change (UNFCCC) process.¹⁷

Despite the existence of policies and institutions with a mandate for climate change adaptation and mitigation at the national level, it is at the local level that concrete interventions take place. Climate change mitigation often coincides with afforestation projects. Climate change adaptation is understood in more general terms as improving the livelihoods of local communities. These projects are particularly numerous in Northern Ghana, where climate change impacts in terms of increased temperatures, more variable precipitations and more extreme events such as floods and droughts are pressing concerns. Most interventions are initiated with funds from international donors (see Table 6). For example, the UNDP is supporting the implementation of the US\$ 8 million Adaptation Fund Project, aiming to increase resilience to climate change in Northern Ghana through the protection, restoration and management of water bodies as well as enhancing the livelihoods of communities living along water bodies.

Many of these initiatives for climate change adaptation and mitigation are conducted by a vast range of NGOs and

Table 5: List of actors with a mandate in the water and water-related sectors.

Core sector	Institution	Core mandate
Water	Water Resources Commission (WRC)	Established by Act 622 (1996). The mandate of the WRC is to regulate and manage the use of water resources, and coordinate relevant government policies in relation to them. The WRC represents Ghana on transboundary-related issues with their riparian counterparts, supported by the basin management boards that are mandated to implement its functions at the basin level. The Commission is made up of 15 members, including the Chairman, the Executive Secretary, a Chief and two other persons, one of whom is a woman. The rest are representatives of water-related institutions.
Water	Basin Management Boards	Represent the WRC at the basin level. They are tied to hydrological boundaries. Currently, for the Volta Basin, there is only a board for the White Volta Basin, which also covers the Black Volta and Oti Rivers.

¹⁷ Information from key interviews conducted in Accra in April 2017.

Table 5: List of actors with a mandate in the water and water-related sectors (continued).

Water	Ministry for Sanitation and Water (previously Ministry of Water Resources, Works and Housing)	It has mandate for water resources and sanitation management, and implements it through the WRC, Ghana Water Company Limited (GWCL), Community Water and Sanitation Agency (CWSA), and the Hydrological Services Department.
Water	Hydrological Services Department	It has responsibility for programming and coordinating coastal protection works, the construction and maintenance of storm drains, and the monitoring and evaluation of surface water bodies in respect to floods.
WASH	Ghana Water Company Limited (GWCL)	Established by Act 310 (1965). It is responsible for the planning and development of urban water supply system in Ghana (for towns with populations above 20,000).
WASH	Community Water and Sanitation Agency (CWSA)	It is the core government agency at the regional level concerned with the provision of potable water and sanitation services to rural communities and small towns. At the district and community levels, the CWSA is assisted by the District Water and Sanitation Team and the Water and Sanitation Committee to implement its mandate at the local level.
Energy	Volta River Authority (VRA)	Established by Act 46 (1961). It is responsible for the generation, transmission and supply/distribution of electrical energy for industrial, commercial and domestic use in Ghana and other Volta Basin countries. The VRA has also the mandate to manage the water resources of the Volta Lake to promote tourism, lake transport, irrigation, inland water fishery, and aquaculture.
Energy	Energy Commission (EC)	Established by Act 541 (1997). It regulates and manages the utilisation of energy resources in Ghana; it recommends national policies for the development and utilisation of indigenous energy resources; and it advises the Minister on national policies for the efficient, economical, and safe supply of electricity, natural gas, and petroleum products.
Irrigation/ agriculture	Ghana Irrigation Development Authority (GIDA)	Established by Supreme Military Council Decree 85 (1977). It develops and designs standards for irrigation infrastructure; it provides public irrigation facilities, and technical services for the development of irrigation facilities.
Irrigation/ agriculture/ fishery	Water User Associations (WUAs)	The WUAs are responsible for small reservoirs developed for the communities and their members; they are made up of irrigators, fishermen and livestock owners. GIDA often provides supervision and takes care of the maintenance of headworks, pumps, primary canals and other major structures.
Environment	Ministry of Environment Science Technology and Innovation (MESTI)	Established by the 1992 Fourth Republican Constitution of Ghana. It ensures accelerated socio-economic development through the formulation of sound policies and a regulatory framework to promote the use of appropriate environmentally-friendly, scientific and technological practices and techniques.
Environment	Environmental Protection Agency (EPA)	Established by Act 490 (1994). It advises the Minister of Environment, Science, Technology and Innovation on how to formulate environmentally friendly policies and recommend strategies that will ensure that the environment is protected. It also ensures that institutions undertake the required Environmental Impact Assessment (EIA) when planning for and undertaking development projects.
Development	Ministry of Local Government and Rural Development (MLRD)	It is responsible for promoting the establishment and development of a vibrant and well-resourced decentralised system of local government for the people of Ghana to ensure good governance and balanced rural-based development.
Development	Metropolitan, Municipal and District Assemblies (MMDAs)	Established by the Local Government Act (Act 462, 1993) They are responsible for the planning, implementation, operation and maintenance of water and sanitation facilities and the legal owners of communal infrastructures in rural communities and small towns. They are the Planning Authority for each District and are assigned deliberative, legislative as well as executive functions.
Development	National Development Planning Commission (NDPC)	It is the central economic planning authority in Ghana, responsible for the preparation of the country's Medium-Term and Long-Term Development Plans. It coordinates and approves the plans of sectoral agencies, including the WRC and the District, Municipal and Metropolitan Assemblies.
Development	Savanna Accelerated Development Authority (SADA)	Established by Act 805 (2010). It designs and coordinates the development agenda for the Northern Savannah Ecological Zones (Northern Ghana) through agricultural modernization, food, livelihood security and social protection, education and health.
Development	Ghana Dams Dialogue (GDD)	It is an important civil society organisation, which aims at building capacities and providing tools for improved decision-making on dam-related issues for equitable, transparent, participatory and sustainable development of dams in Ghana.

Source: Authors, compiled from various documents.

Box 4: Decentralisation in Ghana

Since the end of the 1980s, Ghana has embarked upon a process of decentralisation, leading to “some formal transfer of authority to elected officials at sub-national levels, along with modest fiscal transfers” (Ayee and Dickovick, 2010). Today, there are 216 local authorities, comprising 6 Metropolitan, 49 Municipal and 161 District Assemblies (Padgham et al. 2015). *

The MMDAs are the highest political authorities in the District, Municipality or a Metropolitan area. Section 10(3) of the Local Government Act of 1993 summarises the functions of a District Assembly (DA) as administrative, legislative, executive, planning and rating authority. The MMDAs are the pivots of administrative and developmental decision-making in the district (Republic of Ghana, 1993). They are specifically required to: formulate policies within the framework of national policies for the efficient administration and development of their areas; facilitate the planning and implementation of development programmes and projects; mobilise human, material and financial support in their districts for the promotion of development; and make the necessary by-laws to promote sustainable development at the district level (Republic of Ghana, 1997: 219).

However, several commentators noted that little progress has been made to devolving power to the district assemblies (Ayee et al. 2011). The President of Ghana appoints all district chief executives, which are responsible for the day-to-day performance of the executive and administrative functions of their DAs. One third of the DA's members are also appointed centrally, often based on party loyalty, rather than technical competence. Thus, DAs de facto operate with direct influence from the central government, and there are concerns regarding their accountability to local populations and civil society (Ayee et al. 2011). The autonomy of local governments is also hindered by revenue and resource constraints, as well as by the lack of human and institutional capacity both in fiscal and administrative terms (Padgham et al. 2015; key interviews).

Source: Authors.

* MMDAs are classified based on their populations. A Metropolitan Assembly is a Local Government unit or area with population over 250,000. A Municipal Assembly is a one town assembly with population over 95,000. A District Assembly is a group of settlements with a minimum population of 75,000 and a maximum of 95,000. The current breakdown of districts can be accessed at http://www.gra.gov.gh/docs/info/all_mmdas_in_ghana.pdf

CBOs, which have proliferated in recent years, often created by local politicians with the explicit intent of channelling international donor funds (Padgham et al. 2015). Their success in addressing climate change impacts has often been constrained by weak technical capacity to research climate change issues, inadequate funding and poor coordination (see also: Asante et al., 2015).

Like other African countries, Ghana has started setting up the required institutional infrastructure to access international climate finance mechanisms such as the Green Climate Fund (GCF). The GoG has created a Ghana Green Fund (GGF) within the Ministry of Finance (MoF), designed to be accredited as a GCF National Implementing Entity.¹⁸ The GCF aims to enable investments and co-financing in more effective adaptation and mitigation, waste management, biodiversity conservation, and natural resources management, as well as strengthen domestic institutional capacities in project preparation, appraisal and financial management to enhance absorptive abilities for climate investment finance (Padgham et al. 2015).

3.2.3. Key actors and their interest in the PMD project

In the words of one respondent, “*the PMD is a Ghanaian story, not a donors’ story*”.¹⁹ In fact, the VRA retains the main mandate over the PMD. It is the VRA that has overseen the project’s feasibility study, and put together and presided the Project Steering Committee (PSC), tasked to provide oversight and support to VRA. The PSC comprises of representatives from the VRA, WRC, SADA, EPA, GIDA, Volta Basin Authority (VBA), and GDD. However, both the AFD and the World Bank (WB) have played a key role in advancing discussions and plans for the dam. As noted above, the AFD funded the feasibility study as part of a package of loans to the GoG to boost its hydropower potential in the 2000s. The WB supported the process for conducting the ESIA, led by the EPA. In addition, it continues to provide technical assistance to the VRA in the framework of the Steering Committee, of which it is part.²⁰

According to the PMD’s feasibility study, the VRA will own the dam and the hydropower plant. It will raise revenues through electricity sales to the Northern Electricity Distribution Company (NEDCo). The GIDA will own the

18 According to key respondents in national government, the GGF received accreditation as a GCF National Implementing Entity in 2016 (key interviews conducted in Accra in April 2017). However, we were not able to verify the accuracy of this information.

19 Interview with representative of donor organisation conducted in Accra in April 2017.

20 Interview with representative of donor organisation conducted in Accra in April 2017.

Table 6: Major climate change adaptation and mitigation projects in Northern Ghana

Actor	Climate change mitigation and adaptation activities
Department of Food and Agriculture at Northern Regional Coordinating Council	<ul style="list-style-type: none"> • Since 2010, it has established a desk office for climate change, which collaborates with the EPA; • It ensures that every project that is implemented in the Northern Region has an environmental component; • It implements a project on 'Adaptation of Agro-Ecosystem for Climate Change' with support from German International Development Agency (Deutsche Gesellschaft für Internationale Zusammenarbeit, GIZ); piloted in the Northern region (Sawla, Bole, Tuna and BunkpuruguYunyoo Districts).
Department of Food and Agriculture of the Talensi District Assembly	<ul style="list-style-type: none"> • Working with SADA to plant mango tree seedlings; • Implementing Sustainable Land and Water Management Project. • Creating buffer zones along water bodies; • Supporting farmers to plant economic trees (teak, acacia, dawadawa and mahogany) with their crops; • Working with USAID, Ministry of Food and Agriculture (MoFA) and EPA to implement bonding of fields to conserve water for the fields, non-burning of fields and discouraging ploughing along the slope.
Savannah Accelerated Development Authority (SADA)	<ul style="list-style-type: none"> • Afforestation; • High yielding short gestation crops; • Agroforestry to support the growing of economic trees-mangoes, cashew, dawadawa; • Tree planting along the banks of the rivers to reduce siltation of the rivers; • Construction of spillways to regulate outflow of the water to check flooding; • Training of communities on how to preserve the dam, under what conditions flooding may occur.
Association of Church Development Projects	<ul style="list-style-type: none"> • Agricultural value chain programme; • Food security, resilience; • Protection of catchment areas of several dams; • Aquaculture, dry season vegetable farming; • Education of farmers on activities that could exacerbate climate change.
National Disaster Management Organisation	<ul style="list-style-type: none"> • Advocacy and influence through sub-committee of District Assembly to mainstream climate change into all infrastructure projects.
Ghana Social Opportunities Project (GSOP)	<ul style="list-style-type: none"> • Establishment of plantations and woodlots.
Upper East Regional Coordinating Council	<ul style="list-style-type: none"> • Regional Committee on Tree Growing made up of EPA, Agriculture, Forestry and NGOs; • Grow trees around reservoirs to reduce evaporation; • Make communities resilient to climate change.
Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> • Support farmers to plant economic trees to protect the forest, check erosion, help rainfall, minimise the strength of windstorm, and nourish the soil; • Alternative livelihoods for women in soap making so that they do not destroy the shea trees.
World Vision International	<ul style="list-style-type: none"> • African Community Resilient Project; • Children in Emergency Disaster Mitigation; • Education against building in waterways; • Encouraging farmers not to farm in waterways; • Encouraging the cultivation of yellow melon and water melon rather than pepper because of the flooding; • Disaster Management Task Force; • Dry season farming; • Support farmers to breed goats.

Source: Compiled by Authors based on key interviews conducted in Ghana in December 2014 and February 2015.

irrigation weir and main canal and sign a management contract with an irrigation scheme company formed by private sector and WUAs. The transmission line connecting the hydropower plant to the network will be financed and operated by GridCo. GWCL will be responsible for the operation and maintenance of the water supply network to Walewale (EEMC et al. 2014). In the feasibility study, it is specified that only VRA will pay for the dam, although it could consider levying charges from all the stakeholders benefitting from the dam, based on the share of net benefits derived by each of them (EEMC et al. 2014). Instead, the cost of the environmental management plan (assessed at USD 23.2m) will be shared between VRA (66%), GIDA (32%) and GridCo (2%) (EEMC et al. 2014).

Recent discussions on the design and operationalisation of the PMD, which focus on the maximisation of the irrigation component at the expense of the hydropower one, risk shifting this institutional set-up. Some argue that if the PMD were primarily for irrigation purposes, GIDA, rather than VRA, should have ownership over the dam. Others support the claim that ownership would still reside with the VRA, considering its overall mandate over the management of the Volta River. To date, GIDA has been involved in discussions over the PMD only marginally; as a member of the Steering Committee, it provided comments on the irrigation provisions as outlined in the feasibility study.

This could change in the future. Both the AFD and the WB reportedly had bilateral meetings with GIDA and SADA to try and bring them more prominently in the process. However, the potential role that SADA could play in the project complicates the institutional framework underpinning the conceptualisation of the PMD project. As the agency in charge of the development of the NSEZ, in fact, SADA - and not GIDA - may claim ownership over the dam's irrigation component. In SADA's Masterplan, the PMD is labelled as a 'flagship' project (SADA, 2016), and SADA portrays itself as the "lead agency for promoting the PMD, together with VRA".²¹ The complementary studies that have been commissioned to Tractabel will specifically look at the enabling framework that is necessary for a viable irrigation scheme to be put in place in Pwalugu, making proposals for land tenure reform, and increasing access to markets and capital in the area.²²

Local level actors have been only marginally involved in discussions and plans for the PMD project. In drafting the ESIA and feasibility studies, consultants have met with governmental authorities in the Talensi and West Mamprusi Districts and Upper East and Northern Regions, as well

as traditional chiefs representing local communities. These meetings have allegedly been informative rather than consultative – aimed at presenting the project, with little space for voicing and discussing local concerns and needs.

Local level authorities worried that "land for irrigation in Pwalugu may end up going to large commercial farmers while poor farmers loose out".²³ The resettlement of upstream communities was another reason for concern – there are about 1,500 to 2,000 people living in the area where the dam's reservoir will be located. These lands also have a cultural and traditional value for local communities, potentially making the issue of compensations a sensitive one. Compensations have not been incorporated in the feasibility study for the PMD; the latter only includes estimates that for an FSL at 172 m asl, 40 households will be displaced, versus 15 households for a FSL at 170 m asl.

Despite these concerns, our interviews revealed that there seems to be a high degree of acceptance and even enthusiasm for the project in the communities and districts affected. In the words of one District Assembly's representative, "our priority is food security in an area that is characterised by long periods of drought, bushfires, unreliable rainfall and poor soil fertility; the irrigation component of the PMD project will bring us some relief".²⁴ Most importantly, and as highlighted in all our interviews in the Talensi and West Mamprusi districts, the PMD project is expected to mitigate the impacts of unregulated flood releases from the upstream Bagré dam, thus reducing the yearly devastation of crops and lives. Finally, "the dam will bring jobs for our youth, thus also discouraging migration".²⁵

While the VBA is part of the PMD's PSC, it has, to date, maintained a marginal stance towards the project. Despite good progress towards developing a Water Charter for the Volta Basin, the VBA remains a coordinating body. The transboundary countries of the Volta River Basin continue pursuing their development plans unilaterally, data and information sharing is limited, and sector/silo-driven discussions persist.

"You can't just tell them (Burkina Faso) don't develop; we understand they need to develop but we need to remind them about the impacts downstream. In Ghana, we understand that the management of our water resources cannot be done in isolation from our neighbors. Development upstream will reduce flows downstream so we need to share and engage on transboundary issues" (Participant in action learning of WISE-UP to Climate project, 2015)

21 Interview with representatives of government organisations conducted in Accra in April 2017.

22 Interviews with representatives of government and donor organisations conducted in Accra in April 2017.

23 Interview with District Assembly representative conducted in Bolgatanga in February 2015.

24 Interview with District Assembly representative conducted in Bolgatanga in February 2015.

25 Interview with District Assembly representative conducted in Bolgatanga in February 2015.

3.3. Relations of power and influence between actors

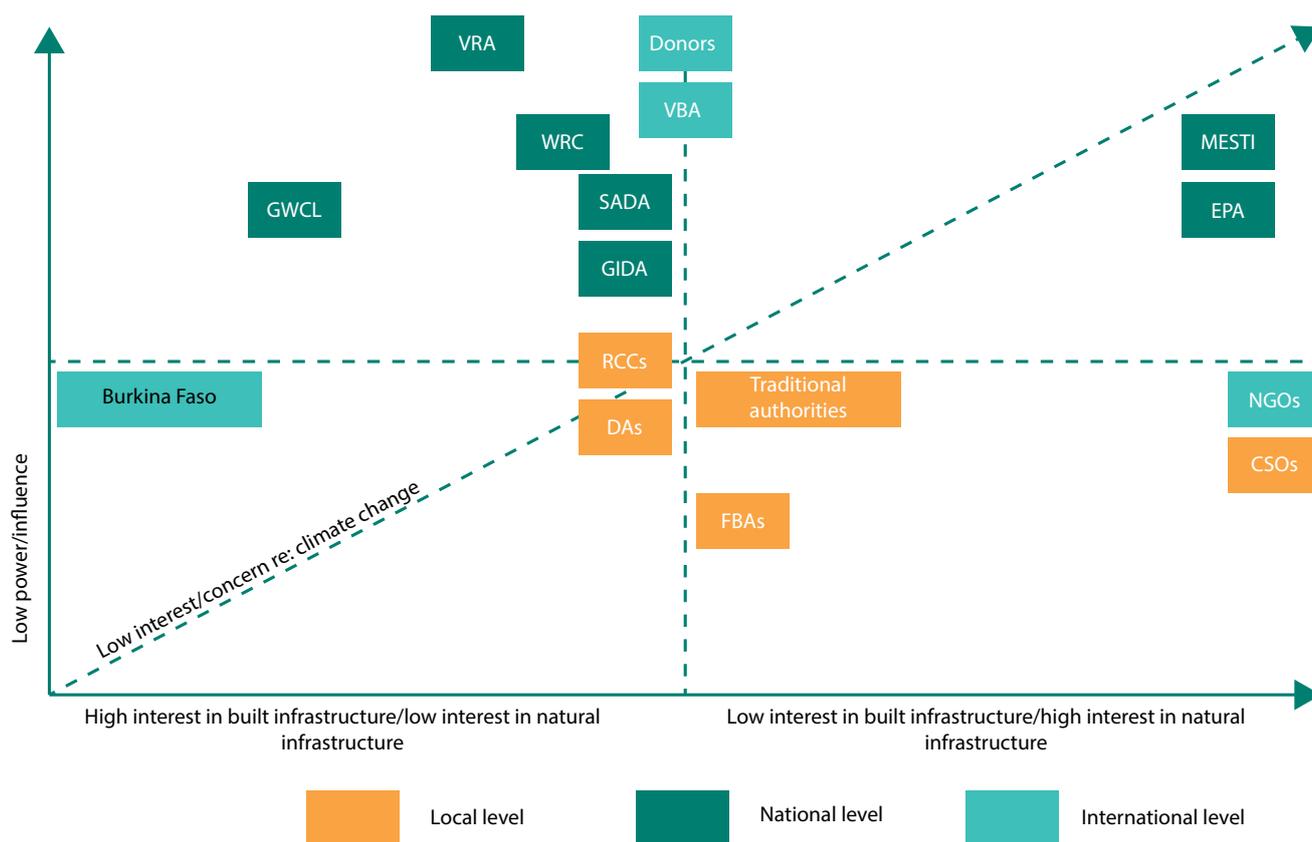
We analysed the relations of power, influence and the interests of the various stakeholders in the water sector in Ghana based on their role in the initiation and development of the PMD project. We used Eden and Ackermann (1998)'s model of 'power' and 'influence' relationships, modified to map the relative degrees of power and influence that actors have in the decision-making process over the PMD, as well as their interest in built infrastructure as opposed to natural infrastructure. We introduced a third axis to visualise the interest and engagement of different actors in relation to climate change adaptation and mitigation. The results of this analysis, based on data and observations collected during key informant interviews, are illustrated in Figure 3.

From Figure 3, we can see that the actors that yield higher power and influence in the decision-making over the PMD are those that have an explicit political mandate over water-using sectors such as agriculture and energy. As noted above, these actors highlight the benefits of the PMD

in terms of hydropower generation to address Ghana's electricity deficit, and fuel its industrialisation plans; and to develop irrigation for improving agricultural yield and hence food security in the Northern Region. Relatively to other actors, key Ministries at the national level have taken less concrete measures to address climate change adaptation. They have committed to implementing the National Adaptation Strategy, and have engaged in the process of drafting adaptation plans and mainstreaming climate change in their activities. Though this is an important first step, the extent to which they will push for and implement concrete interventions aimed at climate change adaptation remains to be seen.

The actors with less power and influence in the decision-making process over built infrastructure investments are those at the local level. All interviewees agreed that, despite a rhetoric of decentralisation, decisions on key infrastructure investments remain in the hands of national Ministries, or even the Parliament and President's Cabinet. On paper, DAs play an important role in conveying the

Figure 3: Analysis of power, influence and interest of main actors in the water and water-related sectors in Ghana



Source: EEMC et al., 2014.

Note: As the analysis suggests, the actors can be put into three main categories, I, II and III. In category I, we have actors whose power and influence is high. They also have high interest in built infrastructure. Actors in category I however appeared to have low interest in natural infrastructure with low interest/engagement in climate change discourse. In category II, they are actors who also have high power and influence with high interest in natural infrastructure. This group of actors also has high interest/engagement in climate change discourse. Actors in category III were found to have low power/influence but had high interest in built infrastructure.

needs and demands of communities to the government. However, in practice they remain substantially under-funded and under-staffed and are unable to fulfil their mandate. The engagement of local level actors in the climate change discourse varies. DAs and traditional authorities are more concerned about the livelihoods of their communities and undertake climate change activities on an ad hoc basis, generally on NGO-initiated and funded projects.

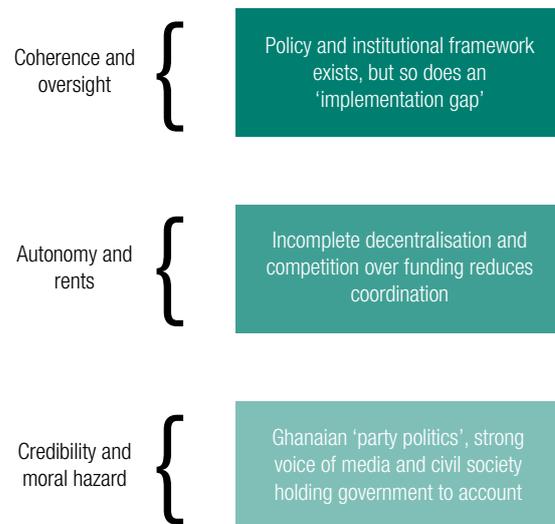
On the top right corner of Figure 3 appear those actors that, because of their mandate and agenda, are more interested in environmental considerations and could thus be open to consider investments in natural infrastructure. Among these, we find organisations with an explicit environmental focus (MESTI, EPA), as well as donors and international NGOs. These actors also appear to have a higher commitment to climate change adaptation and mitigation, confirming the finding in Sova et al. (2014) that “MESTI and EPA are influential given their mandate in steering national climate change initiatives in Ghana, as well as their association with international agencies to mobilised climate change resources” (Sova et al., 2014). It also confirms the results of the analysis of climate change expenditure in Ghana by Asante et al. (2015: 49), noting that the MESTI, together with the MLNR, MWRWH and MoFA have the highest number of climate change relevant budget codes.

3.4. Drivers of the decision-making process over built infrastructure in Ghana

In Ghana, the principal driver of water infrastructure development is energy demand, with the objective of satisfying unserved and under-served households and powering industrialisation. Most stakeholders interviewed in Ghana agreed that “the government has its priorities, and now it’s energy, energy, energy”.²⁶ There is a political drive to invest in new generation capacity, and to operate existing infrastructure for maximum output. While many current dam projects are described as multi-purpose, the widespread view is that “hydropower is always the priority”.²⁷ Although nationally the demand for energy is the primary driver, irrigation development is also an important concern, especially in Northern Ghana.

Built infrastructure is conceived as the primary driver of economic growth. It is also thought to be a vote-winner, given high levels of dissatisfaction with the status of water (and related sanitation and hygiene services) and

Figure 4: Main characteristics of the decision-making process over built infrastructure in Ghana



Source: Authors

gaps in energy provision in both urban and rural areas. We were told that the people are “*very quick to kick out*” a government that is not seen to act on such priority issues, and announcements of new investments in hard infrastructure by elected leaders are a means of being seen to act.²⁸ Dams are also seen by politicians as a legacy investment.²⁹

Respondents had different opinions on the extent to which the environment, or ecosystems, are a real concern for policy-makers in Accra. Some argued that energy, water supply, infrastructure development and food security should take precedence over environmental considerations in Ghana. A key informant stated that politicians “*are not insensitive to nature, but they have to show progress on energy and water supply first*”.³⁰ Implicit in these observations is the assumption that there is a trade-off between benefits to society (to be gained from developing water resources) and benefits to nature (to be gained by leaving them alone); and that investments that benefit national economic growth should be prioritised over investments that have benefits at the local level.

Other respondents highlighted that the GoG is increasingly aware of the need for its projects to meet international social and environmental standards. It is also more willing to listen to environmental concerns related to infrastructure development because it recognises that

26 Interview with representative of government conducted in Accra in June 2015.

27 Interviews with representatives of government conducted in Accra in June 2015 and April 2017.

28 Interviews with representatives of governments and NGOs conducted in Accra in June 2015 and April 2017.

29 Ibid.

30 Interview with representative of government conducted in Accra in June 2015.

addressing them early will save money on compensation or mitigation in the long run.³¹ The Akosombo Dam was constructed with very little consultation and poorly managed compensation arrangements; many compensation claims are still unresolved fifty years later. “*We are learning our lessons from previous mistakes like in the case of the Akosombo Dam*”.³² Particularly in the irrigation sector, “*ecosystem considerations have become stronger; the EPA is pushing for minimum environmental damage and mitigation of negative environmental impacts*”.³³

The increasing attention to ecosystems and environmental protection was evident during the 2016 electoral campaign, during which the media have successfully highlighted the environmental threat posed by the *galamsey*. These local artisanal gold miners, operating independently of mining companies and hence without a concession or license, have existed for centuries in Ghana. However, the government had never vigorously addressed the problem until the media started exposing the contamination of rivers with mercury and other damaging substances throughout Ghana. Today, ‘the issue

of *galamsey*’, as it is commonly referred to in Ghana, is discussed at the radio, on TV, in bars and restaurants; and has brought environmental concerns on top of the new government’s agenda.

Climate change is a preoccupation of the GoG, partly due to the high levels of donor interest as well as the promises of international climate finance. A recent study found that climate change relevant expenditure in the national budget is approximately two percent of government expenditure and 0.5 percent of GDP. This level of budget allocation represents a very low base for the NCCP to accomplish its policy objectives over the next five years (Asante et al., 2015). More funding is coming from development partners, although it is difficult to establish its total value as it flows through multiple financial systems. For example, support from the Germany’s International Climate Initiative, one of Ghana’s bilateral international climate funds, takes place outside the national public finance management system (Asante et al., 2015) (see Table 7 for a list of relevant climate finance initiatives in Ghana).

31 Interviews with representatives of government conducted in Accra in June 2015.

32 Interview with government representative conducted in Accra in June 2015.

33 Interview with government representative conducted in Accra in June 2015.

Table 7: Major climate finance initiatives in Ghana

Lead organisation	Initiative	Description
African Development Bank (ADB)	Africa Climate Change Fund	Launched in April 2014, part of ADB's strategy 2013-2022, it focuses on a transition to greener growth. The African Climate Change Fund aims at increasing climate funding for activities that consider climate change in African countries. Initial contribution of EUR 4.7 million from Germany. Focus on 'climate resilient and low carbon projects', with component on data/info sharing and capacity-building.
AMCOW/ADB	African Water Facility (AWF)	Hosted and managed by the ADB. Created in 2004, The AWF has an established track record in providing grants for Project Preparation, Water Governance and Water Knowledge, supporting projects designed to increase water, energy and food security, enhance regional cooperation and promote socio-economic growth in Africa. 15 bilateral, multilateral financial institutions, foundations and African governments – EUR 151.2 million since 2006.
Adaptation Fund (AF)		Objective: Increasing resilience to climate change in Northern Ghana through the management of water resources and diversification of livelihoods. Funding: US\$ 8.2 million, approved in 2015. UNDP is multilateral implementing entity for this project.
International Climate Finance Initiative		3 projects in Ghana – 18 global projects with Ghana as one of the components. Ghana-specific projects are about: a) rehabilitation of smallholder cocoa farms and forest ecosystems in the Hight Forest zone of Accra (Jan 16-Dec 18) – EIR 1.4m to Forestry Commission, SNV implementing; b) Sustainable energy and water supply for the university of Accra (finished in 2010); c) promoting integrated mechanisms for climate risk management and transfer (Nov 15 to Oct 18) – EUR 5m to Mol.
Green Climate Fund (GCF)		Every developing country has National Designated Authorities who are the interface between each country and the Fund. These focal points communicate the country's strategic priorities for financing low-emission and climate-resilient development across its economy.
Global Environmental Facility (GEF)	Trust Fund – Climate change focal area	76 projects in Ghana, GEF grant funding of US\$450.71 million+ US\$2.71 billion of additional co-financing: US\$ 2.4 million for climate change, US\$ 3.1 for biodiversity; US\$ 4.3 for land degradation. Operational focal point: MESTI.
	Special Climate Change Fund	The Special Climate Change Fund supports adaptation and technology transfer in all developing country parties to the UNFCCC, supporting both long-term and short-term adaptation activities in water resources management, land management, agriculture, health, infrastructure development, fragile ecosystems, including mountainous ecosystems, and integrated coastal zone management
United Kingdom	International Climate Fund	Not clear what their role is in Ghana
WB	Pilot Programme for Climate Resilience	See SREP Investment Plan for Ghana – support/focus on renewable energy development (mini-grids and stand-alone solar PV systems, solar PV based net metering with battery storage, utility-scale solar PV/wind power generation; technical assistance to scale up renewable energy.
START/ASSAR	Vulnerability and adaptation to climate change in the semi-arid regions of West Africa	Aim: develop integrated regional research program on climate change vulnerability and adaptation centered around advancing knowledge on socio-economic and biophysical systems, governance and institutions, gender, and wellbeing (2014-2018)
GWP/AMCOW	Water, Climate and Development Programme (WACDEP)	WACDEP aims to (a) integrate water security and climate resilience in development planning, (b) develop partnerships and capacities to build resilience to climate change through better water management, and (c) develop 'no regret' financing and investment strategies for water security and climate change adaptation.

Source: Compiled by authors.

4. The decision-making process around water infrastructure in Ghana

In the previous section, we described the main actors involved in decision-making over the management of water resources, and the frameworks that are in place to regulate their interactions. We now move to identify the characteristics of the decision-making process over built infrastructure: its drivers, the logics it follows, and the outcomes it leads to. We start by identifying the main ‘bottlenecks’ that, based on our analysis, limit the capacity of the political system to change and innovate, particularly in terms of integrating environmental and climate change concerns into the planning and implementation of built water infrastructure projects. We then use the six categories of incentives proposed by Harris and Wild (2013) (see Box 1) as an analytical framework to explain why these bottlenecks persist. We combined the six categories of incentives proposed by Harris and Wild into 3 groups, each describing a very specific problem of the decision-making process over built water infrastructure in Ghana:

1. **The lack of implementation of policies and regulations for water resources management and infrastructure development** – especially as far as provisions for environmental protection and climate change adaptation are concerned.
2. **The ‘siloes’ of the decision-making process** over water built infrastructure, or the lack of coordination of actions and investments between relevant stakeholders at different levels (transboundary, national, local).
3. **The importance of politics**, and particularly ‘electoral gains’ for politicians, skewing investment decisions towards projects/interventions with high visibility among the electorate and/or particular constituencies.

This conceptualisation allows us to examine the structural and systemic features of the decision-making process, to better understand where the problems are, and hence what can be done to overcome them.

Figure 4 illustrates the ‘bottlenecks’ that need to be overcome to introduce change/innovation in the decision-making process over built infrastructure in Ghana. In the

following sections, we examine these bottlenecks one by one. Looking at the political-economy context of Ghana, we propose several reasons why they persist.

4.1. The ‘implementation gap’ for environment and climate change

The first bottleneck to introducing change in the decision-making process over built water infrastructure in Ghana lies in the difficulty of implementing the policies and regulations that are in place to manage water resources and develop water infrastructure. This is reinforced by a lack of monitoring mechanisms and processes to ensure compliance with existing regulations.

The decision-making process around the PMD occurs within a well-defined policy and institutional framework. In the PSC, each Ministry performs a specific role in the negotiations over the dam, based on its mandate. The VRA, entrusted with the management of water resources in the Volta River, leads on the project; GIDA develops its irrigation component; SADA checks that the project is in line with the broader development goals of Ghana’s Northern regions; and EPA ensures compliance with existing social and environmental guidelines. Multilateral and bilateral donors are also part of the process, willing to release a loan for the construction of the dam once the project is deemed to be viable, profitable and sustainable. The VBA guarantees that information on the project is shared with neighbouring countries. Regional Coordinating Councils are also involved to voice local concerns and needs.

In addition to the general framework for managing and developing water resources at the basin level, Ghana has invested in developing a strong policy and institutional framework to address climate change adaptation and mitigation. One of the objectives of the manifesto with which the NPP party won the elections of December 2016 was to “*work with international partners to access the \$30 billion global fund available for climate change*

purposes” (NPP, 2016). The “goodwill and commitment of the government”³⁴ to climate change is visible at both the national level through the launch of the NCCP and NCCAS, and at the international level with the submission of Intended Nationally Determined Contributions and the preparation of the 4th Communication to the UNFCCC (currently ongoing).³⁵

The MoF has created a Natural Resources, Environment and Climate Change Unit in 2010 to coordinate and manage the financing of natural resources and climate change activities. A sub-committee in Parliament has been created and staffed to deal with climate change issues specifically (Padgham et al. 2015). There are even talks of creating a specific Climate Change Commission, to put the issue directly under the Vice President’s Office – rather than leaving it as a unit of the EPA.³⁶ Also at the local level, District Assemblies are requested to mainstream climate change adaptation and mitigation across their mid-term development plans; failure to do so risks blocking the release of funds from the District Development Fund.

In practice, however, the implementation of these policies and processes is fraught with challenges. According to a recent analysis of the political economy of climate compatible development in the fishery sector, researchers at the Institute of Development Studies concluded that “*the major constraint to climate compatible development is institutional failing, rather than the lack of policies per se*” (Tanner et al. 2014, 3). Several reasons have been brought forward to explain the persistence of such ‘implementation gap’, from the failure to monitor the compliance of different actors with existing rules and regulations, to poor coordination and data sharing between agencies and ministries, and the lack of financial and human resources especially at district level.³⁷

Funding is the major constraint, especially at the district level. DAs can generate revenues on their own, but they barely manage to collect sufficient funds to cope with the many development priorities they face. “*Especially in this region [Upper East Region] we struggle to generate enough money; people live off subsistence agriculture*”.³⁸ “*The limited budget we have needs to be spent on priority projects, such as health, road construction, agriculture;*

climate change and biodiversity-related activities are not priorities”.³⁹ Local level authorities, consequently, have limited resources to monitor the observance of rules. It is chiefs that mostly do the monitoring, but they observe the implementation of their ‘community’ rules, rather than those set by official government authorities. For example, the Arigu chief oversees compliance with the rules he set regarding seasonal fishing in ponds; “*it is less likely that he will monitor compliance with the buffer zone policy, he may not even be aware of it*”.⁴⁰

Government agencies at all levels also suffer from significant gaps in terms of human resources, and staff turnover is high. For example, when we asked District and Regional officials in the Upper East region whether they knew about the PMD project, only some of them mentioned that they were invited to “*some meetings about the dam some years ago, where international people were present; but then I moved to another post and lost track of the process; I do not know if my successor ever attended similar meetings*”.⁴¹ Indeed, District Coordinating Directors, Budget Officers, Finance Officers and Planning Officers are often transferred from one post to the other based on “*the political priorities of the ruling government*”, “*especially after elections when a new government is formed*”.⁴² This results in the loss of institutional memory over the planning and implementation of infrastructure projects.⁴³ Low salaries also make public posts less attractive for well-qualified and high-level technicians and experts, especially when alternatives in international organisations or the private sector are available.

Looking at the implementation of environmental and social regulations in the case of infrastructure projects such as the PMD, our interviews revealed that the current process is a substantial improvement with regards to the past. “*At least environmental and social impact assessments are conducted now, respecting international standards, and informed by some form of consultation with communities*”.⁴⁴ While some interviewees felt that the guidelines of the EPA were too weak and did not demand enough of project developers and investors, the case of the PMD project demonstrates that environmental concerns are becoming more and more of a priority. One of the

34 Interview with representative of civil society conducted in Accra in April 2017.

35 Interviews with representatives of government and civil society conducted in Accra in April 2017.

36 Interviews with representatives of government conducted in Accra in April 2017.

37 Interviews with representatives of government and donors conducted in Accra and Bolgatanga in April 2017.

38 Interview with representative of government conducted in Accra in April 2017.

39 Interview with representative of government conducted in Bolgatanga in April 2017.

40 Interview with representative of government conducted in Bolgatanga in April 2017.

41 Interview with representative of government conducted in Bolgatanga in April 2017.

42 Interviews with representatives of government conducted in Accra in March 2015 and April 2017.

43 Interviews with representatives of government conducted in Accra in March 2015 and April 2017.

44 Interview with representative of government conducted in Accra in March 2015.

recommendations that the Steering Committee made after analysis of the ESIA and the feasibility study for the PMD was to commission an assessment of critical habitats in the Pwalugu area, using international guidelines, and to review the ESIA accordingly. A staff of one government agency admitted that “*we have not always been fair to communities or the environment, but there is willingness to do better in this regard*”.⁴⁵

4.2. The lack of coordinated action for water management and development

Including considerations over the preservation of ecosystem services and climate change adaptation requires concerted action between all stakeholders involved in decision-making over built water infrastructure projects. However, we noted limited coordination between relevant stakeholders at national level, and between stakeholders at national and local levels. The lack of horizontal and vertical coordination is a further bottleneck to introducing change in the decision-making process.

The case of the PMD shows that, even though all stakeholders have precise mandates and roles, they often enter in competition for the control of projects and interventions. According to one of our respondents, “*the main challenge for the PMD project is who will lead it, who will have ownership over it if it goes ahead; depending on what shape the project takes, VRA, GIDA, SADA may all want a slice of the pie*”.⁴⁶ In the design and implementation of water management and development solutions, there is a problem of coordination between Ministries; this is especially true for infrastructure projects that attract loans and generate economic returns. “*In the face of budgetary constraints, each Ministry is determined to own projects that can benefit from international and national investors; it is a survival strategy*”.⁴⁷

In this context, collaboration and information sharing with other stakeholders can turn at one’s disadvantage. This results in stakeholders continuing to work in siloes. For cross-sectoral issues such as environmental protection, or climate change adaptation, this lack of coordination and collaboration is detrimental. In theory, sectoral ministries at national and district level should prepare their mid-term development strategy synergistically, to fit the objectives of Ghana’s long-term shared growth and development agenda.

However, our interviews revealed that this process proceeds on a sector basis and dialogue is limited. Dialogue often occurs on a case by case basis, in the framework of specific initiatives and projects – for the PMD, it is the Steering Committee that provides such space for coordination between different stakeholders.

Dialogue is even more difficult at the transboundary level. The VBA lacks visibility and authority in decisions over water infrastructure investments. It relies on donors’ support to perform its functions, and has a total staff of 8 people. The process to develop a Water Charter for the Volta River Basin is ongoing, but until its approval, the VBA remains a coordinating body, with little say over country’s investment policies and decisions.⁴⁸ In the case of the PMD, interviewees argued that “*it is difficult to see the role of the VBA in the PSC; Burkinabe authorities have not been involved in discussions around the dam project to date, and it is clear that Ghanaian authorities will go ahead with the project no matter what Burkina Faso or other neighbours say*”.⁴⁹

One of the problems that interviewees also raised referred to the lack of coordination between donors, which are often the ones funding projects and interventions in the water sector, and in relation to environmental and climate change issues. “*Donors pursue their own agenda, and have their own viewpoints and ideologies on things; they coordinate with the government and ensure their interventions are in line with the government’s agenda, but they often fail to coordinate with each other*”.⁵⁰ In the case of the PMD, for example, the WB and AFD, the two major donors involved in the negotiation over the dam project, have different views on the irrigation component of the project: the WB pushed for large-scale irrigation and investment of the private sector; AFD was keener on small-scale irrigation for smallholders. “*This (and other issues) stalled the approval of the feasibility study, so that we had to commission a complementary study to look at irrigation more in depth*”.⁵¹

In addition to the difficulties of horizontal coordination, information flows from top to the bottom, and vice versa, was also found to be weak. The district level offices of GIDA, MoFA and GWCL, for example, were informed about the PMD project only via “*personal contacts*”.⁵² Some of them admitted to have been invited to “*one meeting with some international people to talk about the*

45 Interview with representative of government conducted in Accra in March 2015.

46 Interview with donor organisation conducted in Accra in April 2017.

47 Interview with government representative conducted in Accra in April 2017.

48 Interviews with representatives of government and VBA conducted in Accra in March 2015 and April 2017.

49 Interview with representative of donor organisation conducted in Accra in April 2017.

50 Interview with donor organisation conducted in Accra in April 2017.

51 Interview with donor organisation conducted in Accra in April 2017.

52 Interview with representative of government conducted in Bolgatanga in April 2017.

dam, but this was a long time ago”.⁵³ Communication about these meetings goes from the convening agency at the national level (e.g. VRA or SADA) to the Regional Coordinating Council (RCC), which then invites the relevant actors at district and community level. Often, however, this chain breaks – the Regional Coordinator may receive the invitation too late, fail to deliver it to the relevant offices, or the invitees may not be available on that date and do not appoint others in their office to attend on their behalf.

“Decentralisation was conceived to foster participation, but participation remains low”.⁵⁴ While the DAs should be the ones interacting with communities and presenting their needs and demands to the Council Assembly (which decides over the allocation of resources to local communities), they cannot conduct proper consultations. Organising community meetings is costly: “you need vehicles to reach the communities, you need to buy water and food to people, they even expect a small payment for participating; our office [at the district level] simply does not have the resources for this”.⁵⁵

This ‘crippled’ decentralisation results in local governments lacking the financial and human resources they need to design and implement development plans in line with national objectives. This is especially true for climate change adaptation and environmental issues, which are considered less of a priority than basic service provision. Increasingly, this gap has been filled by NGOs and CBOs, with mixed record of success. Especially in Northern Ghana, the proliferation of NGOs, some of which have been created by local politicians to channel international donor funds, has led to the concern that NGO operations are marginalising rural communities in decision-making processes (Marchetta, 2011). Another important concern with regards to NGO-led efforts is the lack of community ownership and an adequate exit strategy and hence consideration given to the continuity of NGOs’ efforts.⁵⁶

Our interviews highlighted that one important cause for the lack of coordination is competition for funding between different Ministries. The funding for large-scale infrastructure projects mostly comes from external sources, i.e. foreign private investors and international bilateral and multilateral donors. In the case of the PMD, for example, the second feasibility study was funded by the World Bank and the AFD. Although the GoG has a clear

strategy for the water sector, investments tend to be made on a project-by-project basis, following the money and specific interests, rather than the real needs of the country and its people. Especially on climate change adaptation and mitigation, the Government’s agenda appeared to be largely shaped by donors’ priorities and funding. This risks creating dependency on donors and hampering the sustainability of projects in the long-term. In addition, some of the donor projects have been poorly implemented, with cases of misuse of funds, and delays in the completion of projects (see IMF, 2003; Quartey et. al., 2010; Government of Ghana, 2012; Benin et. al., 2014).

Although the GoG has identified the Green Climate Fund (GCF) as a priority climate finance mechanism to achieve the goals set in the NCCP, accessing such fund remains a challenge. Ghana has demonstrated some experience with climate finance before; the GoG recently secured an Adaptation Fund project in Northern Ghana⁵⁷, and it hosts several REDD+ activities. However, the MoF does not have a mechanism to track the resources generated for climate change action within the country or from external sources, which weakens its leadership role and increases the risk of overlap and duplication of efforts (Asante et al., 2015). In addition, our interviews pointed to the lack of capacity within key agencies for submitting a proposal to the GCF: “We do not understand how to access these funds; we do not have enough technical expertise and administrative capacity within Ministries, the procedure is very difficult.”⁵⁸

4.3. The importance of elections and accountability

Political support is another important motivation for action at both local and national levels. Typically, in Ghana, politics plays an important role in determining one’s position and appointment, and setting the agenda – what some commentators have defined as ‘party politics’. We found that this represents an obstacle to the inclusion of considerations of natural infrastructure and climate change adaptation in built water infrastructure projects. Our analysis also revealed that the Ghanaian media and civil society play an important role in holding decision-makers into account as far as environmental issues are concerned.

53 Interview with representative of government conducted in Bolgatanga in April 2017.

54 Interview with representative of government conducted in Bolgatanga in April 2017.

55 Interview with representative of government conducted in Bolgatanga in April 2017.

56 Interviews with representatives of government and civil society conducted in Accra and Bolgatanga in March 2015 and April 2017.

57 Financed by UNDP and launched in May 2016, implemented by Ghana for 4 years, total of 8.2 million USD, see: <https://www.adaptation-fund.org/project/increased-resilience-to-climate-change-in-northern-ghana-through-the-management-water-resources-and-diversification-of-livelihoods/>

58 Interview with representative of government conducted in Accra in April 2017. It should be noted that, to address this gap, the UNDP has put in place a Green Climate Fund Readiness Programme, which should build the capacity of the MESTI and MoF to mobilise and access international funds on climate change mitigation and adaptation.

Numerous authors talk about the problem of patronage in the Ghanaian party system (see, e.g. Booth et al. 2005; Gyima-Boadi, 2007; 2009; Saffu 2007a;2007b; Lindberg and Zhou, 2009). A WB report on the political economy of the mining sector in Ghana uses the concept of ‘executive governance’ to describe the centralisation of policy-making in national institutions (Ayee et al. 2011; key interviews). And although the country has decentralised its political and development strategy since the 1990s, little progress has been made to devolving real power to the district assemblies. The president appoints all district chief executives, as well as one-third of the DA’s membership; thus, these bodies remain part of a bigger patronage system (Ayee et al. 2011).

As also noted by other authors, the impact of political groups is “*as apparent at the community level as it is in Accra*” (Sova et al., 2014). At the district level, political parties engage in service delivery directly to communities in attempts to win votes; DAs and traditional authorities are frequently being drawn into the political foray. Party loyalty, rather than technical competence, has frequently been the main criterion for appointments of DA’s members (Ayee et al., 2011). According to our interviewees, this is because national Ministries retain substantial control over budget allocation and investments.⁵⁹ Ghana’s new composite budget has theoretically fortified the DAs’ central planning and coordinating role. Yet, significant delays in the release of central-level funds to the DAs and limited capacity for DAs to produce internally generated funds have challenged confidence in the system (Sova et al., 2014).

On paper, projects should be conceived in line with the long-term and medium-term planning coordinated by the NDPC. However, in practice, decision-making is dominated by elected representatives in the Cabinet and President Office, looking to gain visibility amongst the electorate.⁶⁰ Re-election for an independent politician mainly depends on his or her ability to adapt to the internal party codes and follow party lines and priorities (Ayee et al. 2011). Ghana has a two-party system, dominated by the National Democratic Congress (NDC) and the NPP (Abdulai, 2016). Electoral competition between these parties has become increasingly intense, and embeds ethno-regional elements

as the NPP has its strongholds in the Ashanti and Eastern regions, whereas the Volta and the three northern regions have voted for the NDC since 1992.⁶¹

Fundamentally, this means that party politics conditions the decision-making process; issues will be included or excluded from the political agenda depending on priorities and interests of the party in power. Given the current priority to tackling environmental pollution and addressing climate change adaptation and mitigation of the current NPP-led government, this can be good news. However, it also makes the implementation of policies and regulations contingent upon who is in power, at the detriment of long-term development planning. The PMD project is a good illustration of these dynamics. The previous NDC-led government strongly supported the PMD project as part of its efforts to develop Ghana’s northern regions. It remains to be seen to what extent the new NPP-led government will continue supporting the project.

Because elections are such an important test for a politician’s own survival, and that of his/her party, they need to be seen as “*doing something good for the people*”.⁶² This becomes even more important considering the presence of a strong media and the civil society, which have been quite vocal in the past years in denouncing the government’s wrongdoing, and holding decision-makers accountable for their actions. During the last round of interviews that we conducted in April 2017, for example, all our respondents discussed the critical role of the media in highlighting the ‘*issue of galamseys*’ denouncing the pollution of water bodies they cause, and calling for the government to act. “*It has been a change from the past, when the media were controlled by the government through the Ghana Broadcasting Corporation; now the media sector has been liberalised and there has been a proliferation of TV programmes and radio stations with programmes in local languages, targeting women, young people, addressing their issues*”.⁶³ The environment and environmental concerns feature prominently in these programmes (“*although more journalists should be trained on these issues*”⁶⁴), contributing to building the awareness of the public, which in turn can demand action to governments.

59 Interviews with representatives of government conducted in Bolgatanga in April 2017.

60 Interviews with representatives of government and civil society conducted in Accra in March 2015 and April 2017.

61 The remaining four regions (Brong Ahafo, Central, Greater Accra and Western) are generally considered as swing voting regions.

62 Interview with representative of civil society conducted in Accra in April 2017.

63 Interview with representative of the media conducted in Accra in April 2017.

64 Interview with representative of the media conducted in Accra in April 2017.

5. Conclusions and recommendations

5.1. In summary: bottlenecks to introducing natural infrastructure and climate change considerations, and why they persist

Through interviews with key respondents in government, donor organisations and civil society at the national and local levels, we examined the characteristics of the decision-making process over built water infrastructure in Ghana. Our analysis aimed to understand the main bottlenecks to introducing natural infrastructure solutions, and identify solutions to address them. We adopted an issue-based approach, investigating decision-making around the proposed Pwalugu Multipurpose Dam project, and extending findings to the broader political-economy context of Ghana.

We argued that the first bottleneck to introducing change in the decision-making process over built water infrastructure in Ghana lies in the difficulty of implementing the policies and regulations that are in place to manage water resources and develop water infrastructure. We found several reasons for this ‘implementation gap’, ranging from the lack of monitoring the compliance of different actors with existing rules and regulations, to poor coordination and data sharing between agencies and ministries. Funding, though, is the major constraint, especially in districts. Government agencies at all levels also suffer from significant gaps in terms of human resources, and high staff turnover.

Including considerations of ecosystem services and climate change adaptation requires concerted action between all stakeholders involved in decision-making over built water infrastructure projects. But in the case of Ghana we noted limited coordination between relevant stakeholders at the national level, and between stakeholders at national and local levels. This is due to competition between agencies for the control of projects and interventions, and for the funding that comes with them. International climate finance can be a solution to increasing the financial resources available to Ministries. However, cumbersome bureaucracy and lack of administrative and

technical capacity have been major obstacles to accessing these funds.

Political support is another important motivation for action at both local and national levels. Typically, in Ghana, politics plays an important role in determining one’s position and appointment, and setting the agenda – what some commentators have defined as ‘Ghanaian party politics’. We found that this can represent an obstacle to the inclusion of considerations of natural infrastructure and climate change adaptation in built water infrastructure projects. Often, in fact, built infrastructure projects are used as ‘vote winners’ by politicians in key positions to obtain the favour of the electorate, or parts of it. Our analysis also revealed that the Ghanaian media and civil society play an important role in holding decision-makers into account.

5.2. Entry points for natural infrastructure for sustainable and climate-resilient water resources management in Ghana

The goal of the WISE-UP project, under which this study was conducted, is to demonstrate natural infrastructure as a ‘nature-based solution’ for climate change adaptation and sustainable development. It aims to identify opportunities, such as they exist, to support positive change in water governance, with a view to leveraging greater recognition and inclusion of natural infrastructure in investment planning and policy-making. Our analysis of water infrastructure for development and growth in Ghana revealed that, at present, priority is given to water built infrastructure for hydropower generation and irrigation. There are several bottlenecks to introducing natural infrastructure solutions, and more generally environmental and climate change considerations into infrastructure investments. In the previous sections, we highlighted the reasons why these bottlenecks persist. We now want to propose some ways to overcome them - what we call ‘entry points’ to introduce change in the way water resources are managed and allocated in Ghana.

Our entry points for change can be organised in three categories:

1. The development of long-term development strategies at national and local levels;
2. Taking advantage of opportunities for cooperation at the basin level and international climate finance; and
3. Investing in awareness-raising and capacity-building for environmental management and protection of communities and the public.

We discuss each of them in detail in the following section.

5.2.1. Long-term development plans at national and local levels

Because the decision-making process over water infrastructure and, more generally, investments aimed at fostering Ghana's economic growth and climate resilience are decided at the national level, this is where entry points for natural infrastructure predominantly lie. In the case of the PMD, its Steering Committee, comprising of all relevant national Ministries and authorities with a mandate over water resources management, will have the final say in whether the project goes ahead. It is, therefore, to the Steering Committee that the case for integrating environmental and climate change considerations into the planning and implementation of the dam must be made.

In a way, this is good news. The Government of Ghana has increasingly demonstrated commitment and goodwill to tackle environmental pollution and climate change. For example, in the case of the PMD project, doubts over its environmental and social impacts are delaying the approval process. There are numerous climate change initiatives at national, regional and district levels. The GoG is taking steps to implement the NCCP and mainstream climate change considerations into its mid-term development process. Both climate change adaptation and environmental pollution are included in the NPP's manifesto. There are new opportunities to access funding from the Green Climate Fund and the Adaptation Fund.

It is important, therefore, that the case for natural infrastructure solutions for climate change adaptation is made with those actors at the national level that are mandated with implementing long-term development plans and goals. Rigorous research, communicated through easily accessible policy briefs and presentation of results at key conferences and events, is needed to 'make the case' for natural infrastructure with Ministries and high-level government representatives. Research should be coupled with capacity-building and technical assistance to help decision-makers translate results into information for accessing international climate and other sources of finance.

It is also necessary to bring this information to the Cabinet and Parliament where decision-making powers ultimately lie. Key sectoral ministries should play this

role – ideally, under the coordination of the MESTI. The NDPC has also an important role to play in ensuring that environmental and climate change considerations are integrated in development planning at the district level. With the support of international donors, the MoF should ensure that district and regional authorities have the required resources for implementation. In all the relevant institutions, it would also be important to have champions on natural infrastructure and climate change. Champions should have the expertise and motivation to push these issues through the political process at the national level, for example by calling for their inclusion in development plans, and for a monitoring system with sanctions and rewards for implementation at national and local levels.

5.2.2. International and basin-level opportunities

We identified opportunities to introduce natural infrastructure solutions to the decision-making process over water infrastructure development also at the basin and international levels. Through the VBA, Ghana could open and engage in dialogue with neighbouring countries to agree on mutually beneficial infrastructure investments. Basin-level cooperation would allow Ghana to receive technical assistance to explore the benefits of natural infrastructure projects. In addition, Ghana has the potential to play a leading role in the region supporting neighbouring countries to address the challenges they face in terms of, for example, food security, energy and infrastructure. To realise these opportunities, the VBA should complete the process of drafting and approval of its Water Charter, which would give it a legal mandate and hence increase its authority over riparian countries. It is also important that the VBA receives adequate financial support from international sources and, importantly, its member countries; this would allow it to get the required resources and expertise to perform its functions.

One focus of transboundary cooperation should be the development of Ghana's northern regions. With a significant mass of land, water resources and labour to trigger economic transformation, Northern Ghana can become a motor of development for the Sahelian region. This requires resources and investments to fund a comprehensive set of development actions in Ghana's three Northern regions. SADA could lead this process, in an independent and transparent way, and leveraging on partnerships with international donors, the private sector, and the civil society. Projects like the PMD could be pivotal in sustaining this effort. However, it is critical that their impact on vital ecosystems on which people's livelihoods depend is minimised, and that the future impacts of climate change, albeit with a certain degree of uncertainty, are considered in investment decisions.

Engaging development partners in discussions over natural infrastructure solutions for climate change adaptation is also key. DPs have access to international knowledge, technology, and funding, and can support the

piloting and scale-up of local-level adaptation responses, as well as the incorporation of adaptation into official government planning institutions and processes. Perhaps more importantly, international partners can support Ghana in its efforts to access climate finance funds, such as the GCF and the AF, through capacity-building and technical assistance. International climate finance presents huge opportunities for implementing actions that reduce the vulnerability of countries like Ghana to the impacts of climate change.

5.2.3. Investing in awareness-raising and capacity-building

While decisions are predominantly made at the national level, our study revealed that politicians in Ghana are susceptible to the pressure and lobby of citizens through the media and civil society organisations. Therefore, it is key to build the awareness of the public on the potential of natural infrastructure to mitigate against the impacts of climate change, and to lead to a more sustainable management of water and other natural resources. The TV, radio, newspapers and other media channels can be

instrumental in this sense. Journalists should be trained on environmental and climate change aspects to ensure they can translate research findings into a language that the public understands and empathises with. Civil society organisations should be empowered to raise people's awareness on these topics and lobby the government to pay adequate attention to the environment.

Finally, our study highlighted the importance of working with local level government and communities' representatives. These are generally in closer contact with communities, and are hence better suited to understand their needs and demands. The existence of a legal framework that legitimately devolves roles and responsibilities to local authorities is a good entry point to ensure these have political and economic power to make or at least influence decisions that will have an impact on people at the local level and communities. The party structure of politics in Ghana means that it is also important to build awareness and improve the capacity of political parties, both in office and in opposition, to address climate change and incorporate environmental considerations into their decision-making.

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Annex 1: Stakeholders consulted

Stakeholders at national level (interviews conducted in Accra in April 2014).

- Water Research Institute (WRI)
- Africa Development Bank (ADB)
- National Development Planning Commission (NDPC)
- International Water Management Institute (IWMI)
- Ghana Water Irrigation Development Authority (GIDA)
- WIENCO/IWAD
- Ghana Dams Dialogue (GDD)
- Water Resources Commission
- Environmental Protection Agency (EPA)/UNFCCC Office
- Ghana Water Company Ltd
- Regional Institute of Population Studies, University of Ghana (UoG)
- Institute of Environment and Sanitation Studies (IESS)
- Environmental Protection Agency (EPA)/EIA Office
- Abuntu for Development
- Ministry of Energy and Petroleum
- Volta River Authority (VRA)
- Bui Power Authority
- Energy Commission

Stakeholders at national level (interviews conducted in Accra in December 2014).

- Ghana Irrigation Development Authority (GIDA)
- Ministry of Environment Science, Technology and Innovation (MESTI)
- Energy Commission (EC)
- Environmental Protection Agency (EPA)
- Water Resources Commission (WRC)

Stakeholders at regional, district and local level (interviews conducted in Talensi and West Mamprusi Districts in February 2015).

- The Regional Coordinating Council - Regional Coordinating Director and Team
- Northern Electricity Distribution Company
- The Ministry of Food and Agriculture MoFA (Regional and District Directors of Agriculture)
- Ghana Water Company Limited
- Pwalugu dam office/secretariat
- National Disaster Management Organisation – NADMO (Regional and District Directors)
- Environmental Protection Agency (Regional)

- Savannah Accelerated Development Authority - SADA
- The Talensi and West Mamprusi District Assemblies (focus groups)
- Non-Governmental Organisations (World Vision International and Care International)
- Traditional Authorities
- Farmers Associations
- White Volta Basin/Water Resources Commission

Stakeholders at national level (interviews conducted in Accra in June 2015)

- Ghana Irrigation Development Authority (GIDA)
- Ministry of Environment, Science, Technology & Innovation (MESTI)
- Water Directorate/, Ministry of Water Resources, Works and Housing (MWRWH)
- Ghana Water Company Limited (GWCL)
- Water Resources Commission (WRC)
- Environs Engineering and Management Consult
- Environmental Protection Agency (EPA)/EIA Office
- Volta River Authority (VRA)
- Energy Commission

Stakeholders at national level (interviews conducted in Accra and Bolgatanga/Arigu in April 2017).

- Savannah Accelerated Development Authority - SADA
- West African Science Service Center on Climate Change and Adapted Land Use (WASCAL)
- Ghana Irrigation Development Authority (GIDA)
- Agence Française de Développement (AFD)
- United Nations Development Programme (UNDP)
- Water Resources Commission (WRC)
- National Development Planning Commission (NDPC)
- Water Resources Institute (WRI)
- Environmental Protection Agency (EPA)
- Volta Basin Authority
- Environmental journalist
- National Disaster Management Organisation (NADMO)
- Volta River Authority (VRA)
- GIDA Upper East Regional Office
- Ministry of Food and Agriculture (MOFA) - Upper East Regional Office (and District Office)
- Regional Coordinating Council (RCC) Upper East Regional Office
- Chief of Arigu Village

Annex 2: Sample interview questions

Below is the pool of questions that guided the interview process. For each interview, a shorter list of questions was selected according to their relevance to the stakeholder in question. The order was changed and questions adapted or added as necessary. Retaining flexibility was important to allow the probing of interesting issues as they emerged and to maintain conversational flow.

Decision-making process for the Pwalugu Multipurpose Dam (PMD) project:

- Who initiated the project idea (brief history)?
- What are the intended objectives, or outcomes, of the project? According to whom?
- Do the objectives and justifications (arguments for the project) differ between stakeholders?
- What stakeholder needs and interests are considered/ not considered?
- How far does the project fit into other national or basin level plans/policies?
- Who approves the overall design, and by what steps? What is the process being followed for developing this project (e.g. initial plans, feasibility studies, designs, construction)?
- Are trade-offs between different interests or objectives discussed openly? How are they addressed in project planning?
- On what basis is the project proposal contested, by whom? How are disputes and contentious issues addressed/settled?
- As the project has developed, has the context changed? How has this altered power balances, the decision-making process, interests and priorities, etc.?

Role of sub-national actors:

- What is the role of governmental authorities at regional and district level in the project planning process? How much influence do they have, and who exactly has influence?
- What are the views, interests and priorities of government staff at district and regional level, with regards to the project?
- How is decentralisation affecting the way that water infrastructure projects (and water allocations) are negotiated and implemented, particularly relations of power in decision-making?

- How have other stakeholders been involved in the decision-making process? At which stages? (e.g. farmers' associations, communities, traditional leaders, NGOs, private sector)
- What role have they played? What are their interests? Do they have any influence?
- Which actors at national, district and community levels have been involved in the consultation process? How were they involved? Are they still involved, or were consultations a 'one-off' thing?
- What was the consultation process? (Who organised/ convened it, who was invited, how many meetings, in what language, was there space for contestation/ discussion, who were the ones 'left out'?)
- What opinions/views/concerns have been raised about the project and by whom? How have these been addressed (or not)? What is not said but is important?
- How has the media covered this project?

Detailed design of the project (including operation plans):

- What are the details of the project design? [It would be very useful to get hold of planning documents, feasibility studies, etc. where available]
- What does the design of the project reveal in terms of the intended objectives? (What is being prioritised e.g. hydropower, irrigation, flood control fishing etc.)?
- What options are being considered during the planning? How are the options evaluated, and by who? Is the 'no project' option being considered?
- What does this tell us about the relative bargaining positions of the key actors?
- Has an ESIA been done? How has the ESIA been used to make decisions relating to the project? Who was involved? Was the report contested? By who?

Financing the project:

- Who is going to fund the construction of the project?
- What will be the contribution of the Ghanaian government?
- What does the manner of funding say about the key interests and motivations behind the projects and the key purposes of the projects?

Natural and built infrastructure:

- What are the natural features of the case study area, including ecosystems of note?
- What natural features are endangered or vulnerable and why?
- Are ecosystem services and natural infrastructure going to be considered in the design of the project? Why/why not? In what ways?
- How important is 'natural infrastructure' for stakeholders in relation to other considerations?
- What positive and negative impacts will the project have on ecosystem services and natural infrastructure in the basin?

Climate variability, climate change and adaptation/resilience:

- To what extent are climate risks and adaptation needs recognised by different stakeholders?
- Does Ghana have a climate adaptation strategy? If yes, how was this developed, who was involved? Does the strategy consider ecosystem services, or sustainable/integrated water resources management?
- What are the motivations for stakeholder to consider the impact of climate change?
- Is climate change used as a justification for decisions? In what ways, and by who?
- Is it voluntary or mandatory for stakeholders to integrate climate change concerns into their plans or activities? Are there any guidelines for this?
- For the PMD, how have climate considerations been factored in to project design?
- For the PMD, have climate change concerns been considered in project funding arrangements?
- Is the project likely to increase or decrease the resilience? In what ways? For who?
- What barriers are there to integrating climate risks and adaptation considerations into water infrastructure decisions? (e.g. lack of adequate financial resources, spatial and temporal uncertainties in climate projections, and lack of horizontal cooperation among stakeholders)

Winners and losers:

- Who will benefit from the project as it is currently designed? What are the main benefits?
- What are the negative impacts, and for who? Consider both direct (e.g. displacement) and indirect (e.g. lower water flows downstream affecting livelihoods) impacts.
- Is a compensation package being considered?
- To what extent is maximization of economic productivity (e.g. contribution to GDP growth, creation of jobs) the highest priority for decision-makers? How are economic benefits of water infrastructure balanced against social benefits of water?

Entry points:

- Do decision-makers consider mixed portfolios of natural and built infrastructure investments in the Volta Basin, or is the focus on built infrastructure?
- What would be the incentives for stakeholders to consider natural infrastructure (or ecosystem services) in their planning and management? How might natural infrastructure options benefit them, or align with their objectives?
- Which stakeholders are likely to be supportive of ecosystem services/natural infrastructure approaches, and why? In what ways? Who is most influential in this regard?
- Are there any current activities, initiatives or innovations that WISE-UP could engage with?
- Are there particular points in the planning or decision-making process in the case study that WISE-UP could engage with/have influence on?
- Are there opportunities outside of the formal process (e.g. informal process, ways of having influence)? How do actors manoeuvre to have their ideas heard and used?
- What opportunities are created by changing institutions and power dynamics, for promoting new approaches?
- What are the incentives for powerful actors to ensure that the PMD project is ultimately sustainable, climate resilient, and pro-poor?

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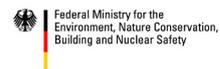
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