



Building Adaptive Water Resources Management in Ethiopia

Executive Summary

Project Rationale: Investments in hydraulic infrastructure such as hydropower and irrigation require an equivalent institutional platform to ensure coordinated and sustainable water resource development that:

- Maximises returns across sectors and the national economy
- Protects local livelihoods and vulnerable ecosystems
- Mitigates risks of climate variability and climate change
- Improves resilience to pressures of population growth and industrialisation.

WRM Analysis: To identify the current institutional platform and what actions are needed to strengthen it, the project team identified socio-economic and climatic risks to water resources, and the extent to which existing water resource management (WRM) structures effectively address them. Institutional gaps were categorised as enabling, developing and sustaining factors.

Enabling Factors: The basic components of WRM, including legal and policy frameworks, the evidence base for decision making, financial structures and human and technical capacities.

- A comprehensive legal framework exists to promote IWRM principles such as basin planning, participation and equitable distribution, with prioritised allocation across sectors.
- Traditional water rights systems also exist, which dominate allocation choices in some areas.
- However, the WRM strategy (2002 WSDP and Basin Master Plans) is out-dated and does not reflect new (planned and completed) water developments.
- Pragmatic WRM solutions must be aligned to development plans such as GTP and CRGE.
- RBAs are only established in three strategic basins and their mandate remains unclear.
- Lack of institutional structures and financial mechanisms in WRM discourages DP engagement in contrast to WASH.
- Funding shortage to cover increasing and conflicting development demands in the sector.
- Lack of systematic data collection (and data series) on water availability, uses/abstractions and quality (especially on groundwater).
- Hydrological and meteorological data series limited with no centralised information system.
- Planned Basin Information System (BIS) but not yet operative: data management and exchange is limited.

Developing Factors: Necessary for functional WRM, including basin planning, water allocation and monitoring, participatory decision-making processes, and flood and drought management.

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- Unresolved discrepancy between basin boundaries for planning and administrative boundaries for budgeting: conflicts between RBAs' and regions' development agendas.
- Regulations providing for stakeholder engagement are not systematically implemented.
- Capacity gaps, particularly for RBAs, to conduct participatory processes.
- Permitting system very limited in scope and does not account for all users (only in the Awash basin, only for large-scheme irrigation).
- Pollution is a growing problem, with limited data and no integrated control methods.
- Hazard early warning systems in place for droughts/food security, but flooding receives less attention.
- Forecasting conducted by National Meteorological Agency and MoWIE but climate monitoring systems are limited.

Sustaining Factors: Required to ensure that water resource management structures continue to be effective and robust in the long run, in order to support achievement of development goals.

- The frameworks to sustain water management processes in the longer term are absent.
- Limited provisions for multi-stakeholder review of implementation, but this is changing.
- Lack of cross sector coordination across government Ministries and within DP agencies,
- Climate and socio-economic risks and pressures poorly considered in decision-making.
- Enforcement of permit system and pollution rights (when in place) is questionable, and penalties rarely used.
- Institutional capacity gaps are significant, exacerbated by high staff turnover, insufficient educational or training opportunities and poor institutional memory.
- Low capacity for IWRM implementation in practice and limited institutional authority.
- System is unable to equitably or efficiently allocate water resources now or in the future.

Knowledge gaps in WRM: Specific areas which require greater research and an evidence base:

- Patterns of use, drivers of change and allocation criteria for users;
- Resource conditions, current/future hydrological, climate and socio-economic trends;
- Assessment skills for diverse trade-offs between resource development and allocation;
- Developing and implementing 'climate smart' water resource plans;

Conclusions: WRM is increasingly being given the importance it deserves in Ethiopia, in strategic documents including as an essential pillar of the GTP (for irrigation, hydropower and new industrial poles). The major challenge is to now to implement this in practice through cohesive and coordinated institutional structures.



Next Steps:

- Stakeholder and political economy analysis of resource hotspots and implications for water management;
- A people-centred approach focused on how resource management can better address needs of the poor and support their livelihoods;
- Enhancing the capacity of individuals, organisations and institutions to develop and implement water resources management policies and plans that support growth, poverty reduction and sustainability, in line with national strategies including GTP II.



Building Adaptive Water Resources Management in Ethiopia

Summary of consultations

1. Our project

Ethiopia has a generous endowment of water, but this water is distributed unevenly in space and time.¹ Historically, Ethiopia's investments to harness its considerable water assets for hydropower, food production, industry, livestock and improvements in health and livelihoods have been very limited. However, the development of water resources to support 'green growth' and poverty reduction now forms a key plank of government policy as the country strives to achieve middle-income status by 2025.

The country's **Growth and Transformation Plan (GTP)** sets out targets for a six-fold increase in irrigated land area and a quadrupling of hydropower generation capacity between now and 2015.² Large areas are already being brought under irrigation and the scale and pace of water resource development is accelerating. This brings important opportunities to stimulate growth and reduce vulnerability to climate change by establishing a minimum platform of hydraulic infrastructure with which to capture, store and distribute water, and buffer rainfall variability. However, an equivalent institutional platform for water resources management now needs to be built to ensure that water resources are developed in a coordinated and sustainable manner, maximising returns to water across sectors whilst protecting local livelihoods and ecosystems.³

The challenges are significant. The **Ethiopia Water Resources Management Policy** (1999) and **Water Sector Strategy** (2002)⁴ enshrine the basic principles of Integrated Water Resources Management (IWRM) and basin planning. However, the policy and regulatory frameworks require updating and strengthening, and their implementation through embryonic River Basin Authorities (RBAs) remains weak. Consensus is emerging that institution building should be a priority of the Government of Ethiopia (GoE) as well as its development partners.

Against this background the Ministry of Water, Irrigation and Energy (MoWIE) and the UK's Overseas Development Institute (ODI) are co-directing a project entitled "**Building Adaptive**

Water Resources Management in Ethiopia” in partnership with the Ethiopian Institute of Water Resources (EIWR), Addis Ababa University (AAU), and the Water and Land Resource Centre (WLRC). More details on the project are reported in box 1 below.

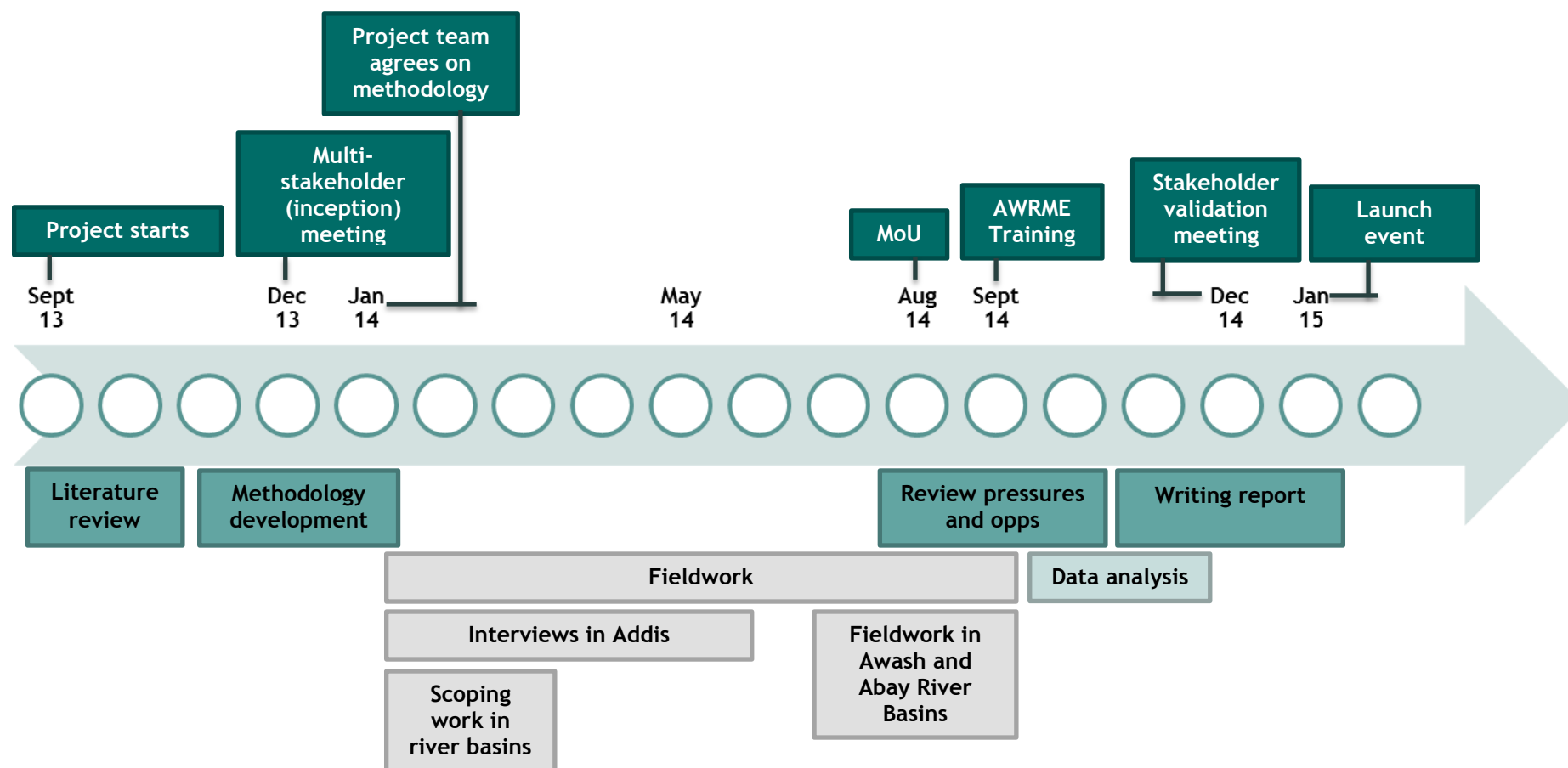
Box 1: Building Adaptive Water Resources Management in Ethiopia: the project in a nutshell

- **Funding:** DFID through SCIP-KPMG, £190K.
- **Duration:** from September 2013 to January 2015.
- **Partners:** Ethiopian Ministry of Water, Irrigation and Energy (MoWIE), Overseas Development Institute (ODI), Ethiopian Institute of Water Resources (EIWR), Addis Ababa University (AAU), Water and Land Resource Centre (WLRC).
- **History:** Conceived as a major 3-year programme. Now Phase 1.
- **Aim:** Sustainable WRM in the face of climate change and other pressures (a long-term goal!)
- **Objective:** Develop a capacity-building ‘roadmap’ for building adaptive WRM at national and river basin levels in Ethiopia.

The project is currently in its **Inception and Diagnostic Phase** (September 2013 to January 2015), resulting in a climate change and water resources management assessment (CC-WRMA) at the national level. A second phase of the project is foreseen, during which further diagnostic work will be conducted in selected basins (‘hot spots’), together with capacity development of RBAs and MoWIE to address the gaps and build on the strengths that have been identified in phase 1. Figure 1 shows the project timeline and key events to date.

The overall aim of the project (phases 1 and 2) is **to enhance the ability of individuals, organisations and institutions in Ethiopia to manage water resources for responsible growth in the face of climate variability, long-term climate change and other pressures on water resources**. A more integrated and adaptive approach to the management of water resources, water-dependent services and infrastructure is key. Achieving integrated and adaptive water resources management (AWRM) in Ethiopia – or at least *good enough* AWRM - is a long-term goal, measured in decades rather than project months or years. The aim of the present study is to begin the process that is required to strengthen understanding and capacities at federal and basin level.

Figure 1: Timeline of AWRME project



2. A brief overview of the methodology

A fundamental component of the project is the **Climate Change and Water Resources Assessment (CC-WRMA)**, an exercise aimed at identifying key socio-economic and climatic pressures and uncertainties affecting WRM, and analysing the extent to which existing WRM policies, strategies and plans can effectively address them. The CC-WRMA has two main components: a review of pressures on water resources management and opportunities for water resources development (WRD), and a status assessment of WRM at national and basin levels.

The review of pressures and opportunities is based on desk study of existing policies and strategies in the water sector, coupled with results from key interviews. It examines the **emerging drivers affecting water availability, access and use, and their implications for WRM. Drivers include climate change, but also other pressures** such as population growth, urbanisation and the need to produce more food and energy.

The second component of the CC-WRMA is an **indicator-based assessment** of WRM systems, practices, capacities and outcomes, taking a ‘pathways’ or ‘bottlenecks’ approach to identify the underlying factors supporting or hindering progress towards AWRM. Data for the assessment were collected through interviews with key stakeholders in water-related sectors at federal, regional and basin levels.

Box 2: Our definition of AWRM

Integrated Water Resources Management (IWRM) describes a process that promotes the coordinated development and management of water, land and related resources. The goal is to maximise economic and social welfare in an equitable manner without affecting the functions of vital ecosystems in the short or longer term (GWP 2000).

More recently and in the context of climate change, the notion of **adaptive WRM (AWRM)** has grown in prominence, emphasising the need for governance structures that are flexible and robust in the face of uncertainties (Pahl-Wostl 2007). The literature points to **five basic requirements for achieving adaptive governance**, including:

1. Production and use of accurate and relevant information;
2. Discovering, preventing and resolving conflict;
3. Fostering compliance with institutional rules through monitoring systems;
4. Providing infrastructures that are flexible over time; and
5. Encouraging adaptation to learn from good and bad practice, and to respond to physical and socio-economic changes (Ostrom 2008)

Building on these definitions, we understand **Adaptive Water Resources Management (AWRM)** as *a process that promotes the coordinated development and management of water, land and related resources, while being able to adapt to the impacts of changing physical and socio-economic contexts on resource availability and quality. The objective of AWRM is to maximise economic and social welfare through equitable distribution of derived benefits of resource development, without compromising the sustainability of vital ecosystems.*

3. Enabling, developing and sustaining AWRM

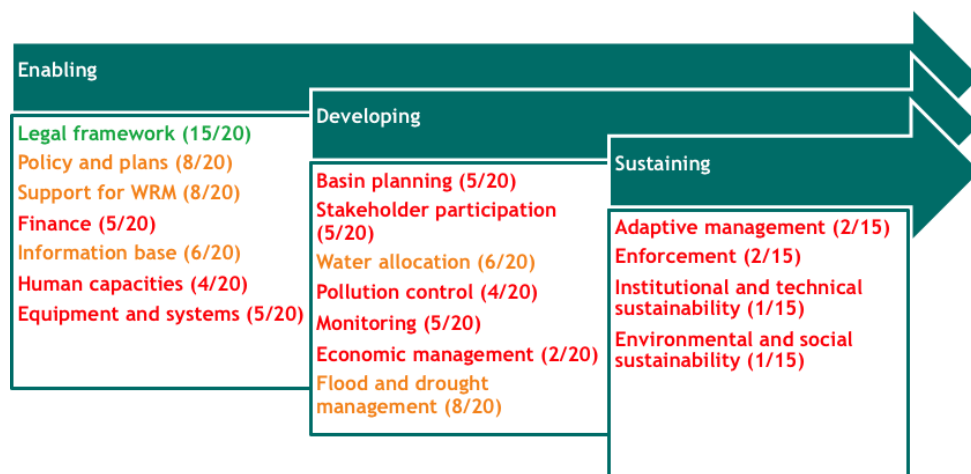
The WRM status assessment sets out a number of ‘enabling’, ‘developing’ and ‘sustaining’ factors that condition progress in WRM, accompanied by specific indicators of performance. These are listed in Figure 2 below. The approach builds on that adopted by the AMCOW-WSP

Country Status Overviews for the WASH sector, which has international recognition.⁵ It also draws on UNICEF's Bottleneck Analysis Tool for the WASH sector (WASH-BAT).⁶

- Indicators in the **enabling category** describe the key building blocks of WRM, including the legal and policy framework, the evidence base for decision making, financial structures and human and technical capacities within the sector.
- Indicators in the **developing category** refer to the key activities associated with functional water resource management systems, including basin planning, water allocation and monitoring, participatory decision-making processes, and flood and drought management.
- Indicators in the **sustaining category** refer to the actions required to ensure that water resource management structures continue to be effective in the long run, in order to support achievement of development goals. To realise this, institutions must be resilient to pressures and risks including population growth, industrialisation and climate change.

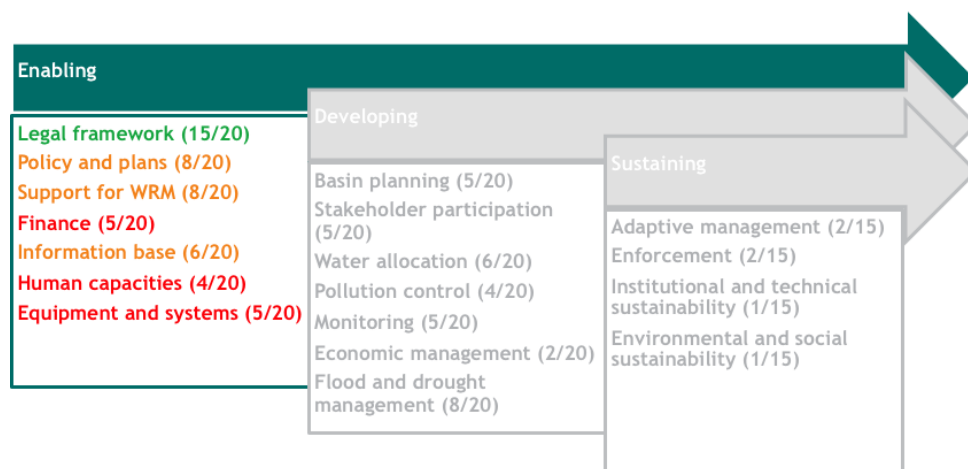
Each indicator is composed of several criteria, assigned scores between 0 and 5 (with increments of 1) depending on whether they describe a condition/function that is or is not in place at the federal and basin level in Ethiopia. A traffic light system⁷ is then applied to help decision-makers identify the major impediments to AWRM, and prioritise investments and resources.

Figure 2: Indicators of AWRM, grouped into 'enabling', 'developing' and 'sustaining' factors.



Participatory reflection, consultation and consensus building run through the CC-WRMA. The project team reviewed laws, policies, strategies, plans and budgets, while conducting interviews with a range of relevant stakeholders from ministries, river basin authorities, regional bureaux of agriculture and water, large and small water users (e.g. farmers and pastoralists), donor agencies and private investors. A formal validation workshop was held in December 2014 to present and discuss preliminary results.

3.1 Enabling factors



Laws and policies supporting IWRM

Water resources management in Ethiopia is inscribed within a legal and policy framework that includes provisions for basin planning, stakeholder participation and the user pays principle, and makes explicit reference to the need to balance social, economic and environmental objectives. Drawing on the principles of IWRM, the 2000 Proclamation states that “*water resources development needs to be underpinned by rural-centred, decentralised management, participatory approach as well as integrated framework [and] should encourage the participation of all stakeholders, user communities, and particularly women's participation in the relevant aspects of water resources management*” (Article 1.3 #6).

Most of the principles underpinning IWRM were previously spelled out in the 1999 Ethiopian Water Resources Management Policy aimed at “*enhancing and promoting all national efforts towards the efficient, equitable and optimum utilisation of the available water resources of Ethiopia for significant socioeconomic development on sustainable basis.*”

Another important document is the Water Sector Development Programme (WSDP) that came into effect in 2002 (and is valid until 2016), outlining a 15-year strategy for Ethiopia in terms of WRM and WRD. The WSDP specifically notes that a “*classical Integrated Water Resources Management (IWRM) framework contains a national policy, strategy and legislation, and an investment plan either at the national or basin level*” (Article 3.2.2 Logical Framework).

Later on, the 2007 Proclamation established RBAs to “*promote and monitor the integrated resources management process in the river basins falling under their jurisdictions [...]*”. A number of Council of Ministers Regulations followed to establish the Abay Basin High Council and Authority (No. 151/2008), Awash Basin High Council and Authority (No. 156/2008) and Rift Valley Lakes High Council and Authority (No. 253/2011).

More recently, the five-year Growth Transformation Plan (GTP), approved in 2010, provides support for “*an integrated approach to be taken to water resources development and utilization that gives due consideration to its security and safety on the one hand, while also considering fully the parallel needs of resource usage such as water supply, development of irrigation, river basin administration, watershed management and related activities*” (Part Five).

Box 3: Water rights in Ethiopia

According to the 1995 Constitution of the Federal Democratic Republic of Ethiopia, all natural resources (including water) are the common property of the Ethiopian people (Article 44).

The provisions for water rights are laid out in the Ethiopian Water Resources Management Policy and Proclamation. In theory, information included in the Master Plans provides the basis for the allocation of water between different uses and users. In practice, Master Plans are outdated and do not reflect the actual demands for water resources deriving from expanding irrigation, hydropower needs, industrial development and a growing population, especially in rural areas.⁸ The plans also focus almost exclusively on surface water resources; groundwater is largely ignored.

While a modern system of formal water rights has yet to be implemented, traditional or customary water rights serve to shape claims to access and use water in many areas. In pastoralist areas for example, access to water is mediated through negotiation and reciprocity within a system of communal land tenure. Groups are often associated with specific territories which contain critical natural resources such as grazing land and water resources, but membership is often 'fuzzy' to accommodate mobility in times of scarcity. Traditional institutions allow different clans or groups to be represented in decision-making regarding access to land and water.⁹

Overall, water rights issues, including definition and allocation within basin caps, and the interface between formal and customary systems, remain unresolved and under-researched.¹⁰

IWRM: good in principle, difficult in practice

What interviewees said...

*"The legal framework that regulates water resources management in Ethiopia is good in principle, reflecting international approaches such as IWRM and laying the basis for responsible water resources management."*¹¹

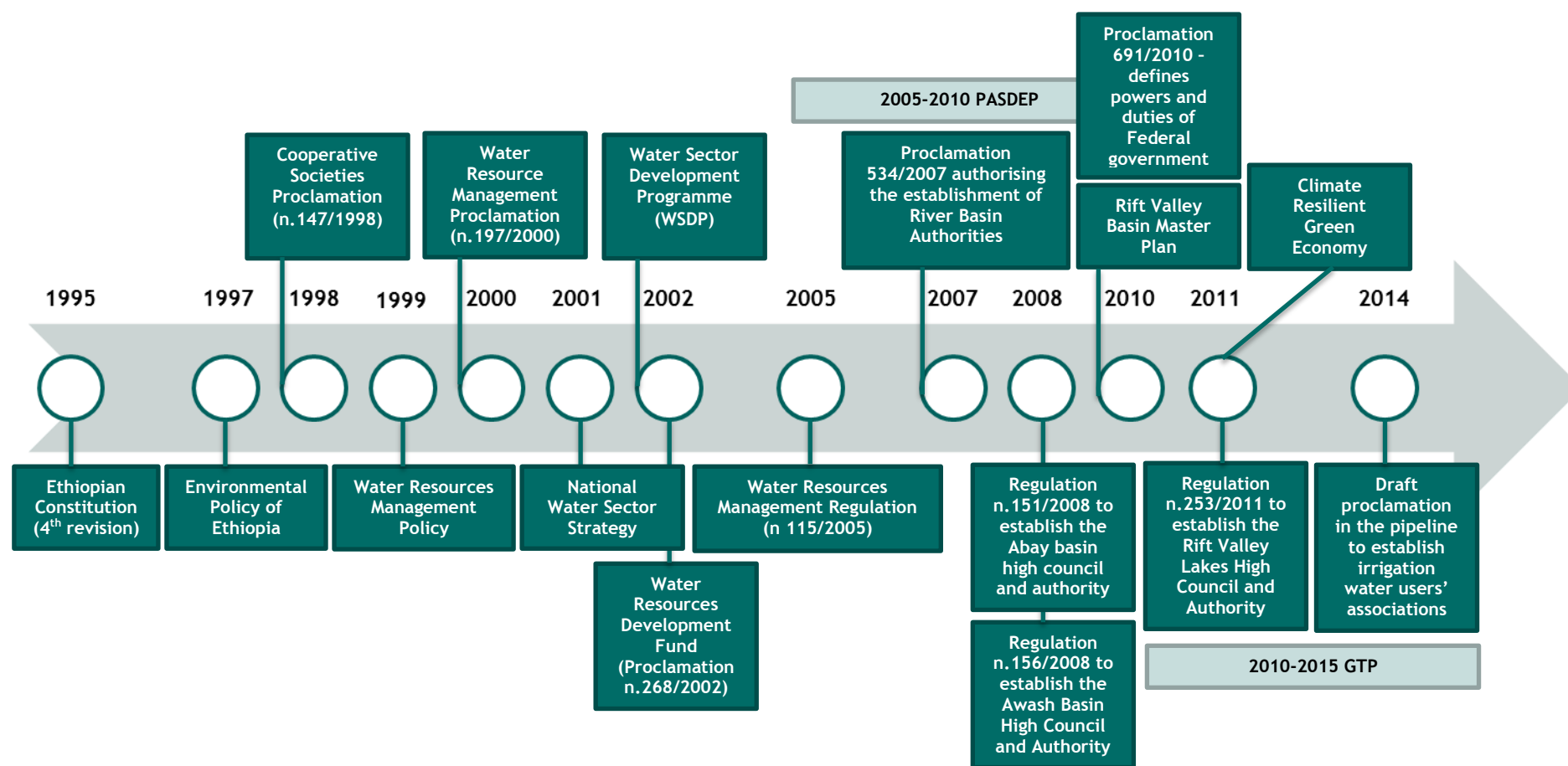
*"However, the strategy for WRM we have in Ethiopia is very old now, it definitely needs to be updated."*¹²

Although legal and policy provisions pay lip service to IWRM, our interviews revealed that policy-makers and water managers remain unclear on what IWRM means in practical terms. In other words, IWRM in Ethiopia seems to have become "an end in itself", with the risk that pragmatic solutions to existing water problems are shut out.¹³

In addition, we noted that the 1999 Policy is still the reference point for WRM in Ethiopia, despite the fact that it does not align with more recent development strategies such as the GTP and CRGE. And although the WSDP

will expire in 2016, no discussions have been started for a WSDP-2 to date. The investment plan that should have accompanied the WSDP has never been completed either according to key interviewees in the MoWIE.

Figure 3: Timeline of proclamations, policies and strategies regulating WRM in Ethiopia. Source: Author.



A basin approach, but not for all basins

Respondents reported that the Government of Ethiopia initially focused on establishing RBAs in the Abay, Awash and Rift Valley as these are the river basins that experience the biggest pressures from climate and socio-economic drivers of change.¹⁴ It is expected that these ‘pilot’ RBAs will guide the establishment of similar bodies in the other nine river basins of Ethiopia. However, there is no evidence that this is happening yet, which generates an “*institutional vacuum*” in the Ethiopian WRM system.¹⁵ Furthermore, while at the federal level, all RBAs are expected to report to the River Basin High Council (RBHC), comprising of representatives of the MoWIE and regional governments, and having ultimate decision-making powers over water allocation at basin level, the latter has only become operational in recent times.

In addition, the 2007 Proclamation, while being clear on RBAs’ responsibilities in relation to irrigation, fails to define those on energy, industrial water use, livestock watering and urban water utilities. Regional water bureaus (RWBs) have used this legal ambiguity to maintain their authority with regards to water allocation in these sectors, limiting the influence of RBAs to agricultural/irrigation water use. Respondents from different departments of the MoWIE have agreed that the breakdown of roles and responsibilities at the federal level is clear, but grey areas remain in regional and basin administrations as to their respective competencies.¹⁶

Key messages:

RBAs have only been established in those basins with that are economically or politically important, and are experiencing serious environmental threats. This creates an institutional vacuum in remaining areas.

Even in those basins where RBAs have been established, water resources planning and management continues to occur in a fragmented way across governance levels and water-using sectors.

Less attention to WRM than WASH

To date, WRM has received limited attention from government and its development partners. Most attention (and resources) has focussed on WASH, reflecting the 2000 WRM Policy stipulating that “*domestic use shall have priority over and above any other uses*” (Article 7).¹⁷ Although extending and sustaining access to domestic water supply clearly is clearly part of the WRM equation, WASH continues to be treated as a separate ‘sector’, with little if any discussion of the resource base it depends on.

The lack of a clear strategy for WRM in Ethiopia, and the difficulties associated with measuring results, has discouraged investment¹⁸ WASH interventions are well-resourced within an agreed institutional framework under the One WASH National Program (OWNP), in line with GTP provisions.¹⁹ In contrast WRM remains institutionally fragmented and under-resourced. New investments in WASH, hydropower and irrigation therefore occur in silos, with little understanding of the tradeoffs and risks involved. Table 1 contrasts the solid organisational and funding base for WASH with the weak overall provisions for WRM.

Table 1: WASH provisions in contrast with WRM

	WASH	WRM
Policy (guiding principles)	<ul style="list-style-type: none"> • Integration • Alignment • Harmonisation • Partnership 	<ul style="list-style-type: none"> • Integration • Priority to water supply and sanitation • Basin-level (and focus on drought-prone areas) • Rural-centred, decentralised and participatory management
Policy (targets)	<ul style="list-style-type: none"> • In line with GTP, targets of 98% and 100% access to safe water supply for rural and urban areas respectively • Access to basic sanitation for all Ethiopians • 7% of population with safe water handling and water treatment at home • 80% of communities with ODF status 	<ul style="list-style-type: none"> • WSDP sets broad objectives (no concrete targets) for hydropower & irrigation development, as well as WSS. • GTP: 98.5% potable water coverage, 100% urban water coverage, 98% rural water coverage, 15.6% developed irrigable land; increase hydropower generating capacity to 10,000 MW (by 2015) • CRGE: does not set targets for WRM specifically.
Components	<ul style="list-style-type: none"> • Rural WASH (agrarian and pastoralists) • Urban WASH (supply services, sanitation services) • Institutional WASH (schools and health facilities) • Programme management and capacity-building 	<ul style="list-style-type: none"> • In WSDP & GTP: Hydropower, WSS, Irrigation. • In CRGE: water cuts across: exploiting the vast hydropower potential; large-scale promotion of advanced rural cooking technologies; efficiency improvements to the livestock value chain; and Reducing Emissions from Deforestation and Forest Degradation (REDD),
Budget	Total estimated: 485 million USD (92.1 from AfDB, 131.6 from DfID, 46.3 from GoE, 10 from UNICEF, 205 from WB)	Not a single estimate for WRM (different budgets in different strategies). CRGE: total 150 billion USD over 20 years (no specifics about water)
Financial mechanisms	<p>One Consolidated WaSH Account (CWA) from which WaSH activities and investments would be supported, where all Development Partners contributions are deposited.</p> <p>Proclamation 268/2002: established the WRDF (managed by MoFED) to ensure the self-sufficiency of water and sanitation service providers.</p>	Mix bottom-up (water fees from permits at basin level – but not operational) and top-down (WRDF managed by MoFED – to ensure the sustainability of irrigation development by granting long-term loans on the basis of the principle of cost recovery)
Partnerships	<p>4 Ministries (MoWIE, MOFED, Ministry of Health, Ministry of Education), development partners (AfDB, DfID, WB, UNICEF). CSOs and private sector recognised as significant partners.</p> <p>WASH Technical Committee under WSWG, ToRs agreed in April 2014.</p>	Establishment of WRM Technical Committee under WSWG, but still at early stages.
Implementation modality	<ul style="list-style-type: none"> • Consolidated Annual WASH Plan and budget – to be prepared by all IPs. • Planning and preparatory steps and implementation modalities well-specified for each partner and each component. • Clear OWNPs governance structure and specification of roles and responsibilities for each IP. • Specific institutional arrangements for OWNPs governance: Oversight and management provided by National and Regional Technical teams. 	<ul style="list-style-type: none"> • MoWIE and RBAs at federal and basin level; RWBs at regional (down to woreda) level. Overlapping mandates especially of RBAs and RWBs. • RBHC at federal level: but only met once • WRM Working Group: under establishment

Of particular concern to the interviewees was "the shortage of finance to cover the demand for development in the sector" [which is] "crystal clear at both federal and basin level."²⁰ Besides WASH, irrigation and drainage development is a priority area for the GoE (in view of Ethiopia's food security imperative), together with hydropower development. For the former, the reluctance of local investors to engage in long-term investment in irrigation has forced the government to look for Foreign Direct Investment and, more recently, public-private partnerships.²¹ For the latter, the government is the main source of finance, with little international funding.²² As for RBAs, their budget should come from funds allocated by the Federal Government (MoFED) and from water charges collected from permit holders and service fees (such as maintenance and construction of roads to access irrigation sites).²³

However, particularly for RBAs, it is difficult to collect enough revenue from licensed users in the river basin, given that the permit system is not fully operational yet.²⁴ Only irrigation investments need to obtain a water-use permit (and hence pay a water fee), which is delivered after land is secured by the relevant ministry at regional or federal level. All other users withdraw water without a permit or, as in the case of industries, water rights are embedded in their licenses for land and industrial development, issued by regional governments. To date, according to our respondents, only the Awash RBA has set up a permit system, and this only covers large irrigation schemes.²⁵

Key messages:

In comparison to WASH, WRM receives less attention and financial support from both the GoE and development partners. In particular, WRM lacks:

- A coherent institutional and policy framework (one that is aligned with the strategic development priorities of the country, including in non-water sectors)
- A clear definition of budgetary needs, and a consolidated financial mechanism to gather investments from both the government and development partners
- A well-defined structure for implementation of interventions, outlining roles and responsibilities of different organisations at different levels and including a coordination body.

Not enough is known about water resources

The interviews highlighted that there is a relatively good availability of data on the quality and quantity of surface waters, although there was no agreement on the extent of and criteria for data accessibility: "data exchange protocols are in the process of being established, but we are not sure when they will be ready and how they will function".²⁶ Efforts are also underway to modernise the monitoring system to allow for the collection of more accurate, systematic and reliable data (to be gathered in a Basin Information System), but concurrent investments in capacity-building for data management and analysis are not being made, especially at the basin level where gaps are more evident.²⁷

In addition, data reporting on groundwater availability is extremely poor, and insufficient to support informed decisions and investments.²⁸ However, discussions held with water managers at both federal and basin levels revealed increasing awareness of the importance of groundwater resources, and growing investment in groundwater-related research (e.g. by the MoWIE Groundwater Directorate and by the ATA).²⁹

Overall, it was noted that data continue to be collected in an *ad hoc* manner by a variety of organisations, including RBAs (starting now), RWBs, and the Hydrology Department of the

MoWIE, and a central system to feed data/information into decision-making processes does not appear to be in place.³⁰

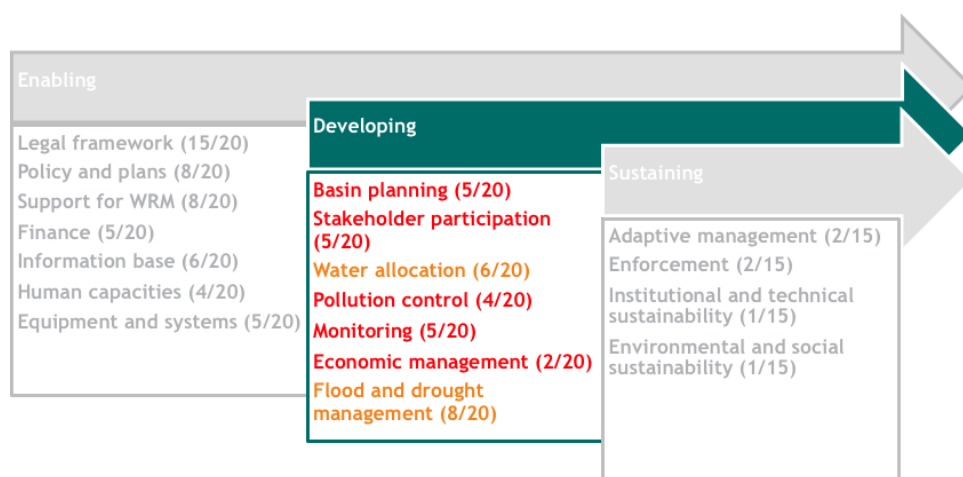
Key messages:

Efforts are underway to establish Basin Information Systems (BISs) in major Ethiopian river basins (at present: Awash and Abay). However, the system must be:

- Conveyed to a centralised system (at federal level) that collects water data from different sources (including RWBs) and synthesises them for decision-making purposes;
- Coupled with investments in capacity-building on data management and analysis as well as the necessary software and hardware.

“We must establish a baseline of data and information on water resources, both surface and groundwater – if we do not understand how much water we have, how can we decide how to allocate it?”³¹

4.2 Developing factors



No planning, no IWRM

The IWRM approach (‘officially’ adopted through the Ethiopian Water Resources Management Policy) calls for basin-level water resources management and planning. In this light, the 2000 and 2007 Proclamations provide for Integrated Basin Development Master Plans to guide the sustainable development of Ethiopia’s river basins over 30 years.³² To date, Master Plans exist for eight of the 12 basins and the 2000 Proclamation gives them quasi legal status. Nevertheless, most of these plans are more than 15-year-old and need to be updated and aligned with the developments that are occurring in water-related sectors such as irrigation and hydropower. In some cases, such as for the Abay basin, Master Plans were developed before the RBAs existed, despite the fact that RBAs have, theoretically, the responsibility to prepare, coordinate and implement the plans. The process of updating the Master Plans has only started in three basins (Awash, Abay and Rift Valley Lakes), but it is not clear what will happen where RBAs have not been established yet.³³

Implementation of the plans has been handicapped by the discrepancy between the basin boundaries used for planning and the administrative boundaries used in budget allocation, the lack of experience and capacity in integrated planning and development, top-down approaches

pursued in earlier plans and the failure to properly address risks such as climate change and environmental issues.

Moreover, land and water management still take place under separate mandates. Land is a regional responsibility, while RBAs are established as a federal structure, and their mandate only covers water management. Regional governments have their own agendas and may develop water resources without the knowledge of the RBA and without following the Master Plan.³⁴ In some cases, RWBs did not appear to be aware of Master Plans.³⁵ Some connections are increasingly being made especially in relation to watershed management activities, and some evidence of ad hoc collaboration, for example in the Tana-Beles sub-basin, was provided.³⁶

Key message:

While on paper, water resources should be managed following the principles of IWRM, in practice the ‘integrated’ dimension seems to have been forgotten. Basin-level planning only occurs in certain basins, master plans have not been matched by implementing institutions (RBAs), and there is an unresolved discrepancy between basin boundaries used for planning and administrative boundaries used in budget allocation.

Participation: not always, not of everybody

Although there are legal and policy provisions for stakeholder engagement in WRM decision-making, these have not been systematically implemented. Especially at the basin level, the participation of stakeholders (including water users) in planning and management processes has tended to occur on an ad hoc basis (e.g. in the framework of a project funded by the Dutch Water Authority in the Awash basin, and facilitated by the World Bank in the case of the Tana sub-basin organisation).³⁷ To date, according to key interviewees, consultations have also been deemed “*ineffective in terms of including women and other marginalised groups, e.g. pastoralists*”.³⁸

These limitations were attributed, on the one hand, to the restricted authority of RBAs, in turn deriving from a generalised lack of awareness with regard to their powers and functions – especially in the hydropower and industrial sectors.³⁹ On the other hand, respondents noted that RBA staff do not have the capacity to conduct participatory processes, and in particular to engage and communicate with stakeholders.⁴⁰

Permit system and water allocations: work in progress?

From our interviewees, it is also clear that the current system for water allocation is not fit for purpose. Proclamation 197/2000 states that water works, water use and discharge of treated wastewater shall be based on a permit system. However, permitting is only being developed for irrigation use, and only in the Awash River Basin. Our analysis did not reveal any instances (in other basins or for water uses other than the irrigation one) in which permits were required and in use.

Key message:

Permitting is viewed as a registration and fee collection exercise, not as a vehicle for defining, monitoring and allocating known shares of basin water resources.

What interviewees said...

“RBAs have not fully taken on the regulation role; their mandate remains limited to service provision.”⁴¹

“At present, the MoWIE Permit Department is raising awareness about the need to obtain water permits, especially amongst larger water users. Once water users understand that they need to obtain a permit, we can work towards a system to release those permits.”⁴²

“Only 10-20% of the monitoring that is planned is effectively done. It is very difficult for us to prove compliance with water permits. We simply do not have enough equipment and people to go and monitor all water uses throughout the country.”⁴³

“Farmers and pastoralists are increasingly withdrawing water from the Awash river, and many are even ‘illegally’ withdrawing water from the irrigation canals. All these uses are not regulated. And yes, each user only withdraws a small amount of water, but if we consider them altogether, the amount of water they use is huge.”⁴⁴

given the growing number of small users and their cumulative impact.⁴⁹ Major water users are known and included in a federal registry (held by the MoWIE Permit Department). According to the 2007 Proclamation, RBAs are tasked with the creation and updating of a users’ registry, but this is not operational yet, and questions remain in terms of what will happen in basins without a RBA.⁵⁰

The different regulatory and legislative tools (and especially the 2005 Proclamation) on this issue do not clearly specify the criteria for water allocation and level of tariffs. Regulations for a water-charging system were supposed to be enacted in 2012 on the basis of the Water Administration System designed by the MoWIE. However, such regulations do not seem to be in place yet.⁴⁵

According to the 2005 Regulation, priority for water allocation goes to domestic water use⁴⁶, and other permits can be terminated to safeguard domestic supply in the case of drought or overuse. However, no such case has occurred to date according to key respondents.⁴⁷ Nevertheless, discrepancies between allocations and actual uses were reported, resulting from the limited monitoring capacity and equipment of management organisations (in turn, a consequence of lack of staff, funding and adequate equipment).⁴⁸

Moreover, since water use is estimated on the basis of permits, it is difficult to account for all the water not captured by the licensing system. This is problematic

Environmental concerns: the problem of water pollution

What interviewees said...

“Environmental concerns are important, especially for hydropower projects.”⁵¹

“No major problems have been encountered so far, because projects are generally developed in consultation with local communities and governments. Therefore, negative impacts for communities are identified in the feasibility studies and mitigation measures are introduced before implementation starts”.⁵²

New investments in irrigation, hydropower and other uses carry environmental risks. Provisions for maintaining environmental flows, protecting or restoring ecosystem services and addressing the water needs of marginalised groups appear on paper (e.g. 2005 Regulation), but there is little evidence of rigorous enforcement. Environmental Impact Assessments (EIAs), which according to the law should accompany all permit requests, generally include environmental and social criteria, as well as consideration of a project’s

impact on communities and provisions for compensation and resettlement (see 2002 Proclamation).⁵³ However, the EIA process is very time-consuming, and many projects are implemented before the assessment is actually complete.⁵⁴

Pollution is another issue that respondents identified as a bottleneck to effective water resources management and development in Ethiopia. A number of water quality standards are already in place, while others are being developed by the Hydrology Department of MoWIE and the Ministry of Environment and Forestry (MEF) for both surface and groundwater.⁵⁵ At the basin level, however, some respondents noted that *“the standards and procedures to control the quality of water resources are not good enough [...] there are very high levels of pollution especially downstream”*.⁵⁶

The problem is that pollution is an *“emerging problem”* in Ethiopia, which is increasingly being studied and understood, but on which *“more remains to be done”*.⁵⁷ To date, data on pollution are very scarce (especially for groundwater resources) and much of the available knowledge remains anecdotal. Moreover, because polluters tend to be powerful stakeholders (e.g. industries), it is very difficult to enforce compliance, particularly for institutionally weak RBAs.⁵⁸

Flood and drought management

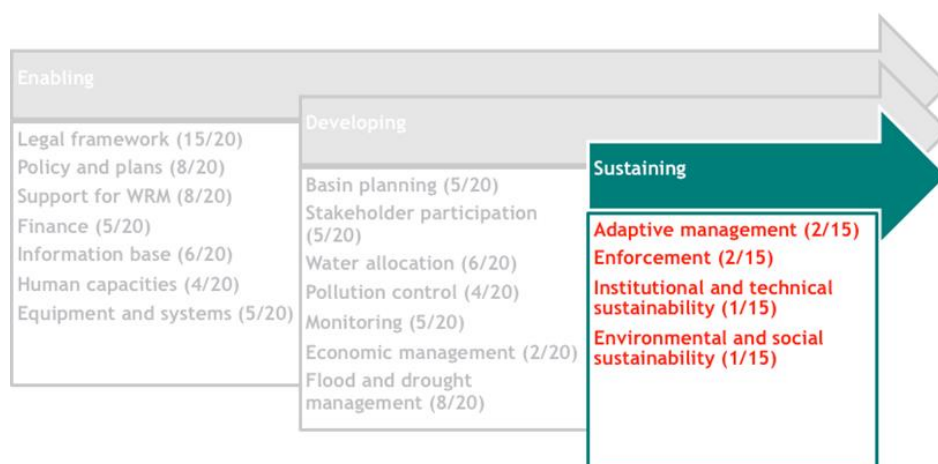
Ethiopia has developed a hazard early warning institutional structure, coordinated through the Disaster Risk Management and Food Security Sector (DRMFSS) in the Ministry of Agriculture. As the name suggests, however, the system is geared more towards assessing and responding to food and nutrition needs than flood hazards.

Ethiopia’s National Meteorological Agency (NMA) currently uses analogue techniques for forecasting purposes, and their remit overlaps with the MoWIE, responsible for flooding and low flow early warning. The MoWIE uses forecasts from the NMA to simulate river flows and flooding in key river basins, including the Awash and Lake Tana systems. However, the early warning sector in general is constrained by a lack of weather and climate monitoring infrastructure, limited knowledge and capacity to effectively predict future climate events, inconsistent use of different information sources across and within country borders, and no systematic forecasting of climate hazards, risks and timely dissemination of warnings.⁵⁹

Key message:

Hydrological variability, rather than a narrow focus on drought, must be the central water resources challenge for development in Ethiopia.⁶⁰ Flood and drought management need to be strengthened through further investment in weather and climate monitoring infrastructure and capacity. More coordination between the different agencies that are producing and using climate information is also required.

4.3 Sustaining factors



The absence of coordination mechanisms

Since many of the enabling and developing conditions for achieving AWRM are not in place, many of the prerequisites for sustaining AWRM over the medium- to longer-term are also absent. First, we identified a lack of provision for a regular multi-stakeholder review to monitor policy implementation, learn lessons and set actions at basin and national level in terms of WRM. On paper the **River Basin High Council (RBHC)** is designated as a venue for this type of review and dialogue to occur. However, in practice the RBHC has only been convened once. Without it, RBAs are deprived of any decision-making power, and their authority and legitimacy especially vis-à-vis the regions is compromised, according to some interviewees in the MoWIE and RBAs.⁶¹

In addition to the absence of WRM-related coordination mechanisms, there is a broader lack of coordination between Ministries in their day-to-day work.⁶² For example, interviewees agreed that communication and information sharing between the MoWIE and the Ministry of Agriculture (MoA) and the Ministry of Trade and Industry (MoTI) should happen on a more regular basis.

The implications of these failures in coordination and communication are clear. It is impossible for the MoWIE to develop coordinated plans for water use within a particular basin without input from the MoA and MoTI on what water-reliant irrigation schemes or industries are operating within the basin. Development partners face similar issues within organisations and across the different agencies. It is hoped that these issues will be tackled within the Water Sector Working Group (WSWG) and particularly the newly established **WRM Working Group**, composed of representatives of the MoWIE, other Ministries and development partners.

Key messages:

- Lack of provision for a regular multi-stakeholder review to monitor policy implementation, learn lessons and set actions at basin and national level in terms of WRM.
- Lack of coordination between Ministries in their day-to-day work.

Climate (and other) changes: absence of scenario-based planning

It was noted that basin plans are not designed to be robust under a range of climate and socio-economic futures. According to interviewees, this type of analysis tends to be performed by

universities and development partners, often through disconnected projects. Results then fail to be incorporated into policy- and decision-making. For example, Addis Ababa University was involved in running the Water Evaluation and Analysis Program⁶³ in the Awash River Basin, looking at capacity-based expansion under different management models and considering four climate and socio-economic scenarios.⁶⁴ While results were communicated to the MoWIE, water managers in the RBA and RWB were not aware of them.⁶⁵

These difficulties are compounded by the general lack of historical hydrological and meteorological data, and also of socio-economic information. When such data exist, they are scattered between organisations at different levels, making it difficult for water managers and policy-makers to access them for decision making.⁶⁶ Among the organisations that we interviewed, only ATA seemed to be seriously considering climate change projections in its planning process.⁶⁷ Projections of socio-economic trends, such as demographic growth, were only done by water managers on an ad hoc basis. For example, the GTP considered two alternative growth rate scenarios: the ‘base rate’ scenario, assuming that the economic growth rate of the preceding five years will be maintained; and the ‘high case’ scenario, envisaging that the GDP and agricultural value added achieved in 2009/10 will double by the end of 2015.

Key messages:

- Basin plans are not designed to be robust under a range of future scenarios, including climate and socio-economic ones;
- Analysis of future trends tends to be project-based and fails to be incorporated into decision-making;
- Lack of historical series of hydrological and meteorological data, and sometimes also of socio-economic ones;

Weak enforcement

Even when/if enabling and developing conditions are in place, enforcement remains weak. For example, in the case of permits for water use and pollution control in the Awash Basin, monitoring is difficult due to inadequate equipment and few staff with the right experience and dedicated time.⁶⁸ Penalties for breaches are provided for in theory, but only rarely applied.⁶⁹ This is partly because it is not clear who requires permits: “*the licensing system is not up and running yet*”.⁷⁰ As a consequence, there are no sanctions available for RBAs to impose on water users who fail to purchase water permits.

In most parts of the country where there are no RBAs, water withdrawals proceed unchecked. Within the Rift Valley Basin for example, water is currently used without planning or regulation and without monitoring.⁷¹ Respondents also expressed major doubts regarding who should be responsible for enforcement: the RBAs, regional administrations, or the MEF?

Key messages:

Enforcement of water and pollution permits is weak because of lack of monitoring (due to limited technical, financial and human resources). Penalties for breaches only in theory, but rarely applied. Most water withdrawals proceed unchecked.

The capacity gap: expertise, recruitment, turnover

The long-term prospects for implementation of an AWRM strategy are seriously undermined by high staff turnover throughout water sector agencies at all levels. Experts are difficult to find, and even more difficult to retain because of the low salaries in the public sector: “*good people leave after a few years, attracted by jobs in the private sector or with international agencies that pay better*”.⁷² This problem is particularly acute at basin and woreda levels, as these roles often entail moving to remote areas (as also recognised in the 2009 Rift Valley Basin Plan).⁷³

Respondents further highlighted a lack of personnel with adequate technical competences (hydrologists, irrigation engineers, etc.), project management/administration background, and skills in terms of stakeholder engagement and communication.⁷⁴ Several capacity-building needs were identified, and educational/training opportunities were said to be insufficient (although increasing), especially for personnel in woredas and RBAs.⁷⁵

List of capacity needs identified by stakeholders⁷⁶:

- WRM planning process – different phases in river basin management from planning (basin plan preparation) to implementation and monitoring and evaluation;
- Basin information management system (data collection, analysis and management) for both groundwater and surface waters;
- Development and use of decision support systems for WRM at basin, federal and transboundary level;
- Pollution: monitoring and environmental protection (for both groundwater and surface waters);
- Lake and wetlands management, ecosystems protection, integrated watershed management;
- Modelling tools for river basins/watersheds (and use of GIS);
- Flood control and management (including development of early warning systems);
- Development of water allocation system, including provisions for monitoring water abstractions and enforcing penalties for breaches.

Addressing equity concerns

To conclude, our analysis indicates a reasonable level of agreement on and understanding of the basic principles of WRM in Ethiopia, but not enough engagement with institutions in the sector, especially at the basin level. There remains limited awareness of what IWRM (and AWRM) means in practice, and of the roles and functions (and often even existence) of RBAs, which therefore lack the power, credibility and authority to engage with relevant stakeholders.⁷⁷

Policy documents reference the needs of the poor and marginalised communities/groups (including provisions for gender equity), and there is a general understanding amongst water managers of the need to protect and strengthen poor people’s entitlements. However, respondents also reported major problems with implementing pro-poor policies and plans (“*the interests of the most powerful prevail*”).⁷⁸

5. Conclusion

As Ethiopia embarks upon an ambitious development path, the capacity of its government and people to use water resources in a sustainable and equitable way will be essential. While still a neglected subject, especially compared to WASH, WRM is gaining greater prominence. Partly driven by international narratives, IWRM is mentioned in all the major policy documents on water resources. It is an essential pillar of the GTP and GTP-2, establishing progressive and modern targets to drive the country's economic development towards achieving middle-income status by 2025.

In practice, however, current visions of irrigation and hydropower development, water supply for all, and the growth of industrial poles are not based on a realistic assessment of how much water will be needed, how much water is available, and what the risks and tradeoffs will be as competition for water intensifies.

Moreover, there is tendency to assume that all new investments in water will simultaneously deliver both economic growth and poverty reduction. Experience from other countries indicates that this is not the case, and a much clearer understanding of 'how' and 'for whom' water resources should be developed is needed. With the benefit of hindsight, many previous water developments have missed opportunities and incurred unforeseen costs, with insufficient attention given to poverty reduction, even where overall (net) gains have been positive. This implies not just better design and implementation of infrastructure; it also means investing in WRM to ensure that the claims and entitlements of poorer people are protected and strengthened.

Box 4: Why is WRM important for poor people?

Harnessing water is central to the development ambitions of Ethiopia. But new projects and infrastructure are not *intrinsically* good for poor people if parallel investments in the institutional 'plumbing' of rights and allocation are missing.

Symptoms of unconstrained water resources development and weak management include:

- Over-exploitation and degradation of water resources, reductions in ecological function and impacts on poorer groups – those with a stake but little voice in WRM.
- Water 'capture' by powerful groups and interests in the absence of clear water withdrawal and allocation rules. One outcome can be *de facto* privatisation of a common resource, and the transfer of wealth from poorer to richer groups.
- Tensions or conflicts over water allocation – between regions, between upstream and downstream users, and between different sectors (e.g. commercial irrigation, domestic use, the environment).
- Failure to deliver the expected benefits of infrastructure development because of a lack of local benefit sharing and resource over-exploitation. For example, big irrigation projects may only succeed in developing islands of prosperity, and capture water that was already being used.

Ethiopia is also home to seven international rivers. In the Nile Basin, tensions have long been high. Cooperation between riparian countries is essential to avoid the escalation of such tensions as demand and competition for water increases. But in order to seriously commit internationally, Ethiopia first needs to build credible national institutions.

Our analysis reveals that WRM in Ethiopia is hampered by a lack of knowledge on resource conditions, patterns of use and drivers of change, and a lack of capacity and skills within

institutions to plan water allocation, assess impacts and tradeoffs and ensure planning is ‘climate smart’. As investment in water ramps up, there is a real danger that unconstrained development and weak management will undermine the resource base, and squander opportunities for the kind of broad-based economic growth envisaged in the GTP.

A summary of the bottlenecks to AWRM in Ethiopia is presented in figure 4 below.

Figure 4: Summary of bottlenecks to AWRM in Ethiopia



From here, it is important to start looking for solutions. A fixation with ‘implementing IWRM’ is not always useful; it can create paralysis, and get in the way of more pragmatic, problem-focussed solutions.⁷⁹ We therefore propose that Phase 2 of the AWRME project takes a ‘problem-shed’ approach.

A good way to start is with ‘**hot spot**’ areas – areas where (for example) competition for water is intensifying, and risks of resource over-exploitation or capture threaten ecosystem health and livelihoods. The aim would be to explore, in detail, what is causing problems, who (and what) is affected, and what kinds of responses are emerging – and at what scale. A key contention is that management solutions are often best crafted from the bottom up: looking at the actors and interests involved, and trying to build (or build on) coalitions for action. These may involve local users, and a variety of different organisations including, but not restricted to, government agencies. The aim is to maintain a **people-centred approach** that asks how water and land management can better address the concerns and realities experienced by poor people: those with insecure rights, those excluded from the benefits of resource access and use, and those most

exposed to water-related risk because of their sex, wealth, class, marital status or other markers of disadvantage.

In parallel, Phase 2 of the project would also include a training and capacity building component, building on the successful training course held for government staff in September 2014. The aim is to use the diagnostic work carried out on Phase 1 to agree specific training needs, for example in water rights administration and management, and water allocation planning.

¹ Ethiopia has an estimated renewable water resource of roughly 1900m³/capita/year, well above the commonly used ‘scarcity threshold’ of 1000m³. However, this is a crude metric that does not consider the temporal and spatial distribution of water, water storage and reliability, water quality, or people’s access to water (‘economic scarcity’), mediated through infrastructure and institutions. See: Fekahmed Negash (2011) Background Paper for the European Report on Development 2011/12: Confronting Scarcity: Managing Water, Energy and Land for Inclusive and Sustainable Growth (www.erd-report.eu/erd/report_2011/report.html).

² Federal Democratic Republic of Ethiopia (2010) *Growth and Transformation Plan*, Addis Ababa, Ethiopia, Federal Democratic Republic of Ethiopia.

³ See: World Bank (2006) Country Water Resources Assistance Strategy, *Ethiopia – Managing Water Resources to Maximise Sustainable Growth* (<http://water.worldbank.org/publications/ethiopia-managing-water-resources-maximize-sustainable-growth-water-resources-assistance>).

⁴ The Water Resources management Policy (1999) is based on four pillars: IWRM, domestic water supply & sanitation, irrigation & drainage, and hydropower development. The Water Sector Strategy (2002) serves as the roadmap for implementation of the policy. The Ethiopian Water Resources Management Proclamation 197/2002 provides the legal basis for water administration in the country, setting out allocation priorities, permitting and charging arrangements, and the broad framework for water resources development and management. Detailed implementation procedures and arrangements for permitting are set out in Ethiopian Water Resources Management Regulation 115/2005.

⁵ See: AMCOW (African Ministers Council on Water) (2011) AMCOW Country Status Overviews – Regional Synthesis Report. Pathways to Progress: Transitioning to Country-Led Service Delivery Pathways to Meet Africa’s Water Supply and Sanitation Targets. Washington, DC: The World Bank/Water and Sanitation Program.

<http://www.wsp.org/sites/wsp.org/files/publications/CSO-Synthesis-Report.pdf>

⁶ Schweitzer, R.W., Grayson, C., and Lockwood, H. (2014) Mapping of Water, Sanitation and Hygiene Sustainability Tools. Triple-S Working Paper 10, May 2014.

http://www.ircwash.org/sites/default/files/triple-s_wp10mappingofwashsustainabilitytools.pdf

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- ⁷ If the condition/function was absent or major impediments existed to its effective functioning (red); it was present but poorly performing (orange); or it was present and performing well (green).
- ⁸ Negash (2011), p.33
- ⁹ Nassef, M. and Belayhun, M. (2012) Water Development in Ethiopia's Pastoral Areas: A synthesis of existing knowledge and experience. Save the Children USA and Overseas Development Institute.
http://www.usaid.gov/sites/default/files/documents/1860/Water%20Development%20in%20Pastoral%20Areas%20of%20Ethiopia_0.pdf
- ¹⁰ Negash (2011), p.33
- ¹¹ Key interview with representative of the MoWIE, held on 9th May 2014 in Addis Ababa.
- ¹² Key interviews with various representatives of the MoWIE, held in August 2014 in Addis Ababa.
- ¹³ Cfr. Giordano, M. and Shah, T. (2014) From IWRM Back to integrated resources management. International Journal of Water Resources and Development.
- ¹⁴ Ibid.
- ¹⁵ Key interviews with various stakeholders, held in August 2014 in Addis Ababa and in various locations in the Awash River Basin.
- ¹⁶ Key interviews with various representatives of the MoWIE, held in August 2014 in Addis Ababa.
- ¹⁷ According to Proclamation 197/2000, priority for water allocation should be given to domestic and industrial water supply; the second priority is for livestock and the environment; the remaining water shall be allocated to irrigation and hydropower.
- ¹⁸ Key interviews held in August 2014 in Addis Ababa.
- ¹⁹ The OWNPN was designed to be implemented in two phases. Phase I is covering the period from July 2013 to June 2015 and Phase II from July 2015 to June 2020. Phase I is designed to increase harmonisation and alignment among and between development partners and the GoE. WASH organisations and procedures are to be fully established and become operational at all levels. All WASH programmes (both existing and new) are expected to align with the OWNPN's principles, approaches and plans. Phase II will be either continuity or redesign, depending on the results of the comprehensive mid-term review to take place at the end of 2015.
file:///C:/Users/bmosello/Downloads/Ethiopia%20-%20WaSH%20-%20POM_Final%20-%20Sept%2030.%202014.pdf
- ²⁰ Key interviews with various respondents, conducted in January 2014 in Addis Ababa.
- ²¹ This approach is being piloted in the Eastern Nile Irrigation and Drainage Project as part of the development of 20,000 ha of irrigation around Lake Tana, under a loan from the World Bank. Cfr. Negash (2011), p. 32.
- ²² Cfr. Negash (2011), p. 23.
- ²³ As per Article 13 of the 2007 Proclamation, and following the provisions for collection of water charges in Article 9(10) of the same proclamation.
- ²⁴ Key interview with representative of Abay RBA, held on 29th September 2014 in Bahir Dar.
- ²⁵ Key interview with representatives of RBAs, held in September and October 2014.
- ²⁶ Key interviews with representatives of MoWIE, held in August 2014 in Addis Ababa.
- ²⁷ Key interviews with representatives of RBAs held in January, May and August 2014.
- ²⁸ Ibid.
- ²⁹ Key interviews with representatives of the MoWIE and ATA, held in September 2014 in Addis Ababa.
- ³⁰ Ibid.
- ³¹ Key interviews with RBAs' representatives, held in September 2014.
- ³² Cfr. Negash (2011), p. 31.
- ³³ Citation from key interview with representative of the MoWIE, held on 12th August 2014 in Addis Ababa.
- ³⁴ Key interviews with RBAs' representatives held in September 2014.
- ³⁵ Key interviews held with various respondents in August 2014.
- ³⁶ Ibid.
- ³⁷ As reported by respondents in the Awash RBA and Abay RBA respectively. Details on the project funded by the Dutch Water Authority can be found here:
<http://www.dutchwatersector.com/solutions/projects/292-water-governance-program-awash-river-basin.html> [last accessed: November 26, 2014]; details on the project funded by the World

Bank can be found here:

http://water.worldbank.org/sites/water.worldbank.org/files/HEFBN1_final.pdf [last accessed: November 26, 2014].

³⁸ Key interviews with group of small farmers in the Awash River Basin, held on 8th August 2014.

³⁹ Key interviews with respondents from RBAs, held in August 2014 in various locations.

⁴⁰ Ibid.

⁴¹ Key interview held in Awash on 5th August 2014.

⁴² Key interview with a representative of the Water Usage and Permitting Department of the MoWIE, held on 14th May 2014 in Addis Ababa.

⁴³ Key interview with a representative of the Abay RBA, held in January 2014 in Bahir Dar .

⁴⁴ Key interview with a representative of the Awash RBA, held in August 2014.

⁴⁵ Key interviews held with various respondents in August 2014; and cfr. Negash (2011), p. 33.

⁴⁶ Although, as recognised in the Rift Valley Plan (2009), priorities may change as a consequence of socio-economic developments - RBAs have the key role of understanding such changes, stakeholders' interests and coordinating decision-making process over water allocations (part 10).

⁴⁷ Key interviews conducted with representatives of the Awash and Abay RBAs in August and September 2014.

⁴⁸ It should be noted that the hydrology stations are owned and operated by the MoWIE Hydrology Department that passes on data to RBAs upon request: therefore, at present, RBAs have not been directly involved in data collection – despite them eventually being in charge with decision-making over water allocations. This information was provided in key interviews with representatives of the Hydrology Department of MoWIE, held on 12th August 2014 in Addis Ababa.

⁴⁹ Water allocation is not backed up by controls/monitoring over water quality and utilization: measurements only occur at the intake of irrigation canals, but “*nobody knows what happens afterwards, farmers can illegally divert water from canals, or industries can release pollutants without being held accountable*”. Key interviews with various respondents held in the Awash River Basin in August 2014.

⁵⁰ Key interviews with respondents from the MoWIE, held in August and September 2014 in Addis Ababa.

⁵¹ Key interviews with representatives of the MEF and Hydropower Directorate of the MoWIE, held in January and August 2014 in Addis Ababa.

⁵² Key interview with representative of the Hydropower Directorate of the MoWIE, held on 9th May 2014 in Addis Ababa.

⁵³ As of June 2013, each Ministry has an Environmental Department that is responsible to conduct EIAs – the Ministry of Environment and Forestry (MEF) has overall supervision and regulatory functions. Often, the EIA process is done by international consultants. However, no functional linkage or accountability among these entities seems to have been established . This information was provided by respondents at the MEF during interviews conducted in August 2014.

⁵⁴ Ibid.

⁵⁵ Key interview with a representative of the MEF, held on 11th August 2014 in Addis Ababa.

⁵⁶ Key interview with a representative of the Awash RBA, held on 5th August 2014.

⁵⁷ As stated by participants in the training on IWRM that was held from 22nd to 26th September in Addis Ababa.

⁵⁸ Key interview with a representative of the Awash RBA, held on 5th August 2014.

⁵⁹ Key interviews conducted in the Awash and Abay basins in August and September 2014. Cfr. GEF (2012) PIF -Strengthening climate information and early warning systems in Eastern and Southern Africa.

⁶⁰ Cfr. WB (2006)

⁶¹ Key interviews conducted with various stakeholders in the MoWIE and RBAs between January and September 2014.

⁶² Key interviews with a representative different Ministries, held in January and August 2014 in Addis Ababa.

⁶³ Developed by the Stockholm Environment Institute's U.S. Center, WEAP ("Water Evaluation And Planning" system) is a user-friendly software tool that takes an integrated approach to water resources planning. See more here: <http://www.weap21.org/> [last accessed: November 27, 2014].

⁶⁴ Tiruneh, Yibeltal. 2013. "Coping with Water Scarcity, the Role of Agriculture. Developing a Water Audit for Awash River Basin" Synthesis report: Awash River Basin Water Audit, Awash River Basin Water Audit (ARBWA) Project, December.

⁶⁵ Key interviews conducted with RBAs' representatives in August 2014 and discussions held during IWRM training on 22nd September 2014.

⁶⁶ Ibid.

⁶⁷ Key interview with a representative of the ATA, held on 13th August 2014 in Addis Ababa.

⁶⁸ Key interviews held with respondents from the MoWIE and RBAs between January and September 2014.

⁶⁹ Ibid.

⁷⁰ Key interviews with representatives of RBAs, held in August and September 2014.

⁷¹ Cfr Rift Valley Lakes Basin Plan (2009), 83

⁷² Key interview with a representative of the Abay RBA, held on 29 September 2014 in Bahir Dar.

⁷³ Ibid.

⁷⁴ Various key interviews held between January and September 2014 in Addis Ababa, as well as different locations in the Awash and Abay River Basins.

⁷⁵ Key interviews with representatives of Woredas and RBAs held in the Awash River Basin in August 2014.

⁷⁶ This list is drawn from an exercise proposed to water managers during the training course on "Building adaptive water resources management in Ethiopia", that was held in Addis Ababa from 22-26 September 2014 in the framework of this project.

⁷⁷ Various key interviews held between January and September 2014 in Addis Ababa, as well as different locations in the Awash and Abay River Basins.

⁷⁸ Key interviews with respondents in villages and woredas, held in August 2014.

⁷⁹ Cfr. Giordano M., and Shah T. (2014) From IWRM back to integrated water resources management. *International Journal of Water Resources Development*, p. 11.