CITY WATER RESILIENCE ASSESSMENT

ADDIS ABABA

WATER RESILIENCE PROFILE

ACKNOWLEDGEMENTS

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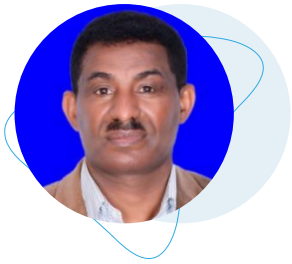
FOREWORDS

Addis Ababa's economy is growing as the city is undergoing a rapid urban transformation. City leaders recognize that the city needs to not only build its capacity to respond and recover from water-related shocks and stresses but also change its relationship with water to create an environment for the city to thrive. Flash flooding events demonstrate how important it is to shift from being merely reactive to being proactive and investing in pre-emptive, anticipatory measures to avoid loss of life, impacts on livelihoods, damage to infrastructure, and disruption of economic growth and wellbeing. In addition, Addis Ababa is already suffering from water scarcity and is expected to experience increased water supply stress caused by the complex interaction of rapid population growth, increased water demand, intensive groundwater development, natural resource degradation, and climate change. To address these challenges in a holistic manner, the city has taken important steps to develop the Addis Ababa Water Resilience Profile and Action Plan.

Throughout the past year, the World Resources Institute (WRI), together with the Addis Ababa Water and Sewerage Authority (AAWSA), Addis Ababa Resilience Project Office (AARPO), Arup, and the Global Resilient Cities Network (R-Cities), worked to develop a better understanding of water risks and identify actions needed to advance the resilience of Addis Ababa's urban water system. This action plan has been developed using innovative, holistic tools like the City Water Resilience Approach (CWRA), integrated with spatial analysis, to identify discrete, place-based actions to address water-related shocks and stresses facing the city. A combination of research, analysis, and stakeholder engagement has led to the identification of nine vision areas with 34 recommended actions for the city of Addis Ababa. The project team looks forward to consulting with city stakeholders to identify priority actions and provide technical assistance to advance those actions towards implementation. In addition, the initiative will support knowledge exchange and joint capacity building between the cohort of African cities developing urban water resilience action plans. This work is part of a multi-year Urban Water Resilience in Africa Initiative, led by WRI along with partners in six cities on the continent. In each city, the initiative facilitates a structured, multi-stakeholder planning process to identify actions that address water-related shocks and stresses. Support for this initiative is provided by the Federal Ministry for Economic Cooperation and Development (BMZ) and The Resilience Shift.

On behalf of the project partners, we would like to thank the Addis Ababa Resilience Project Office, the Addis Ababa Water & Sewerage Authority and all the city stakeholders who have engaged in the planning process to develop this Water Resilience Profile and Action Plan.

ARUP RESILIENT CITIES NETWORK THE RESILIENCE SHIFT WORLD RESOURCES INSTITUTE



LETTER FROM THE ADDIS ABABA RESILIENCE PROJECT OFFICE

Addis Ababa faces a wide range of of challenges in its water system, including water scarcity, destructive flash floods, watershed degradation and lack of sufficient sanitation services. These risks must be addressed to fulfill resident's rights to equitable access to affordable water and sanitation services while building the city's resilience to withstand the intensifying effects of climate change.

In acknowledgement of its vulnerabilities, Addis Ababa is committed to increasing investments in building resilience within its water system. Thus, the development of the city's first Urban Water Resilience Profile Report as part of the Urban Water Resilience Initiative (UWRI) is a crucial milestone for Addis Ababa.

In alignment with action #32 of Addis Ababa's Resilience Strategy, this process has brought together a multitude of stakeholders and communities involved in the water cycle to collaboratively build water resilience at the city-region scale. The Urban Water Resilience Profile Report has identified nine discrete vision areas with 34 concrete actions that the city and city stakeholders aim to take to address water scarcity and flooding risks. This action plan is a result of one year of research, analysis, and stakeholder engagement supported by the Urban Water Resilience Initiative (UWRI) with funding from the Federal Ministry of Economic Cooperation and Development (BMZ).

The Addis Ababa Resilience Project Office (AARPO) is proud to be a part of Urban Water Resilience Initiative in Africa and this fruitful process. We would like to thank The World Resources Institute, the Resilience Shift, Arup, and the Resilient Cities Network for supporting this project, as well as many stakeholders in the city of Addis Ababa who contributed to this process.

DR MOGES TADESSE
Chief Resilience Officer
Addis Ababa Resilience Project Office

LETTER FROM ADDIS ABABA WATER SUPPLY AND SEWERAGE AUTHORITY (AAWSA)

In Ethiopia, city governments face three converging challenges: extending water and sanitation for growing populations, managing watershed risks largely outside city jurisdictions, and designing for climate resilience. Recent flash floods in Addis Ababa have caused loss of life, damage, and disruption that the city is just now emerging from.

The city is committed to intensifying mitigation and protection efforts to reduce risks and protect people and property while addressing long standing water stress and access issues. The Urban Water Resilience Initiative(UWRI) responds to a demand for innovative approaches and tools that help stakeholders and communities involved in the water cycle collaboratively build water resilience at the city-administrative scale.AA WSA believes that the initiative is to provide support towards advancing city water resilience action plans. The initiative facilitates a structured, multi-stakeholder planning process to identify priority actions to address water-related shocks and stresses. It provides technical assistance and facilitates knowledge exchange and capacity building with the cohort of city partners. It uses innovative tools like the City Water Resilience Approach (CWRA) integrated with spatial analysis to identify place-based actions. On behalf of the Addis Ababa Water and Sewerage Authority (AA WSA) I would like to thank The World Resources Institute, the Resilience Shift, Arup, and the Resilient Cities Network for supporting this project, as well as many stakeholders in the city of Addis Ababa who contributed to this process.

Sincerely,

ZERIHUN ABATE (ENG.)
General Manager
Addis Ababa Water and Sewerage Authority

EXECUTIVE SUMMARY

AFRICAN CITIES PROGRAMME

The World Resources Institute (WRI), Arup and Global Resilient Cities Network (R-Cities) have jointly developed a plan of action for developing Urban Water resilience in three African cities in close partnership with city leaders and stakeholders. The objective of this work is to help city stakeholders better design specific interventions to address their water risks and vulnerabilities. The first city involved in this process is Addis Ababa, the capital of Ethiopia.

Climate risks manifested as too much water, too little water and poor-quality water are already affecting people's health and wellbeing, constricting economies, threatening lives, and livelihoods in many countries around the world. As climate risks continue to increase, access to water has become a defining challenge of our times. A recent UN-endorsed projection estimates that global demand for fresh water will exceed supply by 40% in 2030 due to the combined impact of climate change, urbanization, and population growth. Many cities—including Beijing, China; Buenos Aires, Argentina; Kabul, Afghanistan; and Mexico City, Mexico—may find themselves in situations like "Day Zero" in Cape Town, South Africa. Concurrently flooding has caused nearly half of all weather-related disasters worldwide since 1995, affecting some 2.3 billion people. By 2050, 800 million people in 570 cities are predicted to be at risk from the impacts of rising seas and storm surges with damage costs of US$1 trillion each year.

Africa is urbanizing rapidly; most cities that will exist in 2050 are yet to be built. Africa's 1.1 billion citizens will likely double in number by 2050, and more than 80% of that increase will occur in cities, especially slums. City leaders in Africa face the converging challenges: extending water and sanitation services for growing populations, managing watershed risks largely outside city jurisdictions and designing for climate resilience. In order to support sustainable urbanization for this expanding urban population it is imperative that African leaders get water management right, adopt good water governance models, balance urban water policy to address socio-economic needs and climate risks, leverage technological innovations, advance water sensitive design strategies and implement integrated water planning to leapfrog and ensure long term urban water resilience.

1

INTRODUCTION

Explaining the focus of this report and providing some context on water resilience drivers at catchment and city scale. Providing an overview of the City Water Resilience Approach and Addis Ababa's part in its development and application . Unpacking the steps taken to prepare the water resilience profile for Addis Ababa.

CONTEXT

WATER RESILIENCE

The concept of resilience is new to the water sector. Globally it is often used in relation to flood and drought resilience, or climate resilience in a broader sense as well as infrastructure resilience or disaster preparedness and response. There is comprehensive guidance published covering resilience planning for critical infrastructure or specific aspects such as drought planning. However, most measures tend to be focused around one specific hazard or one means of mitigation.

The concept of resilience widely encompasses the ability to "return to a new normal" by effectively coping with negative impacts or rapid-onsets disasters, the ability to adapt to new circumstances effectively, and the ability to accommodate radical shifts. In this context the demand for new concepts, approaches, and guidance on resilience has increased dramatically over the last few years focusing particularly on disaster risk reduction closely linked to infrastructure resilience and climate adaptation. Though the topic has been covered extensively in theoretical studies, outstanding examples on resilience practice in the water sector are rare.

In the context of this proposal, a water resilient city is defined as a city or metropolitan area that exhibits the capacity to provide access to high quality water and wastewater services for all residents, businesses and industries and protects its inhabitants from water-related hazards while protecting the natural water cycle. A city that can survive and thrive in the face of water-related shocks and stresses— ranging from drought to flooding, storm surges, and sea level rise—and the potential impact of a range of shocks and stresses, not limited to water-related hazards (for example, the impact of an earthquake on key water infrastructure).

Addis Ababa's economy is growing and is undergoing urban transformation. Urban water resilience is an important prerequisite to create an environment for the city to service water shocks and stresses and thrive. The World Resources Institute together Addis Ababa Resilience Project Office (AARPO), Arup, and the Global Resilient Cities Network (R-Cities) are working to develop an understanding of water risks and needs to help advance Addis Ababa's urban water resilience. This work is supported by Federal Ministry for Economic Cooperation and Development (BMZ) and the Resilience Shift.

In addition, a water resilient city recognizes that the urban water system it depends on is only one part of complex, overlapping and interdependent urban systems. The use and availability of water is impacted by energy supply and transportation networks, and directly affected by land use and waste management practices. Water is essential to economic growth and public health, and yet the sector is driven by local politics and managed through siloed relationships without strategic alignment horizontally across sectors or vertically across jurisdictions. Integrated urban water management will require alignment between and across many actors, and multiple nested, overlapping, and interconnected urban systems. Therefore, water resilience demands action at a large scale, through interventions that meaningfully influence the myriad systems that impact water resource management and service delivery. Additionally, the natural water cycle does not neatly align with administrative or political boundaries of cities or metropolitan areas, which means that any work conducted in this space requires the engagement of all actors working throughout the larger urban area and the catchment.

Because overall city resilience, water resilience and catchment level resilience are mutually

interdependent, an assessment of urban water resilience cannot be thought of in isolation from its hydrological context, including the basins, the built infrastructure, and the socio-political and economical context. A holistic approach to resilience is therefore key to designing interventions that make systems resilient. As water is used every day in formal and informal ways, resilience needs to be grounded in the existing decision-making processes around the socio-political, economical, and hydrological context where the city lies. One fundamental challenge for most cities is that water governance functions are often siloed, and there is limited coordination, collaboration and knowledge sharing between actors working in the water system. In planning interventions to build resilience, it is therefore important to identify all stakeholders responsible for making the system resilient and making decisions about what should be made resilient and for whom. New initiatives that build resilience must strengthen existing infrastructure assets and systems, but also address the duplications, overlaps and gaps in the roles and responsibilities of the stakeholders across multiple levels and sectors, responding to different shocks and stresses. In addition, any response on the urban scale (though not confined to city limits) must be biased towards actions that can be performed at this level and seek to strengthen the symbiotic relationship between the city and its catchment, connecting the range of stakeholders and systems that bridge natural and urban systems.

The CWRA at its core helps assess the resilience of the water system a city depends on and includes upstream and downstream catchment issues. In Addis Ababa it allowed stakeholders to better understand the interlinkages of climate-induced water risk on the water system they depend on as well as provide guidance on adapting to water-related climate risks. The outputs from the assessment outlined in this report will allow Addis Ababa to alter their development trajectory to adapt to current and future water risk. Together with the pilot cities and potential other cities that choose to implement the CWRA or have implemented the CWRA (e.g. Cape Town) the cities will build an initial network of actors to increase ambition to build water resilience in Africa as well as globally.

Addis Ababa is one of the oldest and largest capital cities in Africa with an estimated population of four million. As capital, it is a hub for migrants within Ethiopia and abroad, coming in search of better employment opportunities and services. Despite rapid and steady economic progress registered over the past two decades, Addis Ababa faces various shocks and stresses that could hinder it from achieving its development goals. Shocks include flooding, urban fire, and disease outbreak; stresses include rapid and uncontrolled urbanization, water scarcity, and high unemployment.

Addis Ababa is already suffering from water scarcity and is expected to experience water supply stress caused by the complex interaction of rapid population growth, increased per capita water demand, and climate change. Water demand is rising, while the availability and supply of water is decreasing due to intensive groundwater development, natural resource degradation, and climate change.

Addis Ababa is home to 65% of the country's industry, and more than 90% of these industries discharge waste directly into nearby rivers without proper treatment, causing heavily polluted rivers. Riverbanks are widely occupied by informal settlements practicing urban agriculture, which, coupled with the lack of adequate sanitation, has led to erosion and transformed the city's rivers into open sewers.

Addis Ababa's topography, lack of sustainable storm water management, and poor waste management, leads to severe flooding during rainy seasons, further aggravated by informal housing in flood-prone areas, increase in impermeable surfaces, and inadequate drainage systems. The combination of climate change and further construction pressures are expected to exacerbate the situation in the years to come. The city's ageing infrastructure is vulnerable to contamination, especially during rainy seasons, which places Addis Ababa at a high risk for the outbreak of waterborne diseases. Unable to practice proper hygiene, residents in informal and low-income areas face greater risk of waterborne and infectious diseases, as revealed by successive cholera outbreaks and the recent COVID-19 pandemic.

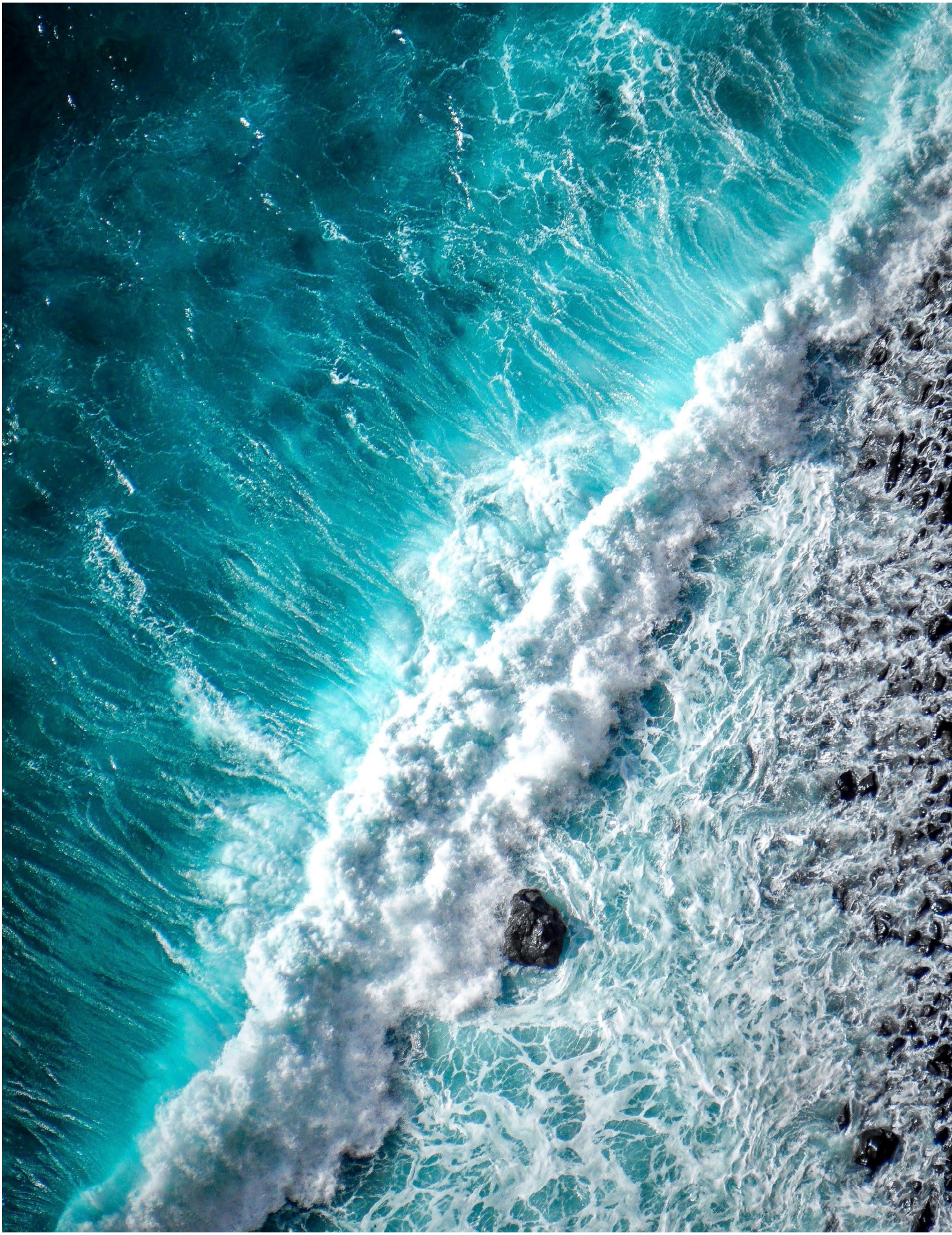
Above all there are major governance limitations that hinder participation, cross scale and cross sectoral governance learning and feedbacks, which are important ingredients of building water resilience. The underdeveloped democratic system and the culture of top-down decision-making system undermine the local perspective, complex realities of households' livelihood issues, and local adaptation and copying mechanisms, which negatively impacts local community's and households' resilience capacity.

OPPORTUNITY AREAS

Based on results from the assessment workshops, participants prioritized nine critical challenges confronting Addis Ababa and identified nine opportunities that respond directly to these challenges. Opportunities were developed through multi-stakeholder design exercises.

Challenge:

- Water Access for Businesses
- Water Access for All
- Pollution of Watercourses
- Security of Water Supply
- Structure Plan Implementation
- Data Collection and Sharing
- Infrastructure Resilience
- Sustainable Sanitation
- Stormwater Management

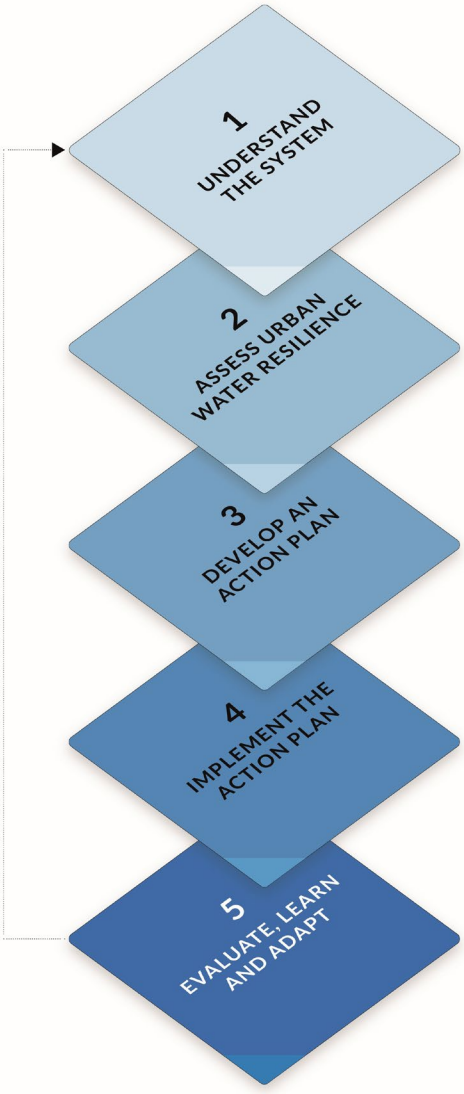


CWRA BACKGROUND

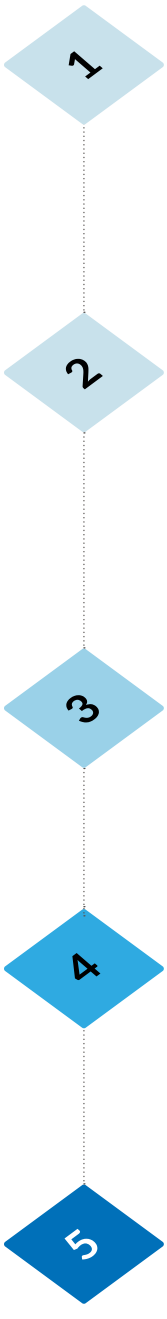
THE CITY WATER RESILIENCE APPROACH

The City Water Resilience Approach (CWRA) responds to a demand for new approaches and tools that help cities grow their capacity to provide high quality water resources for all residents, and to protect them from water related hazards ("provide and protect"). The CWRA process outlines a path for developing urban water resilience and provides a suite of tools to help cities survive and thrive in the face of water-related shocks and stresses.

The CWRA is based on fieldwork and desk research, collaborative partnerships with subject matter experts, and direct engagement with city partners. The approach was developed through investigations in eight cities, and consultation with over 700 individual stakeholders, by Arup—working with the Stockholm International Water Institute (SIWI), Global Resilient Cities Network (R-Cities), the Organization for Economic Cooperation and Development (OECD) and in close collaboration with city partners from Cape Town, Amman, Mexico City, Greater Miami and the Beaches, Hull, Rotterdam, Thessaloniki, and Greater Manchester. Each partner city confronts persistent water-related shocks or suffer chronic water-related stresses and are committed to co-creating water resilience approaches. The cities represent diverse geographies, and face a range of shocks and stresses, in a variety of socio-political contexts.



The approach outlines five steps to guide partners through initial stakeholder engagement and baseline assessment, through action planning, implementation and monitoring of new initiatives that build water resilience:



Understand the system - the city's unique context is appraised to understand shocks and stresses, identify system interdependencies, convene local stakeholders and map key infrastructure and governance processes. This first step of the CWRA process results in City Characterisation Reports that summarize the results of this research.

Assess urban water resilience - the city's current practices are assessed using the City Water Resilience Framework to identify areas of existing strength and weaknesses and establish a baseline against which progress is measured. This second step results in a City Water Resilience Profile, which summarizes the assessment process and outlines potential actions to build resilience.

Develop an action plan - based on the city assessment, an action plan is developed for realizing interventions that develop water resilience. The action plan is based on holistic evaluation of anticipated benefits and costs and prioritization of projects identified in the previous step.

Implement the action plan - actions agreed upon during the previous step are implemented according to best practices. In this step, the CWRA provides best practice guidance for how ongoing actions can be monitored to ensure objectives are met, and resources are used appropriately.

Evaluate, learn and adapt – implementation is evaluated. Adjustments are made to the implementation plan to account for new developments or changing circumstances in the city, and to align with updated objectives for the next period.

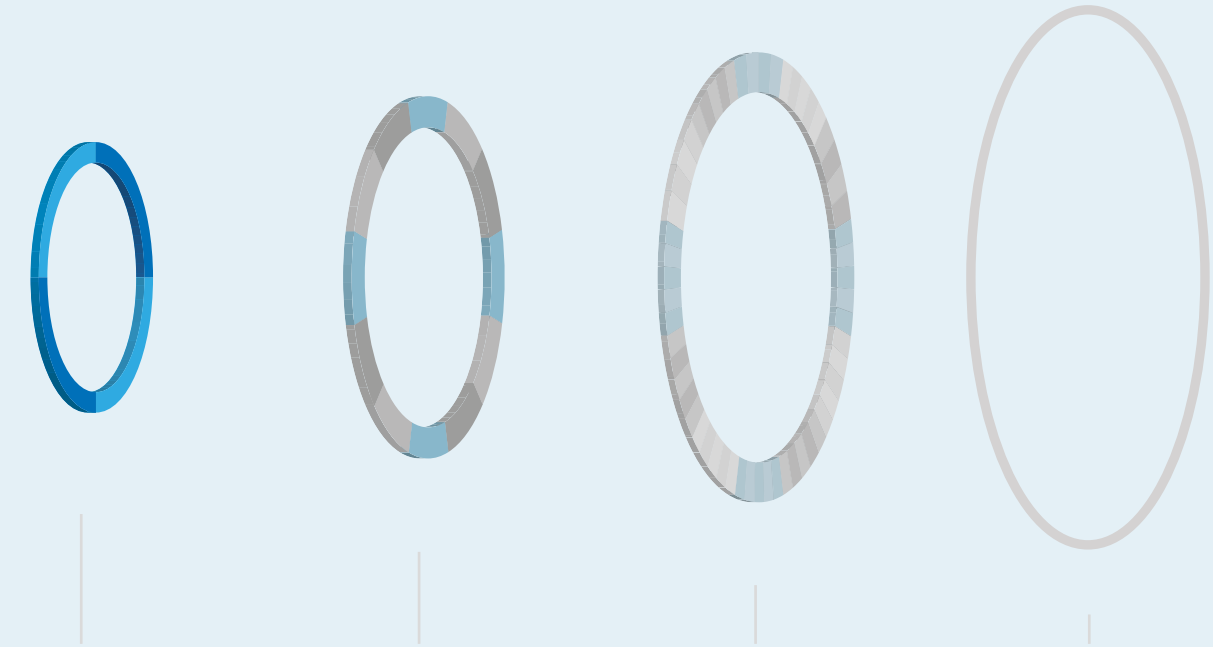
To guide cities through this process, the CWRA offers a suite of resources that target specific challenges identified by cities in their efforts to build water resilience:

- OurWater is a digital tool that helps cities better understand the types of shocks and stresses they confront, their impact on natural and man-made infrastructural systems, and the interaction between key stakeholders involved in urban water management. The OurWater tool is used in Step 1 of the CWRA to map the infrastructure and governance arrangements that define the urban water system.
- The City Water Resilience Framework (CWRF) assesses the resilience of a city to water-based shocks and stresses and allows the city to identify and prioritize future action. Understanding their resilience helps cities formulate a clear vision of what urban water resilience means to them, including what specific conditions must be in place to achieve this vision, what efforts will be required to build resilience and what actors are involved. The CWRF is the primary tool used in Step 2 to assess urban water resilience, and the focal point for workshops conducted in the city.

The CWRF is the primary tool used in evaluating the strengths and weaknesses of an urban water system, and the city's overall resilience to water-related shocks and stresses. Workshops held in GM&B assessed the metropolitan area against a model of water resilience—comprising dimensions, goals, sub-goals, and indicators—that are described in the CWRF.

The innermost ring of the CWRF consists of four **dimensions**, critical areas for building resilience. Within each dimension are the resilience **goals** that cities should work towards to build resilience in that area. Hybrid goals, which are marked in a different colour, refer to goals that can be placed in more than one dimension. Resilience **sub-goals** identify the critical elements for realizing each goal. They provide additional detail and help guide the concrete actions that help realize each goal. Finally, the outermost layer of the CWRF wheel consists of **indicators**, which measure how the city performs according to each area.

The CWRF can be broken down into dimensions, goals, sub-goals and indicators.



DIMENSIONS

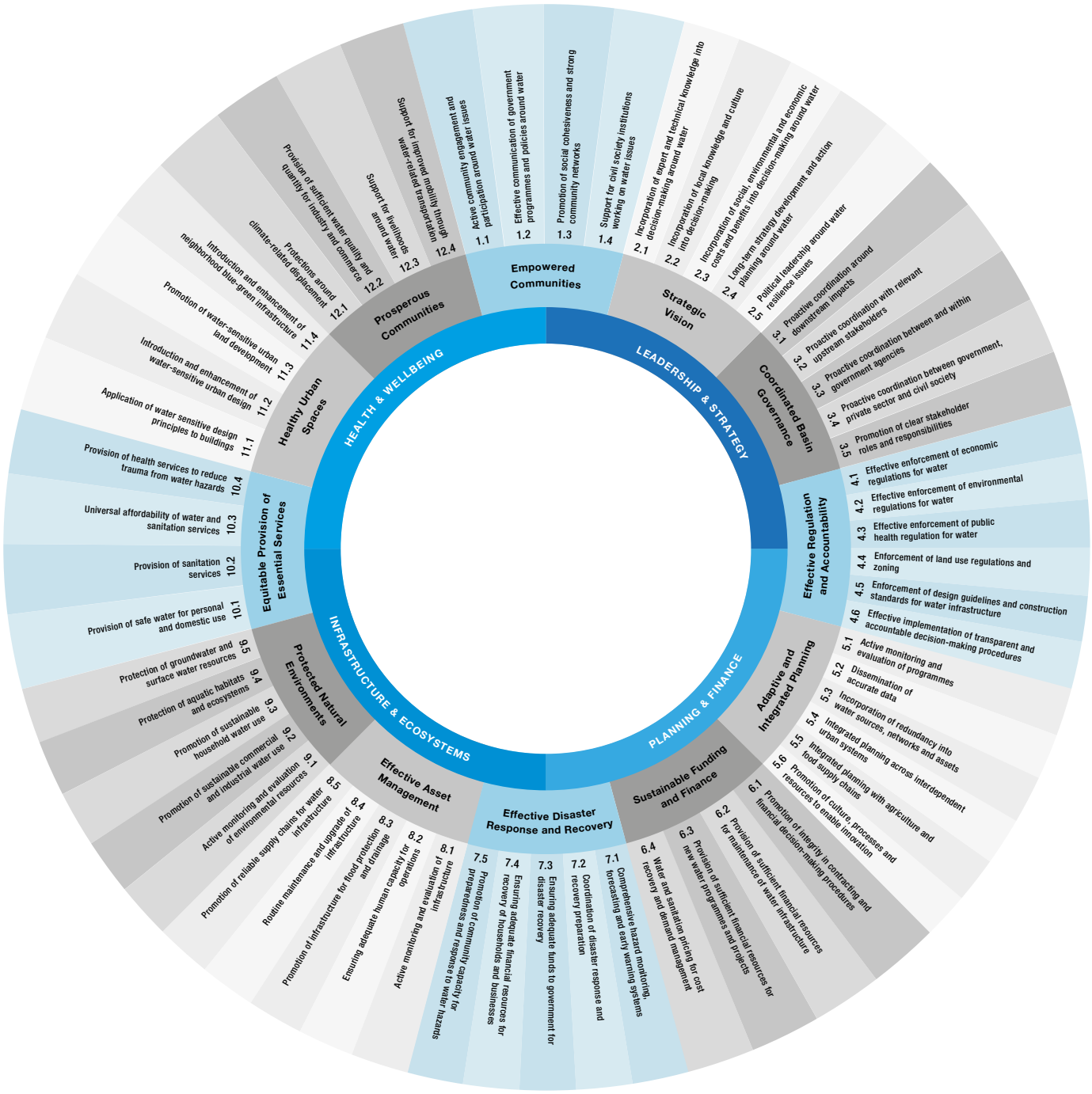
GOALS

SUB-GOALS

INDICATORS

(Qualitative and Quantitative)

The City Water Resilience Framework 2021



WORKSHOP METHODOLOGY

This section describes the approach taken to assess water resilience in Addis Ababa. Three workshops with city stakeholders assessed urban water resilience in the city and helped identify actions that will promote resilience-building activities.

WATER RESILIENCE ASSESSMENT WORKSHOP

The objective of the assessment workshops was to evaluate the resilience of Addis Ababa's water system using the City Water Resilience Framework (CWRF) tool. Results informed strategy development and action planning in the Visioning Workshop hosted several weeks later.

STAKEHOLDERS

The Water Resilience Assessment workshops gathered subject matter experts from government, academia, civil society, and the private sector to participate in round-table discussions focusing on Addis Ababa's resilience to water challenges. A detailed stakeholder analysis exercise was undertaken between WRI, R-Cities and Arup to ensure that all relevant sectors were engaged in the process.

WORKSHOPS

Two workshops were held in person in Addis Ababa at the end of February. Due to local Covid-19 restrictions, group sizes were limited to three people and 2m distancing was maintained between groups. Each group also had an in-person facilitator, a virtual facilitator and a note-taker. The discussions were held in both Amharic and English, depending on the preference of the attendees.

Each workshop had six groups each covering two different resilience goals from the CWRF, with a different selected group of stakeholders.

Over the course of the two workshops, all of the resilience goals and indicators were covered twice.

As well as the in-person workshops, we hosted an online virtual assessment workshop, for those who could not attend in person. These covered four additional goals, but maintained the same activities and outputs as the in-person workshops.

SESSION OUTLINE

The Assessment Workshop consisted of two sessions:

1. ***Introduction to the CWRF*** - The session began in plenary with a welcome address by Aklilu Fikresilassie, WRI Africa Director of Thriving and Resilience Cities and Dr Moges Tadesse, Chief Resilience Officer for the Addis Ababa Resilience Project Office followed by a short presentation of the CWRF and the day's agenda.
2. ***Indicator Assessment*** – During the second session, participants assessed each qualitative indicator.

- Attendees were split into six groups based on their area of expertise and to reflect a range of perspectives in each group.
- The facilitator introduced each new indicator by reading the name of the indicator out loud, then allowing time for participants to read guiding criteria and take notes.

- The facilitator asked each participant to provide an initial score with minimal explanation for why they assigned that score.
- Once all participants had reported, the facilitator encouraged them to explain their scores.
- The facilitator then asked participants to provide a final score and, if the first and second score differed, to reflect on the reason for the updated score.
- Discussion of each indicator lasted approximately 15 minutes. After the last indicator session, facilitators asked participants to provide feedback on the workshop process and summarize strengths and weaknesses of the water system based on discussions from the day.
- Facilitation of each group was split between an online facilitator from the core CWRA team as well as an in-person facilitator based in the city. A notetaker was responsible for recording all discussion in both Amharic and English.

Following the Assessment Workshops, facilitators and notetakers convened to reflect on the workshop, and compile scores for preliminary analysis. Through analysis of these results, the project team then developed ten (10) statements that reflected the critical challenges identified by Addis Ababa stakeholders.

MEASURING RESILIENCE

Indicators help measure complexity when direct measurement is difficult (or impossible). Responses to indicator questions help identify strengths and weaknesses, and measure progress over time.

The CWRF takes a pioneering approach to measuring resilience through collaborative workshops dedicated to discussing qualitative indicators, supplemented by quantitative indicators that provide additional detail and help validate qualitative results. This mixed approach has been adopted because elements of resilience—especially those related to water governance—can be difficult to measure quantitatively. For example, a quantitative indicator might suggest whether a long-term strategy exists, but not whether the strategy is a good one or if has been properly implemented.

The workshop approach adopted in Resilience Assessment allows for a diversity of views on the same subject, gauges general perception of system performance and creates an opportunity for capacity building and dialogue between stakeholders. This approach also reveals how much consensus exists between different city stakeholders on any given topic. The assessment can be conducted over a single week (with additional quantitative indicators gathered later) reducing the time and cost associated with the assessment.

VISIONING WORKSHOP

A combined visioning workshop was held for all virtual and in person attendees. During the Visioning Workshop, participants from the previous three workshops reconvened to identify specific actions that can be incorporated into future strategies to improve resilience in Addis Ababa. The objective of the Visioning Workshop was to define and prioritize actions to improve the resilience of the city's water systems based on initial findings of the resilience assessment.

During the Visioning Workshop, the project team presented preliminary results from the Resilience Assessment Workshops back to participants, highlighting key challenges facing Addis Ababa. Responding to these challenges, participants identified areas of opportunity for building resilience in GM&B and then outlined specific actions that will help advance these visions.

STAKEHOLDERS

Having attended previous sessions, participants were familiar with the project objectives, and use of the CWRF "wheel" to identify strengths and resilience vulnerabilities in Addis Ababa. The project team, consisting of the Arup, WRI and R-Cities staff and representatives from AARPO attended the workshop, either using video conferencing or in person.

SESSION OUTLINE

The Visioning Workshop consisted of three sessions:

1. ***Introduction –*** The project team presented conclusions from the Resilience Assessment Workshops, including an overview of strengths and resilience vulnerabilities identified through the assessment. During introductory presentations, participants were reminded of the diverse shocks and stresses confronting Addis Ababa, and they were asked to consider the full range of these shocks and stresses when developing actions to build resilience.
2. ***Root Cause Analysis*** – Following the introduction, participants were asked to identify critical challenges facing the region. These challenges were presented as Problem Statements developed by facilitators based on the two Assessment Workshops, through analysis of CWRF scores and comments provided by workshop participants. From eleven Problem Statements, participants selected ten to work on throughout the day. They worked in tables, and online breakout rooms to identify a range of underlying root causes for each problem, including social, technological, environmental, financial, political, and other underlying causes that contribute to the problem.

3. ***Solutioning*** – Participants were then asked to develop concrete actions, in small groups, based on the problems and visions identified in the previous step. The "solutioning" phase was broken down into two stages. In the first stage, participants developed a Design Brief that identified beneficiaries, needs, challenges, and assets and resources available to realize the resilience "vision." In the second stage, participants were asked to identify a specific Proposed Intervention that could help advance the vision. In this, participants were asked to identify the next steps in the short-to-long term, key decision-makers, and the shocks and stresses the action might respond to. Facilitators then presented Proposed Interventions back to the full group in plenary and identified the actions they believed were most important for Addis Ababa to pursue. The workshop concluded with a short reflections session that identified ways to improve the workshop and to provide any additional comments that might guide the development of the Addis Ababa Water Resilience Profile.

The workshop concluded with a short reflections session that identified ways to improve the workshop and to provide any additional comments that might guide the development of the Greater Miami and the Beaches Water Resilience Profile.

The project team also introduced OurWater, a digital tool developed by the CWRA team to support water resilience.

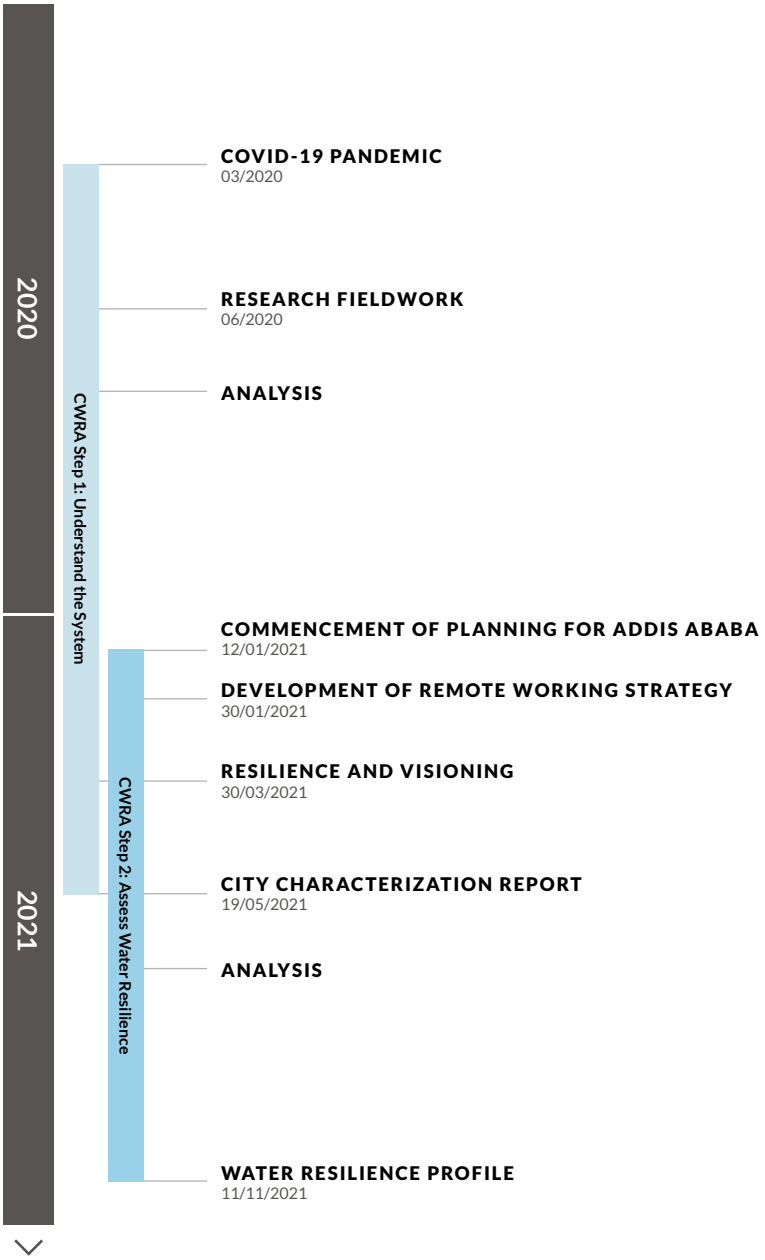
2

RESILIENCE ASSESSMENT

This section describes the approach taken to assess water resilience in Addis Ababa and summarizes the results. During two interactive hybrid in-person and online workshops, stakeholders assessed each sub-goal within the CWRF, generating and initial resilience profile along with valuable insights to inform challenges and opportunities.

INTRODUCTION TO CWRA PROCESS

The Addis Ababa Water Resilience Profile builds upon several years of research related to urban water resilience, shocks and stresses. Preliminary research was undertaken in Addis Ababa by the local WRI team in consultation with Arup and R-Cities, to form the basis of the City Characterisation Report. In parallel, WRI have developed a series of spatial narratives for the City and a framing paper for Urban Water Resilience in Africa. The CWRA team then worked closely with the Resilience Project Office and other city authorities to develop the resilience profile based on workshop findings.



INDICATOR SCORES

Indicators describe the ideal or best-case scenario, and the score provided for each indicator reflects how well Addis Ababa currently performs when compared against that best-case. For example, workshop participants were asked to reflect on whether the statement "a long-term strategy is in place to guide projects and programs that build water resilience over time" accurately describes current practice in Addis Ababa. To help guide discussions, a series of "guiding criteria" were provided to participants at each table. Guiding criteria have been based on desk research and expert inputs, and they identify important considerations for each indicator. They establish a common language and frame of reference for workshop participants, who often bring different perspectives, interests, and expertise to the conversation. Where multiple indicators were required to assess a resilience sub-goal, each indicator was discussed by the group separately. All indicator questions are provided in the following section, organized according to sub-goal.

There CWRF wheel provides a snapshot of strengths and weaknesses for Addis Ababa in building its resilience to water-related shocks and stresses. It describes how the area performs against a best-case scenario for each of the 62 sub-goals. Scores for all resilience sub-goals are provided along the outer edge of the CWRF wheel, while averaged scores for resilience goals are shown in the inner ring.

Detailed results for each resilience indicator are provided in the next section, along with a summary of key points identified during roundtable discussions. The themes identified in each discussion, and qualitative scoring results for indicators reflect the opinions of individual participants. A strong effort was made to bring together participants with diverse and technical expertise and knowledge of the subject areas.

INDICATOR SCORES

4.5-5.0 Optimal

The indicator fully reflects conditions in the city. No improvement is required.

3.5-4.4 Good

The indicator mostly reflects conditions in the city. Minimal improvement is required.

2.5-3.4 Fair

The indicator somewhat reflects conditions in the city. Some improvement is required.

1.5-2.4 Low

The indicator mostly does not reflect conditions in the city. Significant improvement is required.

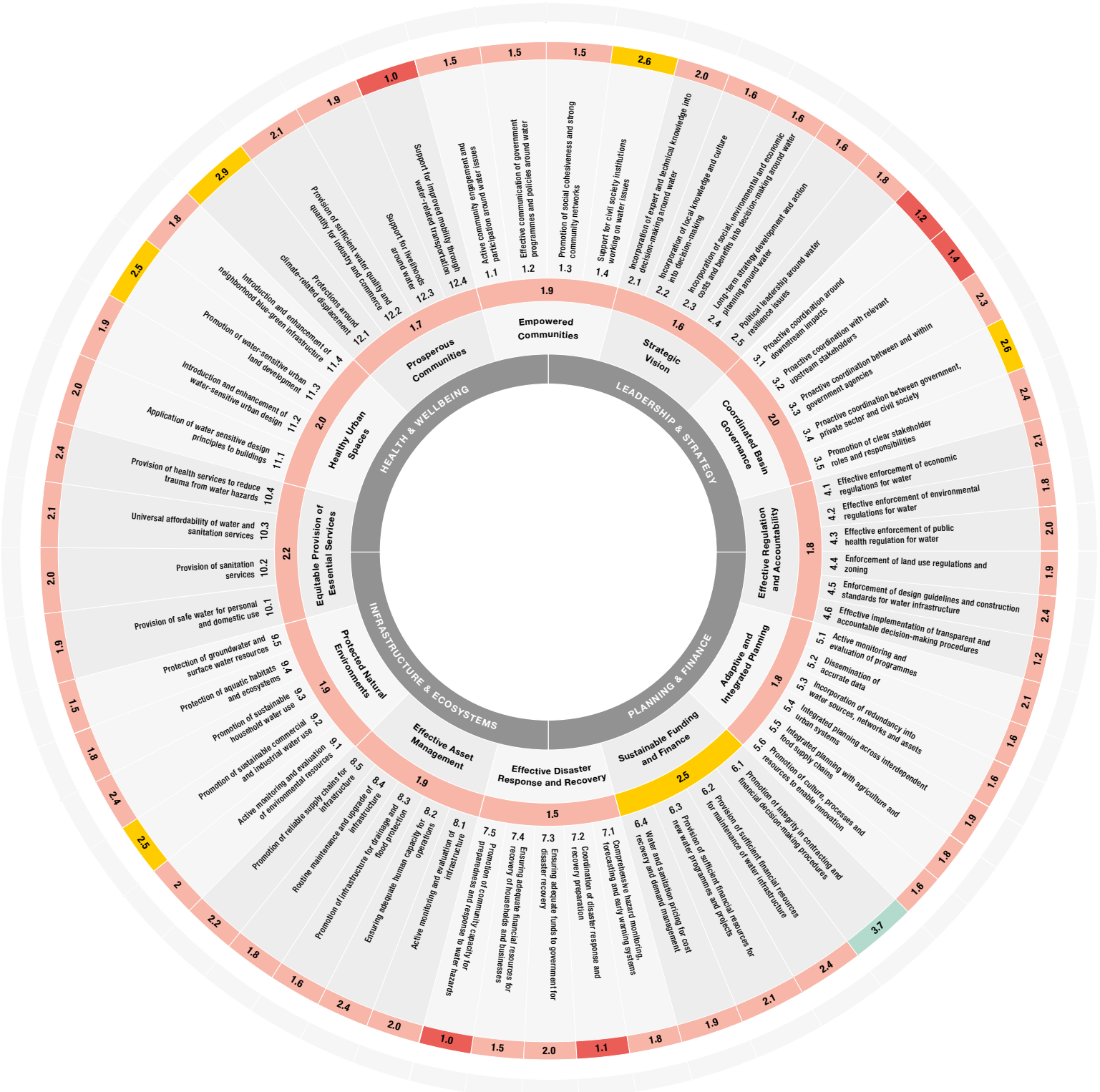
1-1.4 Poor

The indicator does not at all reflect current conditions in the city.

N/A

The indicator is not relevant to the city.

The City Water Resilience Framework qualitative scoring for Addis Ababa, 2021



LEADERSHIP & STRATEGY

Throughout Addis Ababa, leadership around water resilience is fragmented and siloed between and within organisations. Addis Ababa is subject to a complicated governance structure between the Federal government, regional bureaus in Oromia and the City authorities. This has a negative impact on coordination between upstream and downstream stakeholders, further complicated by Addis Ababa's growing water demands due to rapid population growth and industrial growth. There is little definition of responsibilities across the water cycle, and within the city itself. There is some recognition of civil society groups, but there is little proactive community engagement or communication with representatives or residents.

Within Addis Ababa, there are problems around the sharing and dissemination of information outside of a small group of technical experts. The City needs to build a better framework for sharing work outside of subject experts and with the wider community to improve engagement.

While there is a lack of cohesive water resilience plans and coordination in place, the National OneWASH Programme and the establishment of the Addis Ababa Resilience Project Office indicate a desire to improve coordination and a willingness to make water resilience a priority issue.

EMPOWERED COMMUNITIES

1.1 Active community engagement and participation around water issues

› QUALITATIVE INDICATOR:

Legal and institutional frameworks and mechanisms promote active, free and meaningful participation around issues related to water supply, sanitation, drainage and flooding

QUALITATIVE SCORE:

1.5

SUMMARY OF ROUNDTABLE DISCUSSION:

The existing institutional frameworks and mechanisms need to be reformed to become inclusive, safe and free and promote participation. There are significant issues around access to information, from water supply to sanitation. The interaction of residents with legal and institutional frameworks is very much affected by land title, community status with informally settled communities having zero or very low engagement and their input is not included. Although there are frameworks in place in some sectors, across the board, implementation is very poor.

1.2 Effective communication of government programmes and policies around water

› QUALITATIVE INDICATOR:

Mechanisms ensure that comprehensive information on government programmes and policies are disseminated to all stakeholders

QUALITATIVE SCORE:

1.5

SUMMARY OF ROUNDTABLE DISCUSSION:

There are mechanisms in place to disseminate information regarding government programs and policies, however it is not sufficient and regularly updated. The government lacks the financial and technical capacity needed to support agencies in disseminating information. The city also lacks a mechanism to monitor the quality of information disseminated to residents and businesses. A particular weakness in the water authority in communicating with stakeholders was highlighted by workshop participants.

1.3 Promotion of social cohesiveness and strong community networks

› QUALITATIVE INDICATOR:

Inclusive and participatory social networks (formal and informal) enable communities to learn from each other, self-organise and act collectively in times of need

QUALITATIVE SCORE:

1.5

SUMMARY OF ROUNDTABLE DISCUSSION:

Formal and informal social networks in the city are well developed and engaged however, they are not coordinated, and usually act on their own. There is a lack of coordination between community networks. Usually, these social networks are engaged on issues other than water related shocks and stresses. There are no formal mechanisms in place by the government to ensure community participation and leadership around water issues. There is a strong informal network, however it is not connected with the formal network and communication between the two is poor. The city government doesn't have an overview on what capacity is lacking across the formal and informal networks or how they can be best supported. There are insufficient resources allocated by the government to these networks and instead the government is more focused on providing necessary resources only to governmental bodies and formal institutions such as universities.

1.4 Support for civil society institutions working on water issues

› QUALITATIVE INDICATOR:

Mechanisms ensure that financial, institutional, and technical support is provided in civil society institutions working on water issues

QUALITATIVE SCORE:

2.6

SUMMARY OF ROUNDTABLE DISCUSSION:

There are strong civil society groups (community groups, academia, charities, and NGOs) working and interested in water related issues in the city however, engagement is not coordinated. There are no instruments in place by the government to facilitate coordination effort by civil societies. The support obtained from the government to civil societies usually focuses on improving technical capacity, not financial. There are examples of academics involved with AAWSA for research purposes, but this is poorly coordinated without a driving framework guiding these interactions. The government lacks planning around this issue. Where possible, government should guide civil society such as NGOs to work on sectors that have less focus, such as water shocks and stresses.

2 STRATEGIC VISION

2.1 Incorporation of expert and technical knowledge into decision-making around water issues

› QUALITATIVE INDICATOR:

Technical knowledge is available, understood and continuously incorporated by government into decision-making around water issues

QUALITATIVE SCORE:

2.0

SUMMARY OF ROUNDTABLE DISCUSSION:

There are efforts by the government to consult technical experts, but this is not disseminated more widely. Only technical staff and top management staff have access to technical knowledge, leading to a gap in incorporating technical knowledge in decision making. Participants listed the Blue Nile initiative are among the only few advising committees known to be acting around water issues outside of individual organizations and agencies. Updates and revisions of technical knowledge is not well organised or shared across organisations.

2.2 Incorporation of local knowledge and culture into decision-making

› QUALITATIVE INDICATOR:

Local knowledge and cultural values of all population groups are referred to in government decision-making around water issues

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

There is no effort at all to integrate local knowledge and cultural values in the decision-making process. It is perceived that indigenous knowledge doesn't exist at all, but there are examples of indigenous water management techniques, such in the case of Borena, there are some traditions in water management, yet this kind of cultures are not acknowledged.

2.3 Incorporation of social, environmental and economic costs and benefits into decision-making around water

› QUALITATIVE INDICATOR:

The social, environmental and economic impacts of increased water resilience are understood and incorporated into short, medium and long-term decision-making around water issue

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

Current efforts by responsible bodies on water issues are more oriented on water supply and do not incorporate wider costs and benefits in the decision-making process. The practice of water resilience is at the early stage of development in Addis Ababa and there are currently no specific policies and programs targeted at water resilience. The city is beginning to think in terms of a resilience framework, and while the issues are beginning to get some traction, there are no implemented programmes or projects at this stage. Water management strategies exist but this needs to be reinforced, actors who can develop water resilience practice from the water management base exist but need to be restructured. When projects are implemented social, environmental, and economic impacts considerations are not.

2.4 Long-term strategy development and action planning around water

› QUALITATIVE INDICATOR:

A long-term strategy is in place to guide projects and programmes that build on water resilience over time

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

Water resilience is a new concept for Ethiopia and action planning around water is only beginning to be framed around this issue. City and regional strategies consider some economic, cultural and environmental factors, but overall the issue of water resilience is not included. Long term planning is a weakness at both regional and federal level with long term plans limited to some sector specific planning (such as dam and reservoirs). Overall the trend in the planning culture shows plans limited to ~5 years.

2.5 Political leadership around water resilience issues

› QUALITATIVE INDICATOR:

Political leadership promotes resilience as a priority issue in government decision-making

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

Establishment of the Resilience Project Office is a big step and a sign of support and commitment from political leadership. However, it is not yet fully embedded and strategies are not fully acknowledged or engaged with. Politicians don't lead on implementing water resilience and it is proving difficult to get their acceptance. This leads to a lack of buy in from other organisations who don't see water resilience as a priority. Sharing information about the Resilience Office with other agencies and residents would improve engagement and uptake. Public outreach around water resilience doesn't exist, and it is limited to a small pool of experts. Water Resilience is getting more attention on national level, for instance within the new climate and economic plan, resilience is considered as one of the core considerations for our national development plan. Further work in increasing the capacity of the Resilience office would help to raise the profile of water resilience within Addis Ababa.

3 COORDINATED BASIN GOVERNANCE

3.1 Proactive coordination around downstream impacts

› QUALITATIVE INDICATOR:

Coordination between city stakeholders and relevant downstream stakeholders minimizes downstream impacts

QUALITATIVE SCORE:

1.2

SUMMARY OF ROUNDTABLE DISCUSSION:

There is an unavoidable problem related to political boundaries between the city and region which makes the coordination of the two bodies difficult. Developments around and within Addis Ababa are interlinked with the region when it comes to resource sharing so proper management of resources is important. The complicated political space creates communication gaps around resource management effecting the downstream stakeholders and environment.

3.2 Proactive coordination with relevant upstream stakeholders

› QUALITATIVE INDICATOR:

Frameworks and mechanisms promote coordination between city stakeholders and relevant upstream stakeholders on water issues

QUALITATIVE SCORE:

1.4

SUMMARY OF ROUNDTABLE DISCUSSION:

Regardless of the issues with unprotected and not sufficient use of water, Addis Ababa has good geographical topography and this works in favour of helping the supply from the upstream. The political complexity in the region hampers efforts to work with upstream stakeholders. Coordination of water use between upstream and downstream users is challenged by unresolved boundary delineation issues and political tensions with regional jurisdictions. For sustainable water supply system in the future all parties involved should come to a common understanding of what the system lacks and what can be improved.

3.3 Proactive coordination between and within government agencies

› QUALITATIVE INDICATOR (3.3A):

Coordination exists between different government agencies operating at various admirative levels to define and implement water priorities

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

There exist programs like "one wash national program" that is being carried out in collaboration with four different ministry offices namely Water, Health, Education and Finance, clearly showing there is fair and promising communication between different government agencies. There is an opportunity for ministries and agencies to collaborate further around water resilience.

› QUALITATIVE INDICATOR (3.3B):

Coordination exists within agencies to define and implement water priorities

QUALITATIVE SCORE:

2.8

SUMMARY OF ROUNDTABLE DISCUSSION:

There is clear deficiency in coordination within agencies and this is one of the root causes for the lack of implementation of policies and programmes within the city.

3.4 Proactive coordination between and within government agencies

› QUALITATIVE INDICATOR:

Framework and mechanisms promote dialogue and deliberation around water and resilience issue between government and non- government actor

QUALITATIVE SCORE:

2.6

SUMMARY OF ROUNDTABLE DISCUSSION:

At a federal level there are several non-governmental works, supported by the government. There are some efforts in encouraging non-governmental works as well as several forums established for different stakeholders to improve the sector.

3.5 Promotion of clear stakeholder roles and responsibilities

› QUALITATIVE INDICATOR:

Frameworks and mechanisms clearly define the roles and responsibilities of water stakeholders.

QUALITATIVE SCORE:

2.4

SUMMARY OF ROUNDTABLE DISCUSSION:

The rules and regulations are clearly stated and explain responsibilities of everyone in line as it was said in most of the above sub goals the issue is mostly associated with implementation and everyone should work on that.

PLANNING & FINANCE

Addis Ababa faces numerous planning and finance challenges, impacting the provision of basic water services and infrastructure and its preparedness to deal with shocks and stresses. Despite various important institutional reforms over the past two decades setting out defined roles and responsibilities for the water sector, more needs to be done to implement this effectively to improve integrated planning and avoid conflicting mandates.

The city lacks a disaster risk management (DRM) strategic planning framework that can serve as a guiding document for decision-making regarding the design and implementation of DRM related plans and programs. In addition, there are currently few regulatory tools that can be used to establish responsibilities, plans, and priorities in a coordinated manner with the participation of all actors. Owners and operators of critical assets such as hospitals, fire stations, and electricity and water distribution networks lack detailed risk assessments. In addition, they rarely have business continuity plans or standard operating procedures for coordinating an emergency response to a shock, despite the prevalence of short-term asset failures. The few guidelines that do exist are highly technical and are only understood by a very small number of specialists.

Decision-making is generally top-down, without a robust human-centric approach. Previous planning efforts in the urban water sector and disaster risk reduction have not adequately consulted and engaged with the public. Addis Ababa has a very large network of social groups such as Ïddïrs (informal social protection system whose main function is to help members during bereavement), mahbär (neighborhood or religious associations), and Ïqqub (rotating credit schemes) that are actively operating in the city. With many residents belonging to such social groups, this informal network could provide a significant opportunity to strengthening community-based emergency response.

While water-related regulations exist, they are not enshrined in law, resulting in little protection to water resources. Monitoring systems are largely absent. Although businesses need to complete environmental impact assessments, in practice this is rarely enforced. Waste disposal from industrial sites and commercial activity is particularly an issue, posing risks to water quality and public health. Procedures to control groundwater extraction and infiltration are also absent, with no system in place to hold businesses accountable or incentivise positive changes. Land use regulations exist, and officially high-risk areas are excluded from development, yet enforcement of this is rare at the planning phase. Land use is a strongly politicised issue and pressure on land development to accommodate growth is high.

A critical component of adaptive and integrated planning is availability and adequate use of accurate data. Stakeholders indicated most agencies lack systems, technologies, resources, and local expertise to use data to inform planning. Existing data does not meet industry standards or good practice in many cases and is rarely cross-referenced, leading to differing figures and statistics. Monitoring and evaluation frameworks exist in some departments, but it is not common practice or coordinated between agencies.

Over the past years, Addis Ababa's aggregate revenue has gradually expanded, reaching 44,7 billion ETB in 2018-19. However, besides foreign loans and grants, the city is highly reliant on state revenues to cover its expenditure. Over the years, the share of municipal revenues has steadily declined, under the combined effect of weak institutional capacity, a low tax rate, a low tax base, low charges and fees for utilities,

inadequate debt collection, and non-recovery of major infrastructure. The city needs to further enhance its capacity to increase municipal revenues to meet the growing demand for urban infrastructure and services fuelled by rapid urbanization. Foreign loans and grants take a long time to come materialize and are usually channelled to new infrastructure rather than maintenance or upgrading of existing assets. Current tariffs for water are low and highly subsidized and do not cover costs. Those in informal homes who must buy water from private kiosks face a poverty penalty, as this is more expensive.

4 EFFECTIVE REGULATION AND ACCOUNTABILITY

4.1 Effective enforcement of economic regulations for water

› QUALITATIVE INDICATOR:

Economic regulation of water and sanitation services and water resources is performed effectively, resulting in adequate provision of key services, and high customer satisfaction

QUALITATIVE SCORE:

2.1

SUMMARY OF ROUNDTABLE DISCUSSION:

Rules and norms exist but these are not efficiently used and not publicized effectively. Currently, the regulatory institute writes, controls, and decides the pricing of service. This institution controls its own budget, and there are only some publicly funded programmes such as public hand wash programs. Addis Ababa water administration office has some level of autonomy and enforcement does exist on a basic level. Water and sanitation prices are subsidized, hence there is no excessive profit from service provision by the utility. When considering customer satisfaction there might be some complaints related to service provision. Based on the experiences of some of the participants, there are places across the city where service provision is non-existent. There is a system in place to report issues, but the public doesn't have enough information about the responsible actors. Empowering residents about possible action in the case of service complaints would allow consumers more agency over their water supply and sanitation services.

4.2 Effective enforcement of environmental regulations for water

› QUALITATIVE INDICATOR:

Environmental regulation is performed effectively, resulting in high quality, protected water environments

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

Environmental protection authority writes regulations around aquifer and surface water use standards but standards are not enshrined in law and so water resources are not well protected. There is an environmental regulation organization but there is poor practice in effective implementation of environmental enforcement. There is no environmental monitoring system and the level of enforcement is low. There are limited attempts to enforce sanctions and penalties for infraction, however political interference does effect efforts in this area. Every company must complete an environmental impact assessment but in practice there is little control on industry. Akaki and Kebena sites were highlighted as suffering from high level of pollution causing issues with odour and affecting local residents.

Standards and enforcement should be developed for current areas of concern around industrial waste disposal and ground water pollution. Waste disposal from industrial sites is a problem area, as currently guidelines for the treatment for carcinogenic heavy metal materials do not exist. Ground water is currently not controlled and with increased use by commercial water users there are concerns about ground water levels and infiltration.

4.3 Effective enforcement of public health regulation for water

› QUALITATIVE INDICATOR:

Public health regulation for water is performed effectively, resulting in water that is safe to consume and wastewater that can be returned to the water cycle with minimal environmental impact.

QUALITATIVE SCORE:

2.0

SUMMARY OF ROUNDTABLE DISCUSSION:

There is a need for checks to ensure the safety of water for consumption. Since water quality is not guaranteed, many use boiled water for personal water consumption. There is a process for submitting complaints to the water utility but this is not well known or effective in addressing issues. While there are also some efforts in establishing decentralized and centralized water supply treatment, the current efficiency of this system is questionable. If industries release toxic substances and cause a negative impact on the environment, there is no system to hold them accountable. For instance, the area of Kebena used to be a recreational area but is now highly polluted due to commercial environmental breaches. The city could develop compensation mechanism for public health breaches.

4.4 Enforcement of land use regulations and zoning

› QUALITATIVE INDICATOR:

A sound regulatory framework controls land use and urban expansion and reduces growth in high-risk and water-poor areas.

QUALITATIVE SCORE:

1.9

SUMMARY OF ROUNDTABLE DISCUSSION:

Land use regulations exist and high-risk areas were identified to exempt from development, but these are not well enforced. For instance, river buffer standards of 30-50m exist in Addis Ababa, reducing to 15 meters in inner city areas, but there are settlements built within these boundaries showing the lack of effective enforcement. Recent land use plans are being implemented as planned. Some participants believe the land use exists, but it is violated, and it is the planning commission itself that violates these regulations, which is the body responsible in preparation of this regulations. A environmental sensitization campaign is likely required both within city staff and citizens to create awareness of the regulations in place, why they are required for protect natural resources and assets that the city depends on. Such sensitization and awareness building campaign can create more ownership and agency for environmental stewardship and compliance on all fronts. Land use and development is a highly political issue in the city. There is a lack of green spaces within the city, especially around the central business district, requiring improvements to the land use plan in order to integrate more green spaces. Violations of land use regulations are primarily addressed with enforcements or penalties after the construction phase. This is limited to financial penalties or demolishing the development. Historically there was more urbanization control in the past but now rules for urban expansion doesn't exist, and political bias is the main driver in creating and updating land use plans.

4.5 Enforcement of design guidelines and construction standards for water infrastructure

› QUALITATIVE INDICATOR:

Technical standards and design guidelines define best practices for critical infrastructure

QUALITATIVE SCORE:

2.4

SUMMARY OF ROUNDTABLE DISCUSSION:

Standards and design guides exist for sector specific issues (i.e. road, electricity, and water) but there are no cross sectoral technical standards. Coordination between agencies during development is minimal leading to a cycle of destruction and rebuild between sectors. Efforts should be targeted to bring a proper level of coordination needed for an integrated planning and implementation. Infrastructure performance is not well measured, with no consideration of shocks and stresses. Design best practice is not developed, and short-term asset failure is common. In best case scenarios assets might built to a good standard but still lacks level of integration with other types of infrastructures. Guidelines are mostly technical statements and not practicable which leads to gaps in implementation. The guidelines and standards are highly technical, and uptake is limited to technical experts and is not accessible to the public.

4.6 Effective implementation of transparent and accountable decision-making

› QUALITATIVE INDICATOR:

Decision-making procedures around water resources management, water and wastewater services are made clear and open to all stakeholders

QUALITATIVE SCORE:

1.2

SUMMARY OF ROUNDTABLE DISCUSSION:

Water resource institutions have clear and defined roles and responsibilities but participation, dissemination, and compliance are poor. Some rules exist to hold individuals and organizations accountable for damage to infrastructure which are regularly enforced. There is no community participation in the decision making and planning process. Moreover, there is no information access for residents, reducing its use and credibility within the community. Regulatory bodies and developers historically had overlapping roles in Addis Ababa but have begun delineating responsibilities for different bodies. This process is not yet complete and in practice there are still overlaps in responsibility and conflict of interest that need improvement. For example, the environmental control authority decides areas to be developed and is responsible for controlling works. A development that could improve the decision-making process is the establishment of a new authority to coordinate infrastructure provision and work to ensure an integrated planning and implementation of works by different stakeholders.

5 ADAPTIVE AND INTEGRATED PLANNING

5.1 Active monitoring and evaluation of programmes

› QUALITATIVE INDICATOR:

Monitoring and evaluation mechanisms and frameworks measure how programmes have achieved intended outcomes and disseminate lessons learned

QUALITATIVE SCORE:

2.1

SUMMARY OF ROUNDTABLE DISCUSSION:

While some authorities have established frameworks for evaluation and monitoring and produce reports, this is not the case across the board. There is little continuity or organizational learning, though the city is in the process of setting up a feedback mechanism to log complaints in one central database. Where monitoring exists, this usually tracks the implementation of the plan, rather than how it contributes to city resilience. There is a need for updated methods and skillsets

5.2 Dissemination of accurate data

› QUALITATIVE INDICATOR:

Accurate data is used by key decision-makers in government, private sector and civil society to promote urban water resilience

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

Most agencies lack systems, technologies, resources and local expertise to use data to inform planning. This undermines long-term decision-making and evidence-based planning efforts. Where raw data is available, it is not analysed or shared.

Existing data does not meet industry standards or good practice in many cases. It is rarely cross-referenced, leading to differing figures and statistics. Data is available about location and size of water supply and sewerage assets, rather than lifecycle and performance. The location and size of drainage assets is incomplete. For water supply, there is little data on the links between the aquifers. The city also lacks reliable up-to-date data on wastewater generation levels and characterization.

There is a general lack of data-sharing policies on water related data (both raw and processed). AA Infrastructure Coordinating Office is responsible for coordination of utilities construction across agencies, but improvement is needed in implementation.

5.3 Incorporation of redundancy into water networks and assets

› QUALITATIVE INDICATOR (5.3A):

Redundancy exists in the networks and assets responsible for water supply, treatment, and sanitation

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

The infrastructure assets are ageing and causing leaking and faulty pipelines, exacerbating water shortages. There are also water system maintenance challenges: 36.5% of water is lost due to leakage and the two largest dams, which supply 60% of Addis Ababa's water have maintenance challenges.

Smaller scale infrastructure at the household levels such as rainwater harvesting tanks may help to improve redundancy.

› QUALITATIVE INDICATOR (5.3B):

Redundancy exists in the sources that supply water to the city

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

Water demand exceeds water availability. Water supply is highly dependent on surface water and the supply system was designed without taking redundancy into consideration which poses a high risk if failures or break downs occur. With current supply falling short of daily need, there is no redundancy in the system. There is a need to diversify water supply and the 10th Master Plan proposed ways to diversify water sources using rainwater harvesting and grey water recycling, however, implementation is lagging. In case of disaster, some parts of the city will have access to water supply while others won't.

5.4 Integrated planning with across interdependent urban systems

› QUALITATIVE INDICATOR:

Coordination exists between public sector water agencies, water utilities and organisations working in related domains such as energy, telecommunications, waste management and transportation

QUALITATIVE SCORE:

1.9

SUMMARY OF ROUNDTABLE DISCUSSION:

Coordination between agencies and utilities is not functioning as it should, despite the existence of some coordination mechanisms. In the case of utilities, one authority will dig in an area and another authority will dig in the same area the following week. AACRA has been working to develop regulations around permits for infrastructure development and maintenance, which should prevent duplicative efforts in the future.

5.5 Integrated planning with agriculture and food supply chains

› QUALITATIVE INDICATOR:

Coordination exists between water agencies and organisations involved in food supply and production

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

Coordination between water agencies largely focuses on domestic water supply, not on agriculture itself. Both urban farms on riverbanks as well as farmland further out the city use polluted water for irrigation – often due to a lack of alternatives. In the past sewerage lines have been blocked illegally to cause overflow, which is then redirected to farms.

There is limited data available on water requirements for food production, and there is no systematic approach to planning for urban agriculture.

5.6 Promotion of culture, processes and resources to enable innovation

› QUALITATIVE INDICATOR:

Resources and processes reinforce a culture of innovation within the water sector

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

Innovation in the water sector is largely absent outside policy discussions. There are no incentives or mechanisms to support businesses or research in the sector, such as tax incentives for water purifiers. One participant mentioned a new type of water meter that measures water use and leakage, and estimates tariffs. These ideas need to be encouraged further across the sector.

SUSTAINABLE FUNDING AND FINANCE

6.1 Promotion of integrity in contracting and financial decision-making procedures

› QUALITATIVE INDICATOR:

Financial procedures promote transparency, minimize risk and ensure that procurement processes are implemented fairly and efficiently

QUALITATIVE SCORE:

3.7

SUMMARY OF ROUNDTABLE DISCUSSION:

Financial procedures and laws are in place and there are transparent processes for bids. This includes a big committee who review the financial submission alongside a technical committee to review technical submissions. The overall accountability falls on the administrators. The mechanism for complaints on the procurement process includes the financial bureau. The success of the financial decision-making procedures are also based on quality and price. The process is generally long-winded (up to 90 days) and often there is a lack in breadth of knowledge in this area amongst staff.

6.2 Provision of sufficient financial resources for maintenance and upkeep of water infrastructure

› QUALITATIVE INDICATOR:

Adequate funding exists to maintain water and sanitation infrastructure and to support existing programmes

QUALITATIVE SCORE:

2.4

SUMMARY OF ROUNDTABLE DISCUSSION:

The financial resources are derived from a mix of public (tariff, city) and international loans and grants. With a rapidly growing city, the maintenance budget will become increasingly stretched. Foreign loans and grants take a timely to be come through and generally is funnelled towards new infrastructure. Shortages of foreign currency hinders the accessibility to new equipment and spare parts which are procured overseas.

6.3 Provision of sufficient financial resources for new water programmes and projects

› QUALITATIVE INDICATOR:

Adequate funding exists to finance new capital projects and programmes that support water resilience

QUALITATIVE SCORE:

2.1

SUMMARY OF ROUNDTABLE DISCUSSION:

The financial resources are made up of public (tariff and city) funding and international loans and grants. In terms of the water tariffs, these are low and not adequate for the costs involved in new construction and O&M. Tariffs in Addis Ababa are subsidized by the government. The city needs better prioritisation as there are substantial projects needing financial support, for instance the city is looking for alternative and additional water sources. Water often competes with other budgets such as housing. International loans can be dependent on approval for resources from Nile, a product of transboundary politics. Overall, the city is behind on performance of the national plan on WASH.

6.4 Water and sanitation pricing for cost recovery and demand management

› QUALITATIVE INDICATOR:

Water tariff systems are sustainable and equitable

QUALITATIVE SCORE:

1.9

SUMMARY OF ROUNDTABLE DISCUSSION:

The city operates with a block tariff system whereby the more water per capita used, the higher the tariff. However, the cost of water to the consumer is low as the tariff is subsidised by the government. The tariff is not adequate for cost of new constructions and O&M. Accessibility of water is poor and intermittent supply (once a week) is a common occurrence to many inhabitants in the city. There is a poverty penalty, where informal homes generally buy water from private water kiosks, which are more expensive.

INFRASTRUCTURE & ECOSYSTEMS

There is no institution at city level with a clear mandate for coordinating disaster risk management. Lacking technical capacity and funding to proactively model and assess level of risk and exposure from water hazards, the city is unable to take proactive measures to adapt to future risks. Most post disaster recovery funding is received from the federal government but there are challenges with receiving these funds in a timely manner and in sufficient amount. The city has not identified and does not engage with vulnerable communities to have efficient mechanisms to disburse recovery funds directly to such communities.

While water supply networks are mapped drainage and sanitation assets are not adequately mapped challenging proactive management and planning. A storm water master plan has been developed recently but is yet to be implemented and lacks integration of green infrastructure. Further coordinated action is required between agencies to mitigate cascading impacts like lack of solid waste management blocking drainage channels resulting in flooding which contaminates the water supply.

At present many key water assets risk failure due to poor O&M regimens. To address these risks asset maps, need to incorporate lifecycle information and donors and national governments need to integrate O&M costs while funding new infrastructure projects. Resources are also wasted due to poor coordination between agencies for example with roads, telecom and electricity departments damage water pipes during repairs. In addition, supply chain related risks need to mapped and communicated to national governments for support in addressing fluctuations, volatility and restrictions associated international purchases. The city also faces a shortage of staff skilled in operations. There is a need for vocational centres to provide more practical operations training to build capacity. Further, political appointment in management and leadership positions at agencies need to consider minimum levels of technical and management qualifications to advance capacity.

At present environmental resources are not well protected, there is no agency responsible for ground water management and over abstraction is not monitored. Surface water pollution and over abstraction is also not monitored or managed well. Efforts to protect aquatic life are considered second to protecting human health though these issues are linked. In recent years riverbank protection and restoration have garnered new interest but attention needs to be put in to create community buy-in and strong implementation and monitoring pathways for these projects to be successful. Further, standards for water use and disposal need to be created and widely communicated to users. Universities partnership can help create long term mechanisms for collecting quality data to support monitoring of environmental resources.

EFFECTIVE DISASTER RESPONSE AND RECOVERY

7.1 Comprehensive hazard monitoring, forecasting and early warning systems

› QUALITATIVE INDICATOR:

Monitoring, modelling and early warning systems mitigate hazard risks

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

The city disaster management focuses more on reactive approaches after disasters happen and the city does not have a comprehensive disaster risk assessment, risk profile, modelling or plans in place currently. There is a poor legal and institutional arrangement for disaster response and recovery, with the lack of a city-wide disaster risk management policy noted as a particular gap in capacity. There is no baseline data for monitoring, forecasting and early warning. Primary causes for this are lack of resources, insufficient funding and lack of trained manpower. Recommendations for further action include improved mapping of city environs and potential risks, specification of survey to understand areas of greatest need and the improvement of communications between governmental actors.

7.2 Coordination of disaster response and recovery preparation

› QUALITATIVE INDICATOR:

Disaster Response and recovery coordination plans and procedures are current, collaborative, well-rehearsed and properly funded

QUALITATIVE SCORE:

1.1

SUMMARY OF ROUNDTABLE DISCUSSION:

The city lacks institutional arrangements for coordinating disaster response and recovery. There is no pre-planned, coordinated committee that has an emergency operation centre which is responsible for monitoring, coordination, and planning of disasters. Monitoring of hazards is not present in Addis Ababa and there are no beforehand indicators of the hazard or disaster risk. There is a management capacity gap not only on the disaster response committee but also on the supply chain. As with indicator 7.1, the primary causes are scarce funding and technical capacity.

7.3 Ensuring adequate funds to government for disaster recovery

› QUALITATIVE INDICATOR:

Public authorities have access to funds for disaster recovery

QUALITATIVE SCORE:

2.0

SUMMARY OF ROUNDTABLE DISCUSSION:

City authorities do have access to federal funding for disaster recovery but this is not sufficient for Addis Ababa. The city disaster risk management commissions fund is entirely based on the city government's budget and federal government disaster risk management commission. In addition, the timeliness of the receiving the funds is an issue. There is almost no coordination between the city government and federal ministries around this issue. Authorizing increased funding and capacity in this field would help the city better cope with disaster recovery.

7.4 Ensuring adequate financial resources for recovery of households and businesses

› QUALITATIVE INDICATOR:

Households and businesses have access to sufficient financial resources for recovery and continuity following shock events or persistent stresses

QUALITATIVE SCORE:

1.5

SUMMARY OF ROUNDTABLE DISCUSSION:

Financial resources exist and are available to some cases, but it is not sufficient and in the case that government funds for disaster relief are available, they usually dispersed very late after the event. Accessing funds is an issue for households and businesses, and there is little understanding from the federal side about where funds are needed most. There is a need to differentiate stakeholders by level of support required during recovery as well as take a macro view to understand the cost of the disaster and recovery so that funds can be properly allocated.

7.5 Promotion of community capacity for preparedness response to water hazards

› QUALITATIVE INDICATOR:

Mechanisms promote community preparedness for water-related shocks and stresses

QUALITATIVE SCORE:

1.0

SUMMARY OF ROUNDTABLE DISCUSSION:

There are no mechanisms in place to identify individuals or groups at increased exposure to water related risks in the city. These vulnerable groups are not identified and there is a lack of communication between the city authorities and residents. Local communities are not usually engaged in planning, implementation or response to water hazards. The city lacks sufficient resources in terms of manpower, technical capacity, and funding. Engaging residents and community groups in planning for water hazards would raise awareness of the issues facing the city.

8 EFFECTIVE ASSET MANAGEMENT

8.1 Active monitoring and evaluation of water infrastructure

› QUALITATIVE INDICATOR:

Monitoring and evaluation of water infrastructure and networks ensure data is current and accurate

QUALITATIVE SCORE:

2.0

SUMMARY OF ROUNDTABLE DISCUSSION:

The city's water and sewer assets are mapped including size, location, fittings and there is monitoring of water supply infrastructure. Data is updated as new developments are built and is generally about location and size of assets, rather than the lifecycle of the assets. The Addis Ababa Infrastructure Coordinating Office meets every 2 weeks to discuss coordination of infrastructure schemes. A water masterplan exists for the city however the translation to implementation on the ground is challenging due to coordination and space constraints. The drainage assets are not mapped comprehensively.

8.2 Ensuring adequate human capacity for operation and implementation

› QUALITATIVE INDICATOR:

Technical and managerial staff are trained and knowledgeable in areas related to operation of key infrastructure and project implementation

QUALITATIVE SCORE:

2.4

SUMMARY OF ROUNDTABLE DISCUSSION:

Qualified professionals with experience in operations and maintenance is lacking at city agencies. Some city institutions like AAWSA have their own training programs and a number of the vocational training centres exist but the curriculum is theoretical lacking much needed practical operational training. In addition, appointments to leadership positions at most city agencies are politically influenced and technical qualifications are not duly considered. Leadership positions also see high turnover and without succession planning adversely impact agency performance and result in loss of institutional knowledge.

8.3 Promotion of diverse infrastructure for flood protection

› QUALITATIVE INDICATOR:

'Grey' and 'green' infrastructure provide protection from flooding and ensure adequate urban drainage

QUALITATIVE SCORE:

1.6

SUMMARY OF ROUNDTABLE DISCUSSION:

The storm water master plan exists but there is not much green infrastructure integration in the plan and it is not implemented yet. At present only 17% of the city is covered by a drainage network, this infrastructure is not well designed and is highly undersized resulting in regular flooding during the rainy season. In addition, poor solid waste management results in blocked drainage compromising existing infrastructure capacity. Flood waters contaminate supply and result in annual cholera outbreaks. These linked issues between poor drainage, lack of solid waste management and water supply contamination need coordinated action between departments. Further, there are many informal settlements along the riverbank but the Addis Ababa River Development Plan needs to consider relocation in a manner that does not disadvantage communities.

8.4 Routine maintenance and upgrade of water infrastructure

› QUALITATIVE INDICATOR:

Existing infrastructure is regularly maintained and upgraded to reduce likelihood of failure

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

The city does not have an asset information management system in place to maintain its water infrastructure in a proactive manner. In addition, sound technical knowledge for O&M is lacking among staff and there is a shortage of skilled operations staff. A number of key water assets like the 2 largest dams (supplying 60% of the city's water) have water outlets silting up and spillways at risk of collapse. In addition, catchments are degraded (particularly due to grassland changing to agriculture) resulting in siltation at reservoirs. Resources are also wasted due to lack of coordination between roads, telecom, electricity departments damaging pipes during construction or maintenance operations. In addition, aging and poorly maintained infrastructure results in high non-revenue water (~30%) due to leakage issues. Funders and government continue to favour funding new infrastructure without considering full lifecycle costs rather than funding improvements and repairs to existing infrastructure. These factors are negatively influencing behaviour of asset owners.

8.5 Promotion of reliable supply chains for water infrastructure

› QUALITATIVE INDICATOR:

Supply chain for key water and sanitation infrastructure are reliable during normal conditions and in the face of shocks and stresses

QUALITATIVE SCORE:

2.2

SUMMARY OF ROUNDTABLE DISCUSSION:

Several supply chains products are dependent on international markets, for these products' currency fluctuations and market volatility drive prices up making managing costs challenging. In addition, long wait times challenge prudent repairs and replacements of international products and new technologies are not often affordable. Further, Chinese loans stipulate buying of Chinese products which are sometimes substandard. National governments should play a role in helping address these international supply chain challenges and city government should map their supply chain risks to better communicate needs to national governments.

PROTECTED NATURAL ENVIRONMENTS

9.1 Active monitoring and evaluation of environmental resources

› QUALITATIVE INDICATOR (9.1A):

Environmental monitoring is conducted to assess the quality of water used for human consumption

QUALITATIVE SCORE:

2.6

SUMMARY OF ROUNDTABLE DISCUSSION:

Data and standards exists but they are not accurate, timely or properly disseminated. The problem is not with the existence of standards, but instead with the management and enforcement. There are problems in properly providing quality services, quality check-up and issues related to wastage (i.e., leakage). There is major lack of awareness when it comes to the quality of water from source to household with citizens unaware of the water quality they are consuming. Much of the environmental monitoring data is from very few sources (UN Habitat), this should be developed and localised. Universities should be working on becoming centres of excellence for data collection, with research and development department working with city administration offices to solve issues related with out-of-date data. Standardisation of data quality as well as quality assurance should be developed.

› QUALITATIVE INDICATOR (9.1B):

Environmental monitoring is conducted to assess the health of environmental systems

QUALITATIVE SCORE:

1.2

SUMMARY OF ROUNDTABLE DISCUSSION:

The terminology is very new and there is doubt that the government took it under consideration to collect data or make standards and policies related to healthy ecosystem. Impact assessment doesn't exist at all in Addis Ababa. Investment permits should be given after careful analysis of the impact it has on water supply and downstream. When talking about quality, we can analyse it based on different standards which could be from WHO or our own standards, data standardisation and bringing local standards into line with international norms would enable improved monitoring.

9.2 Promotion of sustainable commercial and industrial water use

› QUALITATIVE INDICATOR:

Mechanisms encourage sustainable water use for commercial and industrial users

QUALITATIVE SCORE:

2.5

SUMMARY OF ROUNDTABLE DISCUSSION:

There are no standards for water use, and currently the focus on water use is management through cost regulation. There are some specified water uses for industrial, domestic, emergency services (i.e., firefighting) . The requirements are determined per sector and losses and demands are used for forecasting purposes. However, efficiency of use is not monitored or enforced it is only used for planning purposes.

9.3 Promotion of sustainable household water use

› QUALITATIVE INDICATOR:

Mechanisms promote sustainable water use for households

QUALITATIVE SCORE:

2.4

SUMMARY OF ROUNDTABLE DISCUSSION:

The water supply is not as available to households as it is to commercial users, as bulk of cost is covered by industrial users, which leads to insufficient attention to households. Household users are the most appropriate users because of the lack in supply. It is not imaginable to wastewater when it is only supplied once a week. There is a media-based awareness campaign which explains financial incentives associated with supply and usage, but this is still not widely understood. Addis Ababa should work on technologies to minimize water usage. Proper and effective resource planning should be exercised, including end users avoiding the current top-down approach used now. Due to the lack of consistent water supply, citizens store water whenever it's available, potentially endangering their health.

9.4 Protection of aquatic habitats and ecosystems

› QUALITATIVE INDICATOR:

Policies and programs protect aquatic habitats and ecosystems

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

Generally, the effort to protect aquatic habitat is poor, as a nation and even as a city, issues around human health are not yet fully managed so protecting the natural environment is seen to be a lesser priority. Policies around pollution exist, with some examples of river side projects demonstrating this is becoming a priority for the city, however developing the existing legislation has taken years. Existing policies are not helping with the problems at hand as poor implementation means that infractions are not punished and destruction to the ecosystem continues.

9.5 Protection of groundwater and surface water resources

› QUALITATIVE INDICATOR (9.5A):

Protections exist to prevent over-abstraction and eliminate pollution of surface water source

QUALITATIVE SCORE:

1.2

SUMMARY OF ROUNDTABLE DISCUSSION:

The responsible bodies are not taking action around over abstraction and pollution of surface water sources. The issues are acknowledged but there is little action to remedy this. Surface water pollution is neglected even though it is visibly impacted by industry within the city. Political stagnation means that action to change this is left in development as the holders of political office change.

› QUALITATIVE INDICATOR (9.5B):

Protections exist to prevent over-abstraction/over-withdrawal and elimination pollution of groundwater sources

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

Improper waste disposal is affecting groundwater, but formal assessment has not been undertaken for this issue. Responsibility for managing ground water has not been owned by an agency and currently there are no controls or oversight around over abstraction of groundwater.

HEALTH & WELLBEING

Access to safely managed water services in Addis Ababa is low, at 58%. Demand for water has long exceeded availability, the result of an aging and limited water supply system, lack of water storage and a rapidly growing population. In addition, economic growth, and the construction boom as well as a rising population heavily affect Addis Ababa's ability to supply all its residents with safely managed water. Drinking water quality is generally perceived as low, which some residents attribute to the low price of water. The water tariff is highly subsidised as AAWSA sells water at 2.4 birr/m^3 which covers only 15% of the production cost (10 – 15 birr/m^3), burdening the financial sustainability and investment capacity of the utility. While tariffs are low, the upfront price to connect to the network is high.

Following the lack of supply, industries and commercial businesses are encouraged to establish independent supply schemes (mainly boreholes) to secure their water demands. Uncontrolled drilling is a risk to the sustainability of the groundwater aquifer. With growing industrial and commercial water consumption, wastewater discharges and downstream pollution are also increasing. Water reuse is not common to meet industrial non-potable water demand.

Only 29% of households are estimated to be connected to the city's sewer system with offsite wastewater treatments, while 51% of households use onsite sanitation facilities and the remaining 20% have no choice but to defecate openly. Access to safely managed services is highly dependent on the household income, with high income groups having excellent services because they can cover costs of the construction of septic tanks and regular emptying or live in a house that is connected to the public sewerage system. The sanitation situation is worst in low-income communities where households struggle to find sufficient space to construct a sanitation facility, preventing them from practising sufficient personal hygiene. This poses multiple public health risks such as outbreaks of water-borne diseases and the prevention of viruses spreading. While a wide variety of health services are provided, quality is generally considered poor especially outside private clinics.

Water is rarely considered as an element of urban place-making. Restoration of rivers and watercourses is beginning to emerge in city plans, but there is little consistent support across all agencies and sectors. Riverfronts are not a desired place to live given the pollution and risk of flooding, resulting in the poorest settlements being located near rivers. While land use regulations exist and high-risk areas are identified at the planning stage, settlements still develop in these areas due to a shortage of available and affordable space. Comprehensive policies and regulations exist that protect people from being displaced or resettled, however, enforcement is lacking and decisions around resettlement are often taken with little consultation of the affected communities.

Small components of blue and green infrastructure can be found in some larger hotels and private developments but are not widely accessible across neighbourhoods. While regulations indicate that 30% of developments in Addis Ababa should be a form of green infrastructure, this target is far from being met nor widely enforced. Some attribute this to the lack of incentives for developers to implement blue green infrastructure, as well as a general lack of awareness of its benefits.

10 PROTECTED NATURAL ENVIRONMENTS

10.1 Provision of safe water for personal and domestic use

› QUALITATIVE INDICATOR:

All people have access to sufficient, safe, accessible and affordable water for personal and domestic use

QUALITATIVE SCORE:

1.9

SUMMARY OF ROUNDTABLE DISCUSSION:

Access to safely managed water services is low in Addis Ababa with only 58%. Large parts of the population receive water irregular sometimes not for weeks. AAWSA rations their water supply as demand exceeds availability. According to information provided the rationing schedule is designed according to criteria that ensure non-discrimination. Addis Ababa has long suffered with water shortages, the result of an aging and limited water supply system, lack of water storage and a rapidly growing population. In addition, economic growth, and the construction boom as well as a rising population heavily affect Addis Ababa's ability to supply all its residents with safely managed water. Drinking water quality is generally perceived as low. Residents believe that the water quality is low because people pay a low price for water. Since people believe that water from the network is not safe for consumption and storing water at home is common and may lead to contamination households who can afford it buy bottled water for drinking.

In general demand for water exceeds supply. The water tariff is highly subsidised as AAWSA sells water at 2.4 birr/m^3 which covers only 15% of the production cost (10 – 15 birr/m^3). The low tariff puts a burden on AAWSA as it does not allow the utility to cover operation and maintenance cost and therefore improve service provision. Although there is a clear policy on cost recovery in the sector, tariffs remain below. AAWSA needs to raise the tariffs to ensure its financial sustainability and improve revenue collection (collection efficiency is low). Affordability is not considered as a major concern but increasing the water tariff may cause a financial burden particularly on poor households. Although significant progress has been made in increasing access to water over the last decade, water quality remains a concern and recurrent droughts, floods and rising temperatures make it more difficult to manage water resources effectively and to ensure continuous supply.

The provision of adequate water supply has far reaching impacts beyond the residents in the city. On participant stressed the importance to also look at irrigation needs of small-scale farmers in the basin as they tend to be overlooked but are highly impacted by water scarcity.

10.2 Provision of sanitation services

› QUALITATIVE INDICATOR:

All people have access to sanitation that is safe, hygienic, secure, affordable, and socially and culturally acceptable

QUALITATIVE SCORE:

2.0

SUMMARY OF ROUNDTABLE DISCUSSION:

Sanitation provision in Addis Ababa is grossly deficient. It is estimated that only 29% of households in Addis are connected the city's sewer system with wastewater being treated offsite. Wastewater treatment plants are currently operating under design capacity as less wastewater than planned for reaches the treatment facilities. It is estimated that 51% of the households use onsite sanitation facilities with some of them being emptied through suction trucks. Emptying services provided by these trucks currently cost around 400 birr per load. Approximately 20% of the Addis Ababa's residents do not have access to any sanitation facility and therefore defecate openly. A large majority of pit latrines, which is the most common type of sanitation facility used in Addis Ababa, discharge into open drains or the environment without adequate treatment. Besides not having access to a safe sanitation facility most poor households also lack access to shower facilities. The sanitation situation is worst in low-income and slum communities where households struggle to find sufficient space to construct a sanitation facility. In high- and medium-income areas the sanitation situation is generally considered good with households having access to safely managed services. Public toilets are not common and pit latrines are often shared between several households. The scarcity of water in the city leads to insufficient personal hygiene particularly in low-income communities.

10.3 Universal affordability of water and sanitation services

› QUALITATIVE INDICATOR (10.3A):

Safe water for consumption is made affordable for all users

QUALITATIVE SCORE:

2.4

QUALITATIVE SCORE:

In general water provided through the public water supply system is provided at an affordable price. However, the price to connect to the network is high and needs to be paid upfront and hinders households to obtain a house connection resulting them relying on public water fountains or other sources of water. High installation and construction cost for domestic connections are the result of high material cost as most of the materials have to be imported and are not produced in the country. Households that do not have land ownership or cannot provide proof through a certificate are not eligible to obtain their own water connection which limits access in informal areas or for people who rent their homes.

› QUALITATIVE INDICATOR (10.3B):

Safely managed sanitation services are made affordable to all users

QUALITATIVE SCORE:

1.7

SUMMARY OF ROUNDTABLE DISCUSSION:

Access to safely managed sanitation services is low in Addis Ababa. AAWSA does not perceive it as its responsibility to provide access to onsite sanitation facilities. Households are responsible to construct, operate and maintain onsite sanitation facilities if they are not connected to the public sewer system. Most households in high-density, low-income areas do not have access to improved sanitation facilities let alone safely managed sanitation services. Personal hygiene practices are a problem in certain areas particularly for poor households but also vary according to different "lifestyles". Access to safely managed services is highly dependent on the income of the household with high income groups having excellent services because they are able to pay for the construction of septic tanks and regular emptying or live in a house that is connected to the public sewerage system. Due to the lack of individual sanitation facilities and low access, the government is taking out loans to construct public (shared) toilet blocks. AAWSA constructed more than 300 of these toilet blocks over the last years but the government has taken on that responsibility. The operation and maintenance of these toilet blocks is a challenge but can generate income and jobs due to the necessity of having care takers / operators. There is a general concern that rich households that are connected to the sewer system do not pay much to dispose of their waste as the sewage tariff is dependent on the water tariff which is considered low.

10.4 Provision of health services to reduce trauma from water hazards

› QUALITATIVE INDICATOR:

High quality health services are made available to residents to reduce impacts from water-related shocks and stresses, including water-borne diseases

QUALITATIVE SCORE:

2.4

SUMMARY OF ROUNDTABLE DISCUSSION:

A wide variety of health services are provided in Addis although quality of services is generally considered poor with the need for improvement highlighted by the participants. The system depends on high-income patients who visit private clinics and external funds / subsidies to be provided to cover the population with primary services. High quality equipment is often lacking and general performance regarding treatments given is low. In times of crisis the health care system is easily overwhelmed and fails.

HEALTHY URBAN SPACES

11.1 Application of water sensitive design principles to buildings

› QUALITATIVE INDICATOR:

Design principles are promoted to improve water performance for buildings

QUALITATIVE SCORE:

2.0

SUMMARY OF ROUNDTABLE DISCUSSION:

While some principles on water sensitive design for buildings exist, policies are rarely implemented and monitored. Policies also do not address retrofitting of existing buildings. Guidance on water use limitations is largely absent, leading to frequent over-use. Water efficient buildings are taxed at the same rate as non-efficient ones, reducing the incentive to opt for water sensitive design. Rainwater harvesting is not widely practiced or encouraged. To bring communities on board and encourage lasting behaviour change, the approach should be more participatory rather than top down.

11.2 Introduction and enhancement of water-sensitive urban design

› QUALITATIVE INDICATOR:

Water is incorporated as a design element in urban place-making

QUALITATIVE SCORE:

1.9

SUMMARY OF ROUNDTABLE DISCUSSION:

Urban designs rarely consider water as an element of place-making. Some new private developments with water features and public amenities such as fountains exist, but these are not accessible to the wider public. Restoration of rivers, watercourses and lakes is now considered in plans but there is little consistent support across all agencies and sectors.

11.3 Promotion of water-sensitive urban land development

› QUALITATIVE INDICATOR:

Water is incorporated as a key consideration in land-use planning and development

QUALITATIVE SCORE:

2.5

SUMMARY OF ROUNDTABLE DISCUSSION:

Neither water nor green infrastructure is adequately incorporated into land use planning. While land use regulations exist and high-risk areas are identified at the planning stage, settlements still develop in these areas due to lack of available and affordable space. Riverfronts are not a desired place to live given the pollution and risk of flooding, resulting in the poorest settlements being located near rivers. There are no incentives provided to developers to encourage water sensitive development.

As riverbanks are widely occupied by informal settlements practicing urban agriculture, coupled with the lack of adequate sanitation, this has led to erosion and transformed the city's rivers into open sewers.

11.4 Introduction and enhancement of neighbourhood blue-green infrastructure

› QUALITATIVE INDICATOR:

Blue and green infrastructure is adopted in neighbourhoods

QUALITATIVE SCORE:

1.8

SUMMARY OF ROUNDTABLE DISCUSSION:

Some larger hotels and private developments have blue-green infrastructure, is it not widely accessible and not practiced across neighbourhoods in the city. While regulations state that 30% of developments in Addis Ababa should be a form of green infrastructure, this is not implemented or enforced.
A lack of awareness around the benefits of blue and green infrastructure, such as green roofs and rain gardens, is also exacerbating the issue. Urban agriculture is on the rise, and should be further encouraged through the city's green infrastructure plan.
Policies around drainage, and especially grey-green-blue infrastructure are not widely used or in development. Flooding due to stormwater is an issue with blockages in river corridors an issue. The current system for stormwater drainage was described as "undersized" and "under-designed.

- *It's hard to say water sensitive design is not there but it's definitely very low.*
- *When buildings are designed, they usually don't consider how to get water supply.*
- *On some situations the topography of the land might even need pumps to get water to the top floor but it won't be an issue during the design.*
- *Additionally, ground water supply won't be considered during the design.*

12 PROTECTED NATURAL ENVIRONMENTS

12.1 Protections around climate-related displacement

› QUALITATIVE INDICATOR:

Policies exist that protect vulnerable populations from displacement as a result of water-related shocks and stresses

QUALITATIVE SCORE:

2.9

SUMMARY OF ROUNDTABLE DISCUSSION:

Comprehensive policies and regulations exist that protect people from being displaced or resettled, however, enforcement is lacking. If communities need to be resettled decisions are taken by government with limited involvement or consultation of the affected communities or the public. Stakeholder coordination is lacking which does not help in ensuring a fair and bearable implementation for affected households.

12.2 Provision of sufficient water quality and quantity for industry and commerce

› QUALITATIVE INDICATOR:

Businesses and industry have access to sufficient water of appropriate quality

QUALITATIVE SCORE:

2.1

SUMMARY OF ROUNDTABLE DISCUSSION:

Growth in economic activities has led to an even further increasing demand for water beyond population growth and increasing living standards. In Addis Ababa the construction boom including the expansion of condominiums and real estate housing developments, the expansion of manufacturing and service sector establishments that has occurred during the last decade, and the significant increase in its population that is expected to occur in the coming years presupposes a sustainable water supply planning and management. As water resources are susceptible not only to these pressures but also to impacts of climate change; environmental managers, urban planners and policy makers need to find solutions for climate change and urban development impact and alternative water sources for the existing and future pressures. AAWSA has the responsibility to provide water to all residents as well as industries and businesses that are located within its service area but due to limited availability of water it failed to meet the demand. Therefore, AAWSA is encouraging industries and commercial businesses to establish independent supply schemes (mainly boreholes) to secure their water demands. With growing industrial and commercial water consumption also wastewater discharges and pollutions downstream are increasing. The reuse of used water is not common to meet industrial non-potable water demand. The uncontrolled drilling is posing a massive risk for the sustainability of the groundwater aquifer and untreated wastewater is threatening precious ecosystems and water use downstream.

12.3 Support for livelihoods around water - N/A

12.4 Support for improved mobility through water-based transportation - N/A

3

CHALLENGES AND OPPORTUNITIES

Challenges describes the approach taken to move from the assessment results to identifying a series of cross-cutting challenges emerging from the analysis. It describes how stakeholders were involved in reviewing, prioritizing and shaping these challenges in preparation for the visioning and opportunities workshop.

Opportunities describes the process of moving from challenges to opportunities. Participants came together for an interactive on-line 'Visioning Workshop' during which groups refined the challenges, then re-framed these to generate and develop a range of opportunities for a water resilient Addis Ababa.

The project team developed ten problem statements based on analysis of qualitative indicators. From these, stakeholders identified nine problem statements to address during the Vision Workshop.

1	Water Access for Businesses	How can the City partner with businesses and industries to manage their water demand, incentivize sustainable water use, and encourage investment in water resilience?
2	Water Access for All	How can the City provide accessible, affordable, safe water for all and improve quality and continuity of service?
3	Pollution of Watercourses	How can the City improve the management of solid waste and wastewater to reduce sewer blockages, protect watercourses, and reduce vulnerability of neighbouring informal settlements to flooding and polluted water?
4	Security of Water Supply	How can the City maintain and improve security of their water supply with urbanisation and climate change?
5	Structure Plan Implementation	How can the Structure Plan better integrate local knowledge, cultural values and the regional context to gain citizen and stakeholder support for implementation?
6	Data Collection and Sharing	How can we ensure water resilience data is high quality, actionable, accessible by all and shared between stakeholders?
7	Regulation Enforcement	How can the City ensure that laws, regulations, and standards are visible and adequate enforcement is in place?
8	Infrastructure Resilience	How can the City improve the resilience of its infrastructure from failure and external shocks and stresses?
9	Sustainable Sanitation	How can the City invest in sustainable sanitation to protect human health during the COVID-19 outbreak and beyond, and reduce the impact on the environment and the local economy?
10	Stormwater Management	How can we improve awareness, acceptance and implementation of grey-green-blue solutions to improve stormwater management?

SUMMARY TABLE

CHALLENGE	OPPORTUNITY	AREA OF OVERLAP
Water Access for Businesses	Promote water-sensitive behavior and ensure sustainable water use and access for high water demand businesses and organizations.	*Overlap with Security of Supply*
Water Access for All	Improve safe and reliable access to water for marginalized communities and vulnerable groups.	
Pollution of Watercourses	Target both the formal and informal education to build socioeconomic transformation, positive culture and conscious towards water source protection, development, environmental sensitivity and sustainability.	
Security of Water Supply	Build a coalition between Addis Ababa City Administration, Oromia Regional State and Finfine Surrounding Oromia Special Zone and strengthen local stakeholder groups to develop and implement Integrated Water Resource Management Plan and inter-regional water resilience program.	
Structure Plan Implementation	City to strengthen and develop cross sectoral agency to encourage integrated planning and collaboration between institutions to better facilitate the implementation of the structure plan.	
Data Collection and Sharing	Ensure access to reliable and up to date data in urban water resilience work across Addis Ababa.	
Infrastructure Resilience	Develop the use of 'Smart' data systems for assessing Water Loss including leakage monitoring and management of Non-Revenue Water, as well as integrating a payment system to improve financial sustainability of the water system in Addis Ababa.	*Overlap with Data Collection and Sharing*
Sustainable Sanitation	Develop a sanitation information system to support policymakers, service providers and funders to improve decision making, planning, monitoring and implementation.	*Overlap with Sustainable Sanitation*
Stormwater Management	Develop and implement the widespread use of green-blue infrastructure through education (training), revision of city policies and programs to support sustainable stormwater management.	

1. Water Access for Businesses

CHALLENGE QUESTION

How can the city partner with businesses and industries to manage their water demand, incentivize sustainable water use, and encourage investment in water resilience?

BACKGROUND TO THE CHALLENGE STATEMENT

The current condition of water distribution is greatly affected by the large industries and organizations that consume a considerable amount of water from the city. These existing businesses need a large water amount to operate so their consumption decreases the overall provision rate and on top of that if we add the 40% leakage from faulty pipes then we can clearly see how low the water provision system is in the city.

Rapid urbanization is severely increasing the water demand in the city. Let alone for business, even the existing city dwellers does not have a sufficient access to water but again the increasing demand is a headache to both the community and the responsible authorities.

Unplanned settlement patterns and have polluted the majority of the rivers in the city. This created a severe environmental degradation in the inner cities. Additionally, uncontrolled sewage and industrial discharges are so common that it's difficult to even ask if there is any law regarding the issue. Responsible authorities do not have the institutional capacity to bring this large-scale chaos in order.

Furthermore, the city's ground water reserve is for emergency only. But there are various private boreholes here and there, and the more people dig their own source the faster the ground water reserve going to disappear. For this reason it is not advisable to use ground water reserve for business and other uses because it may lead to excessive extraction.

SUMMARY OF THE OPPORTUNITY

Need

A national vision, an integrated water resource management plan, and political commitment are critical to address water resilience issues for water access for businesses.

Root Cause and Opportunity

- Develop efficient and evidence-based data for planning.
- Livelihood of communities should be transferred to off farming activities. This will open new opportunities than the traditional way of income generation and better their earnings.
- Improve efficiency of water use. This can be done with awareness creation campaigns and such.
- Instead of only focusing on the supply side, demand driven water provision system needs to be implemented.
- Incentive and disincentive for water users. Good practices will be acknowledged and awarded.
- The tariff structure needs to be improved to minimize water misuse and high consumption (Especially for large factories and industries).
- Control deforestation and land clearance. Incentives for afforestation practices need to be provided.
- Address land use, land cover, degradation issues. Surface protection works need to be done.

1. Water Access for Businesses

- Discharge water quality improvement should be a big focus. (Source protection).
- Better settlement patterns and land use planning for water flow and quality (Usually riverside settlements are the main causes for river pollution in Addis Ababa).
- Technological innovations for treatment and discharge.
- Locally adopted technologies need to be worked on to minimize import costs.
- Have a national vision and national water plan.
- Policy and decision making should be clear and systematic.
- Capacity building of expertise to address gaps and improve overall skillset.
- Political commitment should be worked on. Integrated approaches need to be practiced.
- Environmentally friendly technologies need to be adapted.
- Perform cost and benefit analysis and set appropriate tariffs.
- Identifying bankable projects for water storage capacity.
- Invest in efficiency technologies.
- Perform sufficient studies to reduce and repair leaking pipes.
- Make sure funds are properly put to the intended purpose (corruption and misuse need to be eliminated)
- Stakeholder engagement in the decision-making process will create a better understanding.
- Coordination between institutions need to be strengthened.

Related Indicators

Incorporation of social, environmental and economic costs and benefits into decision making.

Effective implementation of transparent and accountable decision-making processes.

Ensuring adequate financial resources for recovery of households and businesses.

Promotion of sustainable commercial and industrial water use.

Provision of sufficient water quality and quantity for industry and commerce.

Relevant assets and resources

- Improved political environment.
- Evidence based research and studies about the problems need to be done. This information will be used as a baseline for the plan.
- Policy wise there needs to be a responsible authority that controls and governs the overall process.
- Additionally, clarity of the plan needs to be assured. Unresolved issues should be cleared out before the work begin and the final scheme should be available to the community and all other interested bodies.

Outcomes

After and during the process of improvement, the main issues that will be addressed are:

- Social
- Governance
- Environmental

Key actors

Lead Organization(s)

- Responsible governmental authorities, community, funders, business leaders and various academics.

Partners

- NGOs and CSOs will be partners in the process. These organizations will support the movement in various ways.

Approval

- Academics, donors, governmental authorities

1. Water Access for Businesses

Approximate Cost

Medium - The cost will not be low because of the various parameters that need improvement. The skill training and awareness creation parts will not take that much from the budget but the advancement of efficient technologies and software will definitely cost a considerable amount. Policy changes and various incentives can help lower the overall costs.

Indicators of Success

The whole process can take up to 7 years. This will be divided in to three parts. Short (2years), medium (3 – 5 years) and long-term plans.

Other Commentary

The scale of the plan consists of all the community, city and catchment areas. This is mainly because it cannot be limited to a specific part, it is a correlated process.

NEXT STEPS

Short

- This plan is for the first two years.
- Stakeholder discussions about the process and their engagement strategies should take place during the first phase. This will allow a clear task division and also solve legal issues with governmental authorities.
- Problem analysis integrated vision.
- Understanding the root cause in order to have a well-defined strategy to tackle it. This can be done using a Problem Analysis.
- Integrated vision.
- Media coverage and Communication.

Medium

- Fundraising, resources
- Continued stakeholder engagement
- Bankable projects

Long

- Implementation, Addressing issues
- Enforcement
- Adaptive management

2. Water Access

CHALLENGE QUESTION

How can we ensure accessible, affordable, safe water and sanitation for all, as well as sustainable and secured water supply?

BACKGROUND TO THE CHALLENGE STATEMENT

Accessibility: Water and sanitation is not accessible to all residents of the city and even those connected get drinking water only three days a week. Water supply coverage is 80% and sewer system connection is only 17%. Per capita water supply is also 40 L/day, which is very low relative to a standard per capita daily water demand of around 110 L/day.

As there is a lack of access for affordable serviced land in the city through formal channels there is an increasing number of households that are buying land informally from farmers in outlying areas. Thus, informal (untenured and self-initiated) housing, also known as Chereka Bet, is a significant source of housing for many in Addis Ababa. Since informal housing is built on any available and unused land, most residents live in environmentally sensitive and unsafe, overcrowded areas. The lack of tenure recognition also limits residents' ability to get drinking water and safe sanitation connection.

Supply security and sustainability: water sources are not secured as the sources lie outside the city boundary and there is a political boundary between Addis Ababa and Surrounding Oromia Special Zone, where the treatment systems are located.

Although the 10th Addis Ababa City Master Plan proposed ways of diversifying water sources such as harvesting rainwater and reusing grey water, its implementation is slow, and the city is relying solely on the treatment plants and boreholes supply.

Watershed protection practice is also weak, and as a result of this and climate change, ground water depletion is of growing concern.

Water quality is a problem. Sometimes poor quality and discoloured water runs through taps and is not to potable water standards.

Affordability: adequate water is not affordable for every citizen. Connection costs are expensive, especially for low-income families. As a result, they are paying 30 birr per cubic metre to purchase water from individual vendor. It is noted that institutions with high consumptions are paying less for water usage.

SUMMARY OF THE OPPORTUNITY

Social

- The is a lack of public awareness of water availability issues.
- Mismanagement of water – potable water is used where non-potable could be utilised.

Environmental

- Tenure of ownership a requirement for water connection. Many families living in untenured and informal housing are unable to get a water connection.
- Water is available but water courses are polluted.

Technological

- There is a lack of metering to help manage water resources.
- Low quality water meters and poor metering information.
- Lack of zoning of District Metering Areas (DMAs) for sub-metering and quantification of water use.
- Low maintenance of the water network resulting in high leakage rates.

2. Water Access

- Leakage is an issue – lack of proper leakage detection to detect and identify leakage within the network.

Political and Governance issues

- There has been historic investment in ground water resources rather than surface water sources (groundwater has not produced the yields expected).
- Poor data on population and water use.

Financial causes

- The high cost of bottled water – only within reach of the wealthy.
- Those without a water connection are required to use common water points.

Other

- Intermittent power cuts affect water delivery.

Related Indicators

6.4 Water sanitation pricing for cost recovery and demand management

9.3 Promotion of sustainable household water use

10.1 Provision of safe water for personal and domestic use

10.3a Universal affordability of water and sanitation services

Relevant assets and resources

-

Outcomes

- Universal access to the water network would result in a more equitable system
- Access to water would lead to more positive public health outcomes

Key actors

Lead Organization(s)

- AAWSA
- City Authorities

Partners

- World Bank
- WRI
- JICA
- Sovereign Funds
- African Development Bank
- Federal Government

Approval

- Local Partners, e.g. Environmental Protection and Green Development Commission, Ministry of Water

Approximate Cost

Medium to High

2. Water Access

Indicators of Success

Accessibility indicators:

- Population served (%)
- Water quality (WHO parameters)
- Adequate water availability (volume, Litre)
- Availability of service and intermittency (Availability hr/24hrs)

Other Commentary

The scale of the plan consists of all the community, city and catchment areas. This is mainly because it cannot be limited to a specific part, it is a correlated process.

NEXT STEPS

Short

- GAP analysis by AAWSA through stakeholder engagement, including
  - Network
  - Connection
  - Metering – network and consumer
  - Funding
- Recognition of untenured households
- Awareness of water accessibility and advocacy from officials by City Govt / AAWSA
- Project initiation and development by AAWSA
- Approaching organisations for funding by City Govt / AAWSA
- Receiving funding from federal government, etc

Medium

- Cost recovery models and sustainable funding
- Feasibility, design, construction, and implementation

Long

- Maintenance and management of the system

3. Pollution of Water Courses

CHALLENGE QUESTION

How can the City improve the management of solid waste and wastewater to reduce sewer blockages, protect watercourses, and reduce vulnerability of neighbouring informal settlements to flooding and polluted water?

BACKGROUND TO THE CHALLENGE STATEMENT

Existing Projects

1. The Addis Ababa River and Riverside Green Development Project, otherwise Known as Beautifying Sheger Project. The Project aims to clean up the rivers, and it runs from Mount Entoto to Akaki, developing 56km green spaces along the rivers. The development will be along the two most notable rivers in the capital city, stretching 27.5 and 23.8 kilometres correspondingly.
2. Source to Tap and Back Project (Sendafa area rehabilitation project) implemented in collaboration between Meta-Meta and AAWSA with a financial support obtained from Dutch government.
3. Establishment of Recycling park (Addis Ababa Resilience strategy action number 40)
4. Establishment of accredited environmental pollution monitoring lab and environmental data management system (Addis Ababa city resilience strategy action number 44).
5. Establishment of water fund.

N.B –In addition to the above listed projects the participants also mentioned that city agencies like AAEGDC, AAWSA, AASWMA, might have projects related to the Challenge and they recommended consulting the respective city agencies accordingly.

SUMMARY OF THE OPPORTUNITY

Root causes

Rapid Urbanization and Population growth fuelled by rural urban migration which is not led by appropriate urban development policy and its related social chaos such as Poverty, lack of affordable housing, compact style living, and bad urban culture and attitude coupled with lack of awareness and collective consciousness as well as Lack of residents sense of belongingness are the social root causes.

In addition to this, the topography of the city results in formation of sewage pockets (un-sewer pockets), and made the city prone to both riverine and surface flooding and this problem is more aggravated due to a poor drainage system and rapid informal housing development along riverbanks. Furthermore, the loss of green space as well as Proliferation of impermeable areas and the lack of adequate environmental rehabilitation programs in upper catchment and the associated erosion resulted in siltation of water sources. In addition to this resident misunderstanding of water or Seeing water as waste carrier resulted in waste management and sanitation issues across the city due to water scarcity, Moreover the city does not have appropriate payment mechanism to environmental services and values.

Moreover, unresponsive physical planning towards environmental protection, structural plan violation and non-contextual infrastructure in terms of water supply and sewage, coupled with limited fund and resources for infrastructural design, construction, monitoring, and maintenance as well as the lack of cost-effective and appropriate technologies resulted in usage of out-dated, less efficient and polluting technologies. Furthermore, inadequate focus is given for innovation, research and development.

Even though the city is economic engine of the country and a major contributor to the national GDP, Still the political ideology considers the city

3. Pollution of Water Courses

as a parasite and the government policy's and political culture is more of rural focused, coupled with unnecessary bureaucracy, corruption, weak/unstable institutional structure and governance culture, in addition to this rapid turnover of higher officials and poor institutional memory, and the conflict of political and administrative structures with natural ecosystems and infrastructure coupled with the lack of participatory, integrated, inclusive and cross border win-win interventions are some of the political root causes for the challenge.

Furthermore, household level poverty across the city and limited municipal budget and finance allocated to develop/manage infrastructure and ecosystem coupled with absence of payment mechanism to environmental services, and violation of the structural plan.

Finally, extreme lack of human capacity towards city resilience and lack of interdisciplinary thinking and weak inter-sectorial intervention are the major root causes mentioned during the discussion.

Need Statement
In the City there is a need to:

- Raise public awareness and improve urban tradition and style of living.
- Improve public participation in decision making on planning implementation, M&E.
- Protect the environment from pollution
- Build institutional capacity in terms of technical and managerial skills.
- Apply appropriate and applicable technologies.
- Create networking platform.
- Properly implement the Structural plan.
- Strengthen political commitment towards environmental management.

Interventions/opportunities:

- Target the curriculum and methodology of formal and informal education towards building positive culture and conscious towards environment
- Engage media and art to develop culture of the community
- Community based and sociocultural leadership and transformation
- Linking waste management and environmental protection with job creation and livelihood production

Key Intervention/opportunity to progress:
Target both the formal and informal education to build socioeconomic transformation, positive culture and conscious towards water source protection, development, environmental sensitivity and sustainability.

3. Pollution of Water Courses

Related Indicators

3.1 Proactive coordination around downstream impacts

4.2 Effective enforcement of environmental regulations for water

5.4 Integrated planning across interdependent urban systems

9.5 Protection of groundwater and surface water resources

10.2 Provision of sanitation services

Relevant assets and resources

-

Outcomes

Shocks and Stresses

- Water shortage
- Water quality
- Environmental degradation
- High unemployment
- Flooding
- Corruption
- Disease outbreak

Key actors

Lead Organization(s)

- Addis Ababa education bureau

Partners

- Addis Ababa Water and sewage Authority
- Addis Ababa Environment and Green development Commission
- Addis Ababa job creation agency
- Addis Ababa Health bureau

Approval

- Ministry of education
- Ministry of higher education
- Mayor's office
- AAEGDC
- Addis Ababa education bureau,

Approximate Cost

High (It requires a high initial investment because the intervention is on community attitude and culture but the cost will decrease as the culture develops overtime. (The intervention will be shorter while the impact could take long time).

Indicators of Success

Implementation could take up to 2 years

Other Commentary

This intervention may need policy revision and requires funding and organized information and data available. Moreover, during implementation it is possible to use existing assets such as demonstration sites, laboratories, infrastructures and School based environmental clubs.

NEXT STEPS

Short Term

- Revision of policy, regulation, programs (Curriculum and methodology) and infrastructure
- Design special projects and programs based on the revision output

Medium Term

- Secure funding
- Launch the programs identified
- Mid-term evaluation

Long Term

- Evaluation of overall impact

4. Security of Water Supply

CHALLENGE QUESTION

How can the city maintain and improve security of their water supply with urbanisation and climate change?

BACKGROUND TO THE CHALLENGE STATEMENT

Addis Ababa is one of the fastest growing cities in Africa with a 4% annual growth rate. However, water use has also been growing at more than twice the rate of population increase in the last century. Currently the total water supply is 580,000m3 per day, while demand is 1.1 million m3 per day, resulting in a demand-supply gap of 40%. Water supply for the city is largely sourced from surface water and groundwater sources located out of the city, within the Oromia region. The surface water and reservoir sources are outside of the city boundary and are susceptible to land use changes in the upstream catchment. Recent changes in the region from primarily grassland to farmland is resulting in the siltation of reservoirs affecting the already stressed water supply for the city.

As well as the major surface water sources, uncontrolled drilling of boreholes is threatening the city's long-term water security and the level of the water table. Businesses and industry are encouraged to source their water through boreholes and it is becoming increasingly used by wealthy residents and some parts of the hospitality industry (ie high end hotels). This is further disrupting an already inequitable water supply system.

Within the city, there are considerable water system maintenance challenges for the utility provider AAWSA - 36.5% of water is lost due to leakage and the two largest dams, which supply 60% of Addis Ababa's water have maintenance challenges.

There is a need to diversify the city's water supply, as identified in the 10th Master Plan, which proposed ways to diversify water sources using rainwater harvesting and grey water recycling, however, implementation is lagging.

SUMMARY OF THE OPPORTUNITY

The identified opportunity for the city to tackle security of supply issues is to develop an Integrated water management plan between at least Oromia Regional State and City (AAWSA) and between city sectors, including resource mapping and modelling, upstream catchment protection, new water sources (including reservoir, grey water recycling & RWH), leakage reduction, water conservation awareness, incentives and penalties for citizens and businesses.

The primary outcome of this will be to make the water supply for the city sustainable.

4. Security of Water Supply

Related Indicators

2.4 Long term strategy development and action planning around water

5.3 Incorporation of redundancy into water sources, networks and assets

5.5 Integrated planning with agriculture and food supply chains

9.2 Promotion of sustainable commercial and industrial water use

9.5 Protection of groundwater and surface water resources

Relevant assets and resources

- Gerbi dam project: AAWSA has launched the construction of a dam on the Gerbi river, 30 kilometres away from the capital. With a total capacity of 73,000 m3 per day, the Gerbi dam will improve water supply in the north of the city.
- Dire, Legadadi, Gefersa reservoirs siltation: AAWSA, VEI, Royal IHC, Dutch Government are exploring dredging to remediate the reservoirs and improve their capacity, build local dredging capacity for regular maintenance, and develop options to re-use sediments.
- The Nature Conservancy, Addis Ababa Water Fund: TNC are exploring setting up a water fund through which municipal utilities and businesses can invest in green protection and restoration initiatives to improve the security of water sources.

Outcomes

This opportunity will increase the water supply, close the demand gap and help the city plan for future demand for up to 25 years. This will also allow the city to align plans with existing national and city strategic plans. In addition, the city will have improved water quality with the aim to achieve adapted WHO standards and develop relevant Ethiopian standards. The opportunity will also help the city tackle climate change, specifically the stresses associated with rising temperatures affecting water demands. The integrated management plan will supply water for a growing urban population and support economic growth.

Key actors

Lead Organization(s)

- AAWSA

Partners

- AA Planning and development commission
- National planning commission
- Ministry of water and energy
- AA Environment protection and green development
- International development partners
- World Bank
- African Development Bank
- International Water Management Initiative
- AA universities

Approval

- City Council & support from businesses
- Inhabitants and communities living around water sources

Approximate Cost

Up to 1 million USD

Indicators of Success

-

Other Commentary

-

4. Security of Water Supply

NEXT STEPS

Short
In the first six months a consultant would be procured to lead a stakeholder identification exercise to determine who would need to be involved in the working group to develop the integrated water management plan. The consultant would also need to identify and carry out a gap analysis on available data sources

Medium
Within the first year, the primary tasks are to develop community engagement and develop existing programmes. The programme would need to identify or consolidate upstream community engagement groups and strengthen sectoral coordination (beyond the existing infrastructure coordination council). In addition, resources should be dedicated to strengthening the capacity of the urban forestry program and Rainwater and grey water use programmes. All already exist but need be developed to improve resources, capacity, and engagement. A feasibility study for a new reservoir should also be commissioned within the first year.

Long
In the following two to three years, the new reservoir project should be developed. Comprehensive resource mapping and modelling should be undertaken, and then used to develop a water resource plan for the city. The programme should also identify and implement appropriate leakage technology and develop water usage incentives to reduce water wasted within the city. Behavioural change should be targeted by devising an awareness programme for citizens and stakeholders.

5. Structure Plan Implementation

CHALLENGE QUESTION

How can the Structure Plan better integrate local knowledge, cultural values, and the regional context to gain citizen and stakeholder support for implementation?

BACKGROUND TO THE CHALLENGE STATEMENT

Existing Projects/Initiatives

- Addis Ababa Resilience Strategy.
- Integrated Catchment Planning.
- Sheger River and Green Development Project.
- Local development plan project including rehabilitation and redevelopment projects through transit-oriented development & settlement projects in different parts of the city.
- Transport Master Plan preparation project (Strategic Comprehensive transport Planning project).
- 10 years Prospective Plan – Addis is in the process of integrating this plan with the structure plan.
- Various development plan at neighbourhood level.
- River Rehabilitation Projects (under implementation and design).

SUMMARY OF THE OPPORTUNITY

Root Causes

Social cause

- Equity: in some of the communities, the water pipes which pass through are neither compensated for the land nor provided with the necessary treated water AAWSA provides for the city of Addis Ababa and even within the city there is disproportional distribution of the water supply.
- Security: because of the lack of sense of safety many educated and abled citizens aren't enthusiastic about working and living outside of the city borders. In addition, people might be willing to pay more given that there is security and consistency provided with the available infrastructures.
- High Level of Poverty & informality: due to the high unemployment rates people in the lower economic classes are forced to settle illegally and informally since they cannot afford to have legal land ownership.

`Environmental Causes

- Lack of catchment Planning and Management: the absence of catchment development plan affects the resource and land managements.
- The barely existing green-blue grids are set like islands and are not networked.
- Unavailability of accurate data might also make it harder to come up with an appropriate catchment plan.
- There is degradation and environmental pollution as reflect in high turbidity in dam and cost related to increased chemical use.

Technological Causes

- Some of the technologies used are too high tech for the systems the city uses and sometimes there are no technologies available for the projects that need to be done. A good example might be the cloud data system which would help in tackling data elated problems. Planning institutions in a city need to have but we (cities in Ethiopia) do not have nor can afford to establish easily.
- Plans are mostly high-level zoning which do not regulate emission especially nor is are planes supported by technologies to regulate

5. Structure Plan Implementation

emission abatement plans. For instance, the Akaki industry emissions are a health hazard for citizens that live downstream of the River.

- The city mostly uses old technology available for cheaper prices.

Political and Governance Causes

- Lack of Governing Metropolitan Plan: city plans should not be limited to the city boundaries considering that most of the resources the city uses are supplied from the surrounding rural areas. It must be thoroughly planned managed and executed. Unless plans include source outside their boundaries it will clearly be a waste and hard to implement.
- Lack of institutional collaboration and integration: identified as the major issue, there is limited effort for integration within Addis, and barely attempts with the neighbouring settlements.
- Lack of coordination or and competing and priority prioritization of more pressing matters some of the aquifer areas that could be used as the city's water supply are now being used for other uses including housing.
- Dualistic development, not mutually supportive or sustainable. Addis's growth is has not benefited surrounding settlements.
- Conflicting institutional mandate the city's boundaries restrict AAWSA from managing the water source because almost all of the water supplied to the city is in the Oromia regions which are outside of AAWSA's mandate. For example, Legedadi and Gefersa reservoirs supply nearly 40% of the water distributed in Addis Ababa and both are out of AAWSA's jurisdiction. Mostly the water catchment is within Oromia's jurisdiction while AAWSA is responsible for treating and supplying the water to the city. The lack of coordination between Addis and Oromia regions is a major challenge.
- Planning process is not participatory specially communities are not included during infrastructure planning. Engage stakeholders including communities from source up to destination is needed. Lack of political willingness is a hinderance for the participatory planning and implementation.

Financial cause

- Absence of Land Value Capture: developments costs are not captured at all. Public actions benefit landowners directly while it should have also benefited the public. This has led to high price of land.
- Willingness to pay: decisions on infrastructure development should follow cost recovery options, community understanding what they are getting, following community buy-in and related willingness to pay study/research should follow to define ways of paying for infrastructure and better service.
- High cost of imported material such as water treatment chemicals. If there were proper catchment management, the money could be used to avoid sediment around peripheral areas which in turn would reduce cost of water treatment.

Scarcity of cross subsidization plans and practice of polluters pay principle and incentives like payment for eco-systems where community can manage their source and protect the environment.

Other Causes

- Enforcement of law: most of the plans are not implemented due to various reasons including, skills, financial resources political buy -in.
- Corruption: even when there is a clear plan in place it is rarely implemented because of high rate of corruption, E.g. cadastres have failed because of vested interest of certain groups who do not wanted such information to be compiled and available. Communication

5. Structure Plan Implementation

gaps: there is huge communication gap and mismanagement which leads to manipulation for short term political gains.

Needs and Opportunities

The most urgent issues we would like to address are Implementation of policies and regulations.

- Institutional coordination and collaboration.
- Resource Planning and management.

The group believes these problems can be addressed by:

- Establishing city-region (metropolitan/ sub basin) governing body. Higher level of advisory and regulatory body, accountable to the PM. A unit that decides the fate of the city regions potentially including Addis Ababa, Oromia regions and the special zone surrounding Addis. The established legal body could manage the, coordination problems between the city and regions surrounding it, strong communication and data sharing and investment when necessary.
- Introducing integrated land use and development planning. The plan should integrate /synergize land claiming and non-land claiming development This planning process must include infrastructure, utilities, aquifers management, flooding areas protection, etc. and non- land claiming resources including finance, skilled manpower etc. Planning process should be participatory in approach.
- Implementation and enforcement of rules and regulations: there should be strict rules and regulations and if the rules be broken there must be an immediate penalty.
- Participants believe the key opportunity is establishing the governmental body that encourages integrated planning and regulates communication (information sharing) among institutions. This organization could integrate the catchment planning needed while focusing on surrounding areas of the city as well to ensure stability.

Related Indicators

Enforcement of land use regulations and zoning

Effective Implementation of transparent and accountable decision-making procedures

Incorporation of expert and technical knowledge into decision-making around water

Introduction and enhancement of neighbourhood blue-green infrastructure

Integrated planning across interdependent systems

Relevant assets and resources

- Innovative Institutions and partnerships.
- Risk- informed land management and water sensitive urban development.

Outcomes

A legally empowered entity (Agency) responsible to bring integrated urban development planning (and management) within the city region which includes AA, Oromia Special Zone and Oromia region. This agency will be directly accountable to the PMs office and will have resources allocated by the highest decision-making body i.e. house of representatives.

Key actors

Lead Organization(s)

- PM office
- Addis Mayor's Office and Ministry of Water Resources i.e. Basin Development authority

Partners

- Governmental actors and NGOs
- Academic Institutions as well as planning bodies
- City administration and regional government including Oromia Special Zone

Approval

- Regional government
- Addis Ababa City Administration, Local Community
- Oromia special zone & Federal government

5. Structure Plan Implementation

Approximate Cost

The cost required will be high because of the complexity of the organization and the needed technological systems for data collection and organizing. Retrofitting and renovating existing infrastructure (in some cases newly investing) to ensure resilience is likely to be expensive and supported by federal government until other financing modalities including Land Value Capture, Payment for Ecosystem Services etc, get traction as sustainable options.

Indicators of Success

Success in this case will be measured by the frequency and quality of dialogues and communication to larger community. Development of the right laws and regulations for the agency to act. The key measurement indicator is the would be the establishment of a powerful and functioning government body with in the coming 2 years.

Other Commentary

The team discussed meaningful impact can be achieved if the established agency is influential enough to bring the City administration and Oromia Region to the table and have the dialog going. Political commitment as high as the Prime Minister's office is required to take this initiative forward.

NEXT STEPS

Short term

- Convene all actors for political dialog specially between the Addis Ababa city and Oromia regional and the special zone.
- Identifying key stakeholders and resources to establish the agency including budgetary support.
- Establish the agency

Medium term

- Creating Platform
- Establishments
- Put in place incentives and enablers

Long term

- Budget Allocations for investment that benefit all stakeholders in the city region. Empowering local institutions and through time transform the agency's role to monitoring and coordination.

6. Data Collection and Sharing

CHALLENGE QUESTION

How can we ensure water resilience data is high quality, actionable, accessible by all and shared between stakeholders?

BACKGROUND TO THE CHALLENGE STATEMENT

-

SUMMARY OF THE OPPORTUNITY

Root Causes

Several underlying causes were listed for the problem. The social causes include insufficient Community participation, lack of effort to engage community in data collection. Moreover, there is lack of awareness on value of data. The community is not conscious enough and limited collaboration to work with the government.

Environmental causes include, absence planned system for hydrogeological data, highly polluted and toxic water bodies, this makes data collection difficult.

Technological causes include, lack of dedicated data centre and networked system, gaps in archiving data generated by different researchers, limitations in use of technologies for data collection (e.g. mobile apps), for instance, conversion of hard copy data, lack of smart water meter and limitations in data analysis. AAWSA has a data centre but it is not well organized, not accessible and Attention is not given to data collection. Files are usually in Auto Cad format which should be converted to GIS.

Political and governance causes include, gaps in properly distributing updated and proposed plans, lack of integrated information system in concerned government institutions, corruption, poor attention to data and restrictions in the quality of information. Besides, data usually exists in the hands of some people and the data is not transferred when those individuals leave their work, thus data usually disappears.

Financial causes include, lack of clear budget line for data collection, limited investment on issues related to data, financial problem to maintenance.

Other causes which were not categorized in any of the causes listed above include, False information, wrong meter data supply and poor meter reading, Poor data compilation, Inaccessibility of infrastructure to collect information and Lack of protocol for data collection, quality assessment, and sharing, lack of skilled manpower.

Needs assessment

The following were critical needs based on the understanding of the problem statement

- There is a need for a well-established and technology-oriented data centre
- Several organizations have been investing in the development of data centres but the development is not significant and centres usually cease to function after the organizations stop funding. For instance, World Bank has constructed a big data centre yet it is not used properly.
- The importance of data needs to be demonstrated and needs proper attention. The importance of a data centre and the need for running the centre for a long time should be well understood. Furthermore, attention given to technology by authorities is not enough. For instance in software updating.
- There should be an agency to organize and lead issues related to water resilient data. If there is an authority to enforce the process it would be better for performance.

6. Data Collection and Sharing

Opportunities

- Empowering existing data centres using the experiences of previously established data centres. Moreover developing applications and software to reinforce data centres along with skill development and capacity building.
- As an opportunity, there has been some effort that can be used as a case study to learn from. We need to study and integrate this into our existing system.
- Enhancing community engagement which will enhance the quality and quantity of data. The community can be engaged in a continuous or limited manner in data collection, analysis, and decision making. For instance, a community can participate in water quality assessment and this engagement could be empowered using technology.
- Building data-sensitive governance. This will help to strengthen the relationship among several sectors.

Key opportunity to progress

- Building data-sensitive governance

Related Indicators

2.1 Incorporation of expert and technical knowledge into decision making around water

5.1 Active Monitoring and evaluation of programmes

5.2 Dissemination of accurate data

7.1 Comprehensive hazard monitoring, forecasting and early warning systems

8.1 Active monitoring and evaluation of infrastructure

3.5 Promotion of clear stakeholder roles and responsibilities

Outcomes

Shocks

- Corruption and theft

Stresses

- Improved political commitment
- Poor planning practice
- Integration

Key actors

Lead Organization(s)

- Federal ministry of water resources
- Water development commission

Partners

- Regional governments
- City government
- NGO's
- Universities and academic institutions.

Approval

- Ministry of council
- Federal government

6. Data Collection and Sharing

Approximate Cost

The overall life cost is high since the proposed intervention requires continuous efforts over a long period to achieve the desired level of sensitivity. Moreover, the scale is catmint level and it has complexity since governance includes all elements.

Indicators of Success

The time frame is 10 years. It could have two phases

- The first five years for preparation purposes and
- The second five years for implementation

Other Commentary

- When referring opportunities it should be clear from which perspective we see the opportunities, this could be from providers or end-user perspective.
- There should have been clear resilience indicators and defined assumptions about data. Is it assumed that data doesn't exist? Data exists but is not sufficient or data exists but there exists an issue in transparency.
- The power of information is well known, we should work on strategically using this to establish a resilient system.

NEXT STEPS

Short term

- Creating awareness on term definitions and application
- Introduction to water resilience
- Establishing a base for the policy document

Medium term

- Formulating policies
- Devising manuals, guides, and directives

Long term

- Establishing actors
- Establishing a monitoring system to ensure effective check and balance

7. Infrastructure Resilience

CHALLENGE QUESTION

How can the city improve the resilience of its infrastructure from failure and external shocks and stresses?

BACKGROUND TO THE CHALLENGE STATEMENT

- Proactive maintenance of water infrastructure is key to avoid future failure. The water system has significant maintenance challenges: 36.5% of water is lost due to leakage, and the two largest dams, which supply 60% of Addis Ababa's water supply have maintenance needs.
- O&M costs are not being considered in new infrastructure design as political focus is on new infrastructure investments.
- There is shortage of skilled operations staff for maintenance and condition and performance data is not collected for infrastructure assets.
- There are no emergency planning mandates and institutional arrangements to ensure resilience of critical infrastructure during shocks such as flooding and stresses such as droughts. There is no redundancy planning in water supply and treatment systems to ensure spare capacity in case of disruptions.
- Supply chain risks such as availability of chemicals and mechanical and electrical equipment, need to be taken into account to plan and manage infrastructure.
- The city needs to prioritize investments as there are many competing demands on city budgets

SUMMARY OF THE OPPORTUNITY

Need

A national vision, ICT based, integrated water management system to ensure resilience of critical infrastructure during shocks and stresses, a political commitment and institutional integration is critical to avoid infrastructure failure and build resilient water system.

Root Cause and Opportunity

Due to the following sustainability problems Addis Ababa's water infrastructure is susceptible for failure.

- Unreliable prioritization of Community engagement plan.
- Poor Investigation in the gap of existing difficulties.
- Inconsiderate of environmental conservation.
- Falls Short in engaging private sectors and concerned groups
- Lack of accountability regarding private developers abusing the water system
- Poor legal frame and company policy.
- Failure to use recycled water for uses other than non-drinkable water
- No solution has been put for stopping the leakage which wastes over 40 % of the water supply.

After discussing the team proposed the following alleviation mechanisms. The need can be addressed in the following possible three ways

1. Strong Infrastructure management Legal framework/ adequate water policy
2. Proper Infrastructural development Financing
3. ICT-based Water Leakage Control/ ICT Based Non-revenue water management.

7. Infrastructure Resilience

Opportunity 01
Out of the three possible options the team chose the 3rd way, which is ICT-based Water Leakage Control (ICT Based Non-revenue water management). After a series of debates and discussions it is decided that in a city where the water supply infrastructure system is wasting more than 40% of the drinkable clean water, maintaining the existing system would be the best possible and feasible solution to meet the growing demand of water supply as well as the quality of the water supply. By doing this rather than building another water dam which might again be susceptible for wasting more water we can satisfy the challenges of water supply scarcity. This could be achieved using advanced computerized technology which detects any water leakage in the infrastructure system, which will include replacing old pipes.

The ICT based NRW detection system which probably will be enhanced with a digital leakage sensor will be installed from catchments up to household level. This makes it a sophisticated yet a worthwhile solution as well as investment.

Thorough this system the city will minimize water loss through leak detection and increase the revenue and can use the budget to replace the old pipes.

The digitalization of the infrastructure system includes the integration of a well-organized payment system for customers. This avoids the labour intensive, tedious and unreliable door to door water meter reading. Again, this can also be achieved with a well-developed inventory of existing parts of the infrastructure coupled with a reliable database system that can be controlled from a single station.

Related Indicators

Integrated planning across interdependent systems

Coordination of disaster response and recovery preparation

Proactive coordination around downstream impacts

Provision of sufficient financial resources for new water programmes and projects

Active monitoring and evaluation of infrastructure

Relevant assets and resources

- Addis Ababa City Resilient strategy
- WRI UWR Framing Paper
- CRGE
- The political environment and relationship with neighbouring municipality need to be improved
- Evidence based research and studies about the problems need to be done. This information will be used as a baseline for the plan.

Outcomes

Shocks

- Flooding

Stresses

- Drought
- Ground water depletion
- Unaffordability
- Water Quality

7. Infrastructure Resilience

Key actors

Lead Organization(s)

- AAWSA- Addis Ababa Water and Sewerage Authority
- Addis Ababa City Gov't
- MOWIE - Ethiopia's Minister of Water, Irrigation and Energy

Partners

- Ministry of Science and technology
- Addis Ababa Plan Commission
- Addis Ababa Resilience Project Office
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility ...)
- Environment forest and climate change commission
- Private Sector
- Higher Education
- Neighbouring municipalities

Approval

- Ministry of Finance
- Donor community
- The Community

Key actors

High - The cost will be high considering there is a need to upgrade the current old pipe, implementing ICT based leakage detection system. The initial cost of implementation of the project will be high but the return will be high as well. the minimizing non-revenue water (NRM) will increase the revenue and will give the opportunity for the city to have more budget for further investment.

Indicators of Success

The project can take up to 25 years. This will be divided in to three parts. Short (5years), medium (5 – 10years) and long-term plans.

The indicator for the success will be

- Decrease the non-revenue water
- Increase the revenue collected
- Increase water quality

Other Commentary

The implementation of the technology requires high level professional expertise, conducive legal framework, in depth research, huge investment, complex hardware and software logistics etc. In addition, because the technology has never been applied in Ethiopia the lack of experienced professional in the subject in the nation makes it more complex when said than applied

NEXT STEPS

Short term

For the first five years

- Collect Baseline data, Engaging the community, engaging with the stakeholders and neighbouring municipality to understanding the root cause in order to have a well-defined strategy to tackle the challenge and integrate and align vison
- Media coverage and Communication. Publicizing the project, Funding for pilot

Medium term

- Pilot project, Monitoring and Evaluation of the project, Further Funding
- Continued stakeholder engagement
- Continued engagement with private sector
- Develop further bankable projects
- Evaluate the pilot project

Long term

- Scaling up
- Institutionalizing

8. Sustainable Sanitation

CHALLENGE QUESTION

How can the City invest in sustainable sanitation to protect human health during the COVID-19 outbreak and beyond and reduce the impact on the environment and the local economy.

BACKGROUND TO THE CHALLENGE STATEMENT

Sanitation provision in Addis Ababa is grossly deficient, as in most cities in sub-Saharan Africa: most people do not have access to a hygienic toilet and large amounts of faecal waste are discharged to the environment without adequate treatment impacting particularly poor households living in low-income and informal settlements and city life as a whole. Pollution, watershed degradation, increasing siltation and flooding are caused due to rampant discharge of wastewater and solid waste. Addis Ababa is home to 65% of the country's industry, and more than 90% of these industries discharge industrial wastewater directly into nearby rivers without proper treatment, causing heavily polluted rivers. Riverbanks are widely occupied by informal settlements practicing urban agriculture, which, coupled with the lack of adequate sanitation, has led to erosion and transformed the city's rivers into open sewers. Addis Ababa Water and Sewerage Authority (AAWSA) is responsible for water supply and sewerage. Besides managing the public sewerage system, it also offers septic tank emptying services. AAWSA has very limited capacity to provide safely managed sanitation services to all residents in its service area. Only a small part of the city is connected to the public sewerage system while the majority of households depend on onsite sanitation facilities that release waste to nearby rivers and drains or need to be emptied by a limited fleet of vacuum trucks. Still a significant minority (about 5%) resorts to open defecation. Illegal connection of storm water runoff and wastewater into sewer lines, the low workmanship and limited supervision overwhelm and increase the risk of flooding particularly during the rainy seasons. Public toilets are not common, but pit latrines are often shared between several households. As a result, in 2007 AAWSA began a pilot to build approximately 200 shared sanitation facilities. After the pilot's success, AAWSA took the next bold step of aiming to build 3,000 shared sanitation facilities, more than 600 of which have been successfully completed since 2016. These shared sanitation facilities include public facilities serving high-traffic urban areas and communal latrines shared between clusters of households in low-income communities.

The city's ageing water infrastructure is vulnerable to contamination, especially during rainy seasons, which places Addis Ababa at a high risk for the outbreak of waterborne diseases. Besides, Addis Ababa is experiencing a significant rise in high-end real estate development, which cannot be connected to the public sewer network because of its limited coverage but are served through decentralised water and sanitation systems. Over the last years wastewater treatment capacity was increased, however, treatment facilities operate under capacity because the sewerage system was not extended.

Unable to practice proper hygiene, residents in informal and low-income areas face greater risk of waterborne and infectious diseases.

Community awareness and understanding of personal hygiene and particularly hand hygiene is poor increasing the risk of communicable diseases. Particularly poor households are used to us sub-standard, unsafe sanitation facilities or none at all. In addition, cultural practices influence sanitation and hygiene behaviour. would be better for performance.

8. Sustainable Sanitation

SUMMARY OF THE OPPORTUNITY

Summary of the Opportunity (several paragraphs to include root cause, needs and opportunity selected from Worksheet B&C)

Although the number of urban dwellers with access to improved sanitation increased significantly over the last decades, progress in Addis Ababa has been outpaced by rapid urban growth fuelled by rural urban migration and instable political conditions within the country and the region. Although economic development has been significant, and the number of poor households decreased over the last years still a significant number of urban dwellers in Addis Ababa do not use safely managed services.
The focus on AAWSA has been mostly on incremental expansion of the public sewerage, mainly benefitting non-poor segments of the population. One of the major bottlenecks identified hindering not only improving access to safely managed sanitation within the city but also substantial funding flowing into the sector are unclear arrangements for service delivery particularly when it comes to on-site sanitation, with little monitoring and regulation of progress and service quality. Furthermore, investment and planning decisions are based on outdated and unreliable data and information. Planning processes do not consider the whole sanitation chain (access, emptying, transport, treatment, and reuse). Overall capacity in the public and private sector is limited and lacks both capacity development plans and coordination at the sub-national level. In terms of budgeting and financing, there is a double bottleneck of a low level of available funds in relation to the needs, and a low capacity to spend those available funds due to unclear roles and responsibilities.
The ability of the city to regulate and monitor sanitation including pollution levels and water quality particularly in surface waters is limited and building codes and technical standards particularly for decentralised systems and industrial wastewater (pre)treatment are not enforced.
There is also a lack of projects and innovative service concepts that can attract new financing or approaches to scale sanitation interventions focusing specifically on private sector involvement incl. SMEs, industrial wastewater management as well as increasing access to safely managed sanitation particularly in low-income areas. This is particularly true when it comes to decentralised wastewater management where opportunities are not utilised. Same applies to identifying and implementing different technical solutions particularly for water scarce environments leveraging opportunities around reuse of waste and effluent. Although the link between urban sanitation and solid waste management is obvious there is a clear lack of coordination and integration between relevant stakeholders and government entities.

The Covid-19 outbreak has demonstrated the need and potential of coordinating urban sanitation with various sectors. Building strong institutions around sanitation and making considerable investments to protect public health through better sanitation is a top priority of the city as part of their recovery and their resilience building work. The expansion of Addis Ababa has not been matched with a growth in sanitation and wastewater infrastructure let alone reliable high-quality services. Unregulated urban growth and a proliferation of informal settlements make the assessment of the provision of sanitary conditions for Addis Ababa a difficult task.
As a result, available data on the city's state of sanitation tends to be dated. Sector and investment decisions are made based on limited knowledge of the situation on the ground and the needs and demands of the population. Like in many African cities business as usual in urban

8. Sustainable Sanitation

sanitation where conventional sewerage and wastewater treatment are considered the only solution. Considering the growth of the city this will not allow AAWSA and the city administration of Addis Ababa to increase access to safely managed sanitation in the context of a changing climate in the years to come.

A real opportunity presents itself now to bring various sectors, organisations and related expertise and solutions together and to develop a data repository and dashboard that can inform policy and strategy, the development of services and monitoring of service provision, identify risks and vulnerabilities as well as foster integrated planning of resilient urban infrastructure. Furthermore data (performance) dashboards are an increasingly popular way for cities and local government agencies to encourage improvement in services and heighten accountability as data proliferates and cities are able to set specific targets rather than simply outlining broad goals. The data repository and dashboard can in addition to that contribute to pandemic preparedness and response and inform multiple dimensions of urban planning and urban sanitation in a more systematic and systemic matter based on high quality , primary data – such as the environment, public health, water, organic waste, stormwater management and faecal sludge management, as well as the potential for energy, fertiliser, and water reclamation for urban greenery incl. irrigation, non-potable and potable water supply.

The ongoing Covid-19 pandemic as well as reduced water availability and environmental degradation highlight the need to shift the urban sanitation paradigm in Addis Ababa, aiming to ensure everyone has access to safely managed sanitation, businesses and industries are discharging their wastewater safely either directly or indirectly by promoting a range of smarter solutions – both onsite and sewered, centralised or decentralized – tailored to realities and the development trajectory of the city. There is a need for new approaches, to think differently, to make smarter and more targeted decisions and investments, create transparency and leverage community engagement and to explore opportunities for leapfrogging solutions that take full account of the public health and environmental imperatives of urban sanitation.

To take better decisions the City of Addis Ababa needs to rethink the way sanitation infrastructure is funded and challenge approaches, that do not embrace innovation and do not consider running cost as well as the potential to deliver multiple benefits at the same time including saving water, developing jobs and income opportunities. This will require awareness raising and capacity building, capturing best practices, working in coordination with complementary city services like stormwater and drainage or solid waste management, and the development and use of tools that help better design and implement sustainable urban sanitation services for all with an enhanced focus on resource recovery and re-use as well as economic development.

Strategic planning and appropriate development and management of sanitation services must be based and supported by accurate and accessible data. Therefore, an opportunity exists to develop an online sanitation data platform or dashboard accessible by a large and diverse set of stakeholders (preferably web-based) that will generate and share knowledge around sanitation management, water quality and public health and provide important baseline information for planning and design of infrastructure and services. If adequately exploited, these data will assist government, service providers, communities, the private sector as well as

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donors and investors during the planning process but also with performance monitoring, benchmarking comparisons, policy progress evaluation, resources allocation, and decision making. A variety of tools and techniques are in place to collect such information in a timely and accurate as well as cost effective manner. While the establishment of a sanitation platform will be the first step to inform the sector, instruments and processes need to be developed for routine data collection, particularly at local level taking into consideration suitable indicators, reliability of collected data, combination of different information sources, and statistical validity of produced estimates when disaggregated into small geographic subareas. While the platform aims to provide policy makers with strong evidence to inform their planning decisions, it also allows to monitor progress over time, prioritise targeted interventions, coordinate and harmonise different projects and funding streams. Furthermore, the mapping of physical and natural assets combined with up-to-date socio-economic data on target populations will guide the city in sector planning moving towards comprehensive citywide planning and decision-making that is grounded in the sanitation reality and includes stakeholders allowing them to plan citywide sanitation by prioritising investments and selecting the most viable projects. Furthermore, the platform will provide information that allows the city to be technology agnostic allowing them to arrive at locally appropriate sanitation systems.

The platform will help all relevant stakeholders to understand the current sanitation situation and project future scenarios in the city based on a comprehensive baseline data collection incl. the development of a comprehensive sanitation profile of the city that includes water supply, wastewater, solid waste, storm water, access to toilets, decentralised and centralised systems, natural infrastructure, and water quality information. Mapping of sanitation infrastructure and associated risks as well as service levels enhances transparency and accountability within the sector. The platform can be used as an advocacy tool providing citizens and local governments with information and arguments to demand improved services and, on an operational level, to improve the sustainability and equity of service delivery. Regular data collection and reliable data will better inform decision-making, ultimately informing future planning and policy. Without a clear understanding of what key issues are and why they exist, a sustainable approach to address them is not possible. The data platfrom will enable stakeholders to create models and predictions for the future growth of Addis Ababa. Hence it enables future problems to be identified and addressed before they become reality. As such, it is a truly sustainable and resilient opportunity.

8. Sustainable Sanitation

Related Indicators

4.3 Public health regulation for water is performed effectively, resulting in water that is safe to consume and wastewater that can be returned to the water cycle with minimal environmental impact.

5.3a Redundancy exists in the networks and assets responsible for water supply, treatment, and sanitation.

7.2 Disaster response and recovery coordination plans and procedures are current, collaborative, well-rehearsed and properly funded.

8.4 Existing infrastructure is regularly maintained and upgraded to reduce likelihood of failure.

10.2 All people have access to sanitation that is safe, hygienic, secure, and socially and culturally acceptable.

10.3 Safely managed sanitation services are made affordable to all users.

Relevant assets and resources

- Addis Ababa Resilience Strategy.
- Action 32: Build a Water Resilient City.
- Action 35: Promote decentralized waste treatment and water sensitive design.
- Action 36: Improve sanitation service provision Action 44: Establish an accredited environmental pollution monitoring laboratory and data management system Action 48: Build a sustainable and resilient city-region food system.
- Second Ethiopia Urban Water Supply and Sanitation Project (SUWSSP): Financed by a loan from the World Bank, the SUWSSP aims to increase access to enhanced water supply and sanitation services in an operationally efficient manner in Addis Ababa and selected secondary cities. The program will provide improvement to the water and sanitation services in Addis Ababa, as well as support for operational efficiency improvements and institutional strengthening of the city's water utility.
- Consolidated Water Supply, Sanitation (WSS), and Hygiene Account Project for Ethiopia funded by the World Bank.
- One WASH National Program (OWNP): OWNP is a sector wide approach (SWAp) whose broad objectives are to achieve water, sanitation and hygiene (WASH) results in Ethiopia through official policies, strategies and development plans in a harmonised and coordinated way involving sector stakeholders. It is a flagship Government programme supported by several development partners (DPs) and NGOs, in which different actors come together to address water supply, sanitation and hygiene as an integrated package.
- Addis Ababa Riverside Green Development Project entitled "Sheger Beautifying Project"
- Decentralized wastewater treatment program: To increase the city's wastewater treatment capacity, AAWSA expanded the existing Kality Wastewater Treatment Plant (WWTP) with support from the World Bank. Completed in 2018, the expansion project has increased the WWTP's capacity from only 7,000 m3 per day to 100,000 m3 per day. The expansion included the construction of 18 km of new trunk main from the center of the city to the treatment plant. While the plant is currently operating at only 40% of its capacity, at full capacity it is expected to serve one million residents in seven sub-cities. Efforts are currently underway to further expand the sewerage network and increase the number of connected households across the city.
- Addis Ababa Drainage Master Plan: The Addis Ababa City Roads Authority (AACRA) is currently developing a comprehensive, citywide drainage master plan that will help address localized flooding caused by stormwater run-off.

Outcomes

Shocks and stresses

- Inadequate sanitation systems
- Flooding
- Aging infrastructure
- Environmental degradation
- Water scarcity
- Poverty
- Unemployment

System change, use data for disaster response, a permanent database to provide data information and risk for the government and other entities to use. Understanding financing opportunity. Improved coverage of sanitation facilities. Improved decision making. Enhanced capacity development. A better understanding of the sanitation system as a whole and the opportunities which arise.

Data collection is not a direct intervention; a better mapping of sanitation systems and locating problem areas through the collection and interpretation of data can enable shocks and stresses to the system to be identified. Hence a focused, direct intervention can be put in place, ultimately saving money and time.

8. Sustainable Sanitation

The following benefits address the listed interventions directly, and hence demonstrate the opportunity for data collection to be a resilient approach.

4.3 Effective Enforcement of public health regulation for water

Existence: rules, norms, standards and organisations ensure that public health risks are considered and managed. In the long term, the river may be restored as a nature attraction, free from public waste and sewerage.

Monitoring and evaluation: mechanisms will successfully be in place to collect information, monitor and evaluate on the regulated scope in fair procedures.

Enforcement: data collection will provide information on key problem areas and enable root causes to be mapped. Hence sanctions and penalties can be put in place to enforce compliance, and ultimately remove the illegal pipeline network.

5.3 Incorporation of redundancy into water sources, networks, and assets

Diversity: the collection of data will enable a better mapping of where the sewerage network exists, and where it does not. Hence a strategy can be put in place to connect locations where the network is absent.

Planning and redundancy: a large bank of information will inevitably enable better planning of the water network. Systems can be built better to withstand disruption and incorporate redundancy to compensate for non-functioning public infrastructure.

7.2 Co-ordination of disaster response and recovery preparation

Existence: data mapping will enable anticipated water-related shocks to be addressed and disaster response and recovery plans can be implemented in advance.

Stakeholders: data mapping will enable relevant stakeholders to be identified and hence recovery plans can be implemented.

Co-ordination: a database of information about the statistical population and sewerage network enables plans to be coordinated between key actors and stakeholders responsible for providing key services related to health, water and sanitation.

Learning: a database of information is a permanent thing. Knowledge and experience can be logged: progress can be made through learning from past mistakes.

8.4 Routine maintenance and upgrade of infrastructure

Maintenance and planning: future models and population predictions made through data collection enable future planning to consider long term trends.

Sufficient resources and scope: mapping of data can provide a spatial understanding of the scope of problems. Hence sufficient time, money and resources can be allocated.

Implementation: maintenance and upgrades to assets can be recorded on the central database, enabling future maintenance to be issued at an appropriate time.

10.3b Universal affordability of water and sanitation services

Affordability and scope: an understanding of the population statistics and a mapping of the sewerage network (as enabled through data collection) will enable an appropriate price to be placed on sanitation facilities so that it is affordable to all people regardless of status or background.

Key actors

Lead Organization(s)

- City of Addis Ababa
- Addis Ababa Water and Sewerage Authority (AAWSA)

Partners

- Traditional funders like World Bank
- UN-Habitat
- Community Based Organisations (CBOs), community leaders, universities, local non-for-profit organisations
- Tech companies like Google, Amazon, Esri

Approval

-

Approximate Cost

USD 2.0 Million to set up the database and dashboard and map existing sanitation infrastructure including centralised as well as decentralised infrastructure as well as relevant socio-economic and water quality data.

Initial funding needs to be provided through donor, philantrophic or CRS funding to collect data, set up the database, development of the dashboard and related capacity development. Maintaining the database requires further investment in personnel and IT licenses etc.

8. Sustainable Sanitation

Indicators of Success

Sanitation monitoring system is set-up and used by core decision makers to manage and improve service provision as well as to inform decision making on sector investments.

Other Commentary

-

NEXT STEPS

Short term

- Develop initial project concept and obtain political buy in
- Establish steering committee and partnerships for the development and funding of the work
- Conduct gap and needs assessment and develop detailed scope of work

Medium term

- Identify most suitable data collection methods, tools and instruments
- Prepare and conduct data collection including training
- Develop the data repository
- Integration of database with existing databases in the city
- Identify host for database and develop dashboard
- Train staff to administer and manage the database and dashboard

Long term

- Maintain and continually update database
- Potential to further develop into a City dashboard that enables Addis Ababa to post curated data so its citizens can more easily understand the city's progress toward its main goals and priorities

9. Stormwater Management

CHALLENGE QUESTION

How can we improve awareness, acceptance and implementation of grey-green-blue solutions to improve storm water management?

BACKGROUND TO THE CHALLENGE STATEMENT

The natural water cycle is affected by rapid urbanization and loss of vegetation. The catchment is degraded which increases the runoff, erosion and flooding. Silt is cumulated in the upstream surface water dams reducing the hydraulic carrying capacity of the dams, which are easily filled and AAWSA is forced to increase the release of spill over during rainy season affecting downstream localities. Construction companies are dumping cart away soil and debris into the riverbanks which is also causing increasing siltation and reduction of the natural hydraulic carrying capacity of the rivers, and increasing flooding incidences. In general, runoff protection, sediment deposition control and pollution control are the three major challenges of storm water management.

There is also lack of public awareness in distinguishing storm water from wastewater, and people are connecting storm water into the sewer pipes and manholes, which is overwhelming and affecting the central wastewater treatment plant. On the other hand, others connect wastewater to drainage canals which increases pollution of waterways and flooding. Informal settlements are built on riverbanks exposing them to flood hazard and are also causing degradation of the riverbank. Solid waste is also dumped on drainage canals, and informal construction on natural ways and artificial drainage canals are clogging, diverting and affecting the flow resulting to flooding and damage.

The partial mandate of Addis Ababa City Roads Authority (AACRA) to protect roads from storm water and the capacity limitations in considering watershed as well as green and blue solution while designing is also exacerbating the problem. The channelization, transporting long distances and accumulation of runoff using mono-functional grey infrastructure (drainage canals) is increasing pressure on specific spots exacerbating flooding, erosion and environmental degradation. Although a drainage master plan is said to have been prepared by AACRA, it is not shared to other sectors like Addis Ababa City Riverbank and Green Administration and Development Agency (AARBGADA) and AAWSA, which manifest a sectoral fragmentation. AACRA's bidding documents for road and drainage construction does not consider the watershed and blue-green solutions.

Another major problem is the political instability and tensions, which constrain the implementation of environmental projects, while intensifying environmental deterioration due to delay in actions for conservation and increasing competition to exploit the natural resources. The political instability is posing difficulty in dealing trans-boundary environmental issues with Oromia region. There are also financial constraints, in the past less attention is given to blue-green solution for storm water management during budgeting.

SUMMARY OF THE OPPORTUNITY

Social causes: Negligence and limited awareness of the residents on the problems of mixing storm water with wastewater as well as the use of storm water are the major root causes for increasing flooding, overwhelming and damage on the wastewater treatment plant. Improper disposal of solid waste and wastewater discharge

9. Stormwater Management

polluting and blocking storm water canals are among the root causes of increasing flooding and pollution of waterways.

Environmental causes: Catchment degradation fuelled by deplorable economic conditions of residents is the major causes for soil erosion, sedimentation into water dams.

Technological causes: Improper design of drainage systems and catchment management are causing the storm water challenge. AACRA does not consider watershed, green and blue solutions for storm water management. AACRA grey solutions (street side drains) are built aiming to remove runoff as quickly as possible from roads causing pressure and storm water challenge in downstream areas and aggravating the degradation of the watershed.

Political and governance causes: Inter regional political complexity (between Addis Ababa the neighbouring Oromia Regional State) on trans-boundary issues is a major challenge, which is not properly addressed and aggravating the catchment degradation. The degradation of the catchment of the surface water sources of the city which are located in Oromia Regional State is caused because of lack of cooperation, and the gap and unclear catchment-based administration. Financial causes: The economic pressure at household level is increasing the use of natural resources for daily livelihood needs and survival means causing the catchment degradation. Expensive and costly infrastructure solutions are unaffordable to finance. Less attention given to blue and green solutions to storm water challenge while designing, budgeting and preparation of bidding documents (AACRA) for storm water management further constraining the implementation.

Other issues: Organizational gap for coordinating storm water management activities at city level and the problems of coordination of catchment management are additional causes of the storm water challenge. The dumping of construction debris and caraway in riverbanks is also increasing siltation and flooding.

9. Stormwater Management

Related Indicators

Long term strategy development and action planning around water

Proactive coordination around downstream impacts

Integrated planning across interdependent urban systems

Promotion of infrastructure for drainage and flood protection

Introduction and enhancement of neighbourhood blue-green infrastructure

Relevant assets and resources

- UWR Framing paper, One of the priority pathways of the African urban water resilience framing paper - "risk informed land management and water sensitive urban design" can best be linked with the specific challenge, which is consisting the following strategies:

- Shift in urban planning and decision-making to account for hydrologically linked regions and climate risks

› Vulnerability assessment through updating and analysing hydrologically linked regional topographic, weather and climate data

› Incentivising spatial growth towards less hazard prone areas, the protection of crucial water ecosystems (such as aquifers and peri-urban agriculture) and the retrofitting of existing infrastructure

- Diversify water management options by investing in water resource conservation, combining grey and green infrastructure and decentralized solutions (such as rainwater harvesting, grey water use, and recharge aquifers)

- Invest in water-sensitive infrastructure design as part of mainstreaming water-resilient city development, with a focus on inclusive nature-based solutions (that avoids green gentrification, while linking the approach to daily livelihood concerns)

› Build capacity to include and enforce nature based solutions in building codes

- Upper catchment (Entoto) water and soil conservation, and water harvesting projects are formulated by Addis Ababa City River Basin and Green Area Development and Administration mentioned during the visioning workshop by the participant from the sector

- Nature based solutions for water resources infrastructure and community resilience in Ethiopia project can be linked to the specific challenge which aims increase forest, minimize siltation, reduce soil erosion through participatory forest management activities in the catchment of the city's water reservoirs

- Addis Ababa Water Fund project can be also linked to address the challenges of catchment degradation. The establishment of water fund on the basis of the project can help to generate funding to implement catchment rehabilitation and livelihood improvement in upper catchment of the surface water sources of the city.

Outcomes

Shocks and stresses:

- Increased traffic congestion and mobility problems as a result of increasing flooding during rainy seasons (August and September).
- Damage on infrastructure.
- Damage caused on wastewater treatment which is overwhelming .

The following shocks and stresses will be addressed:

- Reusing storm water to maximize water supply could reduce the stresses caused by drought.
- Traffic flow during rainy seasons will be improved during rainy seasons.
- Wastewater treatment plant can be protected from flooding, and thus reducing stress caused by pollution and the damage on infrastructure contributes to improved asset condition. Reduces flooding shocks- property damage and casualty.

Key actors

Lead Organization(s)

- Addis Ababa Environmental Protection Authority
- City Manager
- Addis Ababa City River Basin
- Green Area Development and Administration
- Addis Ababa City Roads Authority

Partners

- The Addis Ababa Water Supply and Sewerage Authority

Approval

- The City Cabinet

9. Stormwater Management

Approximate Cost

At initial stage the short-term actions can be financed by relatively lower budget which is to be progressively increased to medium and higher budget as the actions are to be scaled up and additional activities are to be undertaken in the medium and long term period.

Indicators of Success

- Long term strategy development and action planning around water
- Proactive coordination around downstream impacts
- Integrated planning across interdependent urban systems
- Promotion of infrastructure for drainage and flooding
- Introduction and enhancement of neighbourhood blue-green infrastructure

Other Commentary

Please further check to note taker files (sent as picture as an additional attachment) if important points are missed. Further emphasis is given by participants to add influential people from the inner circle of the City Mayor as part of this initiative.

NEXT STEPS

Short term
Baseline survey on awareness and attitude, identify gaps, sensitization of the scale of problem and the importance of runoff, and pilot and/or model project implementation within 2 years, measure performance.

Medium term
Scaling up efforts to full-fledged awareness program (particularly at grassroots level), revising laws and policies (such as drainage master plan) to support the awareness raising program, and green-blue infrastructure development (soil and water conservation, rain gardens, retention and detention ponds at local level).

Long term
Scaling up green-blue infrastructure and watershed development through mass participation and mobilization.

4

VISIONS

This section describes the process of analyzing the interdependencies and alignments between emerging opportunities and prioritizing these into an initial high-level visions. It looks at alignment with existing projects and programs and indicates some potential next steps.

VISION	ACTION
1. Build water sensitive corporate organizations and businesses	1. Develop & implement a capacity building program for efficient and sustainable water management for high water users 2. Implement a benchmarking study for water consumption and NBS options for large institutional zones 3. Develop policy Incentives for stewardship programs to promote CSR around water
2. Support equitable access to safe and reliable water	1. Develop a baseline assessment of water access and quality for vulnerable groups using local data 2. Develop policies and programs for innovative financing for affordable water access for vulnerable groups 3. Upgrade water insecure areas prioritizing decentralized water services and low-cost innovations
3. Enable clean water (river) courses	1. Expand educational programs on WASH to include water pollution and ecosystem protection 2. Strengthen community voices for cleaner urban rivers 3. Develop and implement an innovation lab for wastewater treatment and waste management along water courses 4. Build capacity of regulators through the sensitization and awareness building of licensing and permit issuance sectors 5. Build treatment, recycling, and pollution abatement capacities of major industrial corporates 6. Undertake activities to incentivize good performing industrial corporates while penalizing the polluting industrial corporates
4. Reliable and secure city region water supply	1. Increase communication and leadership around inter-regional water resilience 2. Strengthen existing platforms and networks for political collaboration around water resilience 3. Conduct assessment of existing water resources and strengthen IWRM
5. Comprehensive/ participatory planning and implementation	1. Establish a catchment water resource planning and management agency 2. Implement a capacity building program on regional and metropolitan governance 3. Build skills and knowledge to improve land-based financing to finance water infrastructure
6. Access to reliable and up to date data to build water resilience	1. Establish a new data centre around water resilience and build capacity of agencies to contribute and coordinate 2. Develop research partnerships models with local universities for long term water risk analysis 3. Complete community vulnerability mapping for resilience assessment
7. Resilient infrastructures	1. Implementing smart data systems for monitoring water loss 2. Develop a capacity building program on water loss reduction strategies and solutions 3. Implement a targeted short term water loss monitoring campaign to assess key problem areas
8. City wide, inclusive, resilient & sustainable sanitation	1. Baseline data collection and stakeholder engagement to create a City Sanitation Dashboard 2. Develop and implement a city sanitation exchange and learning event 3. Pilot a sanitation mapping project in a low-income community
9. Vision for sustainable stormwater management	1. Ensure the consideration of climate risks and natural water flow patterns in urban infrastructure planning and implementation 2. Develop a strategic green infrastructure plan to address storm water management challenges in Addis 3. Implement a resilience academy to integrate a multi-benefits resilience approach in ongoing green infrastructure projects 4. Pilot community level sustainable storm water management project 5. Implement a pilot sensitization campaign for citizen stewardship on stormwater management 6. Retrofit existing infrastructure to integrate a water sensitive agenda

NEXT STEPS

In the coming months the strategies identified in this report will be further developed into clearly articulated actions. WRI will convene key organizations and stakeholders to assess and identify where actions can be integrated into other plans and where new actions will remain part of this water resilience strategy. Key actions will be reviewed and refined by stakeholders to ensure they include all relevant perspectives, including of those who may not have been able to participate in the workshops.

Using evidence based spatial analysis WRI will work with action owners to further phase and prioritize place-based interventions. WRI will engage external subject matter experts and consultants as needed to implement technical analysis needed to assess feasibility and scope specific priority actions. This process will require time, resources and effort from all stakeholders. This is expected to be an ever-evolving and improving blueprint of actions - one that takes advantage of existing programs and relationships while advancing change through new individual or collaborative actions to build resilient and equitable water systems and services.

DELIVERABLE	MILESTONE DATE
Complete City Characterization Report & OurWater Analysis	Feb, 2021
Complete CWRA Assessment workshops and problem statement report	Mar, 2021
Complete Visioning workshop and draft action briefs	April, May, 2021
Integrate evidence based and place-based priorities in Action plan	June, 2021
Compile and Refine Action plan	July, Aug, 2021
Seek political approval and commitment on Actions	Sept, Oct, 2021
Develop TA scope and partnership plan for 2 priority actions	Sept, 2021
Design and production of Action plan	Sept, 2021
Start and Implement TA scope	Oct, Nov, 2021
Release Action plan and announce TA partnership (COP26)	Nov, 2021
Other Actions are advanced by local champions	Dec, 2021
Results of progress are shared at a peer to peer knowledge exchange forum	Jan, 2022
City Participates in a convening for the Catalytic Fund	Feb, 2022

VISION 1:

Water Sensitive Corporate Organizations and Businesses

MODIFIED OPPORTUNITY

Promote water-sensitive behaviour and ensure sustainable water use and access for high water demand businesses and organizations.

CHALLENGE DESCRIPTION

Industrial and commercial development is essential for a rapidly growing economy like Addis Ababa. However, this has also impacted the increase in the demand for water and the pressure on the city's utility. The city is facing challenges and financial strain to extend services and meet the increasing demand. Beverage factories (e.g., Coca Cola, Heineken Brewery, Awash Wine factory, BGI Ethiopia…), corporate business organizations (such as Ethiopian Airlines), industrial parks and also governmental institutions (e.g. Ministry of Defence, Addis Ababa University…) are among the ones who consume a considerable amount of water. In response to these growing challenges the city utility has been encouraging the development of boreholes within the premises of high-water consuming organizations, particularly industrial establishments. However, with limited information and capacity to monitor and regulate groundwater level and extraction, the city is facing over extraction and depletion of groundwater sources. This response signifies a reactive measure adopted by the city utility which is unsustainable. In addition, the uncontrolled discharge of untreated wastewater from industries is polluting the city's water resources.

VISION DESCRIPTION

This vision is set to promote the active role of corporate organizations while ensuring sustainable use and access to water through managing their demand and reducing their hydrological footprint, thereby encouraging them to fulfil their corporate social responsibility and contribution to the transition towards a water resilient city. Promoting water sensitive behaviour of high-water consuming organizations is needed to ensure the achievement of the vision I. This entails increasing efficiency of water utilization of the particular organizations through providing training, raising awareness and fostering champions of change among the executives and employees of the organizations.

Concomitantly, promoting a stewardship program helps the development of alternative financing mechanisms for addressing the demand. For example, encouraging high consuming organizations (who have the potential financial capacity, large land holdings and roofs, and secured tenure) to complement their needs through implementing nature-based solutions (NbS) within their premises. Additionally, using alternative off grid water sources such as rainwater harvesting and grey water re-use for non-potable consumption helps to reduce their hydrological footprint. This needs to be

VISION 1

complemented through acknowledgement, recognition and certification from appropriate authorities and officials (such as ISO standard certification) which help to incentivize the organizations for increasing efficiency in water use, implementing NbS and reducing their dependency on the city's centralized water supply system.

The following needs shall be addressed by the vision:

- Curb the increasing demand and improve the efficiency in the utilization of water by high water consuming organizations. Provide training, demonstration and introduction of innovative water technologies for efficient utilization. Increase awareness on the importance of water conservation, water saving methods and technologies, and foster water sensitive behaviours through organizing training and awareness building programs. Advise and promote high water users to consider re-use of water for non-potable purposes.
- Develop guidelines, certification mechanisms and incentive packages for promoting stewardship programs and corporate social responsibility of large water consuming organizations.
- Revise the existing water tariffs to signal the importance of managing demand and increasing attention to water saving and efficiency in use of high-water users.
- Promote the use of rainwater harvesting and the reuse of grey water by introducing innovative property taxation and tariff systems according to the land cover, impermeability, and contribution of runoff from each large land holding and high-water consuming organizations using remote sensing and GIS technology for longer term action.
- Active participation of high-water consuming organizations in transitioning to a water resilient city. Develop incentive mechanism for promoting stewardship programs.
- Devise monitoring mechanisms and evaluation criteria, and conduct regular monitoring and evaluation of the implementation, accordingly revise and take necessary steps and actions that help to better achieve the visions.
- Promote reporting on ground water extraction and use and develop guidelines for extraction based on city priorities, users' needs and ground water capacity.

RELEVANT ASSETS AND RESOURCES

- Addis Ababa Water Fund project: aims to generate capital from business operators and high-water consumers for financing ecosystem conservation and ensure water security.
- Addis Ababa Resilient Strategy: Under action 32 of goal 3.1 demand side intervention strategies is focused on reducing high consumption level of consumers, thus this particular vision is aligned with and helps in the realization of the existing City Administration resilience goals.
- International Institute for Sustainable Development (IISD) and United Nations Industrial Development Organization (UNIDO) funding opportunity from Mava Foundation and the Global Environmental Facility (GEF) aims to provide technical assistance to conduct cost benefit analysis and return on investment assessment on specific nature based solutions projects. This initiative can help to formulate bankable projects for the realization of NbS and thus helps to encourage and increase the confidence of the high-water consuming organizations to implement the most viable NbS in their premises.

VISION 1

- Strategic Planning framework for Nature Based Solutions (NbS): The WRI project is a systemic assessment of asset mapping, risk assessment, and NbS options assessment that fit multiple needs, and thus is a relevant ongoing initiative by WRI Cities team and Cities for Forest (C4F) team that can be synergized with this vision. Accordingly, the NbS options scanning can be focused to locations of high-water consuming organizations, so as to identify a suitable NbS solution that meets multiple needs of the high-water consumers and addresses the water security challenges Addis is facing.
- Some of the corporate organizations already have active stewardship programs which can be linked and capitalized with this initiative.
- This initiative can also be linked with the WRI Africa's urban water resilience framing paper (forthcoming publication) pathway three, which is about innovative institutions and partnerships for water resilience. Particularly linking this initiative with the African Green Stimulus Program, which is indicated under the mentioned third pathway, can provide funding opportunities from the African Development Bank.
- Corporate social responsibility in sub-Saharan Africa, https://www.springer.com/gp/book/9783319266671.

SHOCKS AND STRESSES

- Water scarcity
- Flooding
- Environmental degradation
- Water quality

OVERALL CHAMPIONS

- AARPO - lead organization
- AAWSA - co-lead

VISION 1

ACTION 1.

Near term - Capacity building program for efficient and sustainable water management of high-water users.

DESCRIPTION

Developing water sensitive behaviour of high-water users, first and foremost requires a capacity building program for more efficient and sustainable water management. Through communication and media engagement, awareness can be created about water challenges in the city and highlight the role of high-water consumers in the transition to a water resilient city. This will help to introduce and promote the importance of the overall program or project and the benefits of engaging in the program and/or project. In addition, building coalition with the key stakeholders to oversee the progress of the capacity building program and the overall actions, as well as to ensure transparency, could be essential.

Identification and engagement with specific large users should be undertaken in the short term to understand their needs and current issues faced. Training and awareness building can be arranged for executives and employees of high-water consuming organizations. Depending on the technology and the training needs, on the job training, demonstrations and introduction of innovative water saving and alternative off grid water technologies could be provided.

Stakeholders

- AARPO - lead
- High water consumers - users
  - Ethiopian Airlines
  - Industrial parks
  - Ministry of Defence
  - Addis Ababa University
  - Coca Cola, Heineken Brewery, Awash Wine factory, BGI Ethiopia
- Chamber of Commerce - facilitator and disseminator
- Media - awareness and dissemination

Potential funding sources

There may be a potential for the Chamber of Commerce to facilitate a funding group for these activities. Partly the activities of this action can be financed from water fund and WRI-Africa's project Strategic Planning for NbS. As a lead organization, AARPO better be a co-financer of the activities so as to own the process for ensuring continuity.

Next Steps

- Identification of key water users in the city and initial engagement activities
- Media campaign around business water use
- Seeking agreement with key users to share their water use information to assess potential efficiencies to be addressed
- Capacity building with large water users in water efficiency and alternative technologies
- Fundraising with business groups

Outcome

Developing stronger relations between the city and major water users will allow for capacity building and behaviour change around water use to be achieved. This will promote more efficient use as well as explore the potential for alternative water sources.

VISION 1

ACTION 2.

Short term to medium term – Benchmarking the water consumption and scanning NbS options for corporate/business water use.

DESCRIPTION

Undertake a baseline assessment – detailed and holistic data about the water system of selected high-water users and natural asset scanning within the premises and hydrological linked areas of the high-water users as well as a detailed accounting of land use and land cover, permeability of the premises, and landholding of the high-water users. This detailed assessment and benchmarking exercise helps to identify any wastage, indicate the potential for NbS options, pinpoint the specific areas for building capacity and to monitor the change through time using remote sensing and GIS technology.

Further assessments of cost benefit analysis and return on investment can potentially be supported by partners like IISD. This analysis includes projecting future climate scenarios in Addis Ababa to value resilience indicators such as carbon storage, urban flood risk, and urban cooling. In addition, based on the selection of specific NbS options a training manual and guide can be prepared by WRI's Cities4Forest team in partnership with IISD to support the stakeholders in implementing NbS interventions to support sustainable water use and management.

Stakeholders

- AARPO - lead
- AAWSA - co-lead
- Environmental Protection Authority - regulator
- WRI

Funding

The baseline assessment and spatial mapping exercises will be a medium-term cost and can draw on other mapping activities already undertaken in the city.

Next Steps

- Baseline assessment of the water system (consumption, discharge, inflow and outflow), demand patterns and spatial mapping of business areas.
- Identification of the use of NbS options for specific users and areas.
- Creation of an integrated cost benefit analysis examining the value of NbS options versus grey infrastructure options in future climate scenarios.

Outcome

The city and major users will gain an understanding of the true demands now and forecasted for water in Addis Ababa, allowing them to link to the existing City Characterization Report, Resilience Strategy and future plans to manage demand side management.

VISION 1

ACTION 3.

Medium to long term - Incentivize stewardship programs and promote corporate social responsibility.

DESCRIPTION

Develop guidelines, certification mechanisms and incentive packages for promoting stewardship programs and corporate social responsibility of high-water consuming organizations. There are already existing standards in the global water community to encourage water stewardship amongst businesses. For example, the Alliance for Water Stewardship (AWS) has developed an International Water Stewardship Standard framework to assist alliance members with understanding their water impacts and adjust their current management towards more sustainable water consumption practices. This specific framework is built around a set of criteria which encourages organizations to gather data, make commitments, implement a stewardship plan, evaluate their performance, and communicate the effort's progress in order to receive the AWS certification. By utilizing existing guidelines such as the AWS Standards, corporate members in Addis Ababa can collaborate with each other to address the identified water-related risks in their catchment areas and implement collective water stewardship schemes.

In addition, explore the possibilities of introducing an innovative property taxation and tariff system according to the land cover, impermeability and contribution of runoff from each land holdings of high-water consuming organizations so as to promote the use of rainwater harvesting and the reuse of grey water. Devise and conduct a monitoring and evaluation system and accordingly take necessary actions to incentivize or sanction.

Stakeholders

- AARPO - lead
- AAWSA - co-lead
- Environmental Protection Authority - regulator
- Chamber of Commerce - facilitator and disseminator
- Ethiopian Institute of Architecture, Building Construction and City Development - research and innovation
- Ethiopian Institute of Water Resource - research and innovation

Funding

Funding for policy development and development of new tariff mechanisms is likely to be needed over the long term, as these actions are likely to take a significant time.

Potential funding sources

Main funding source for this action shall be from CSR funding and from stewardship program of the corporate organizations. Other funding sources could be AfDB's African green stimulus program and green bond insurance.

Long term aspirations

- Engage with AARPO on existing Resilience Strategy programme on demand side management.
- Provide training and capacity building to high water users on specific areas (i.e., for adapting NbS and on how to reduce hydrological footprint) based on need assessment.
- Provide policy guidance on land use, zoning, building regulations and tariff structures to improve water use, treatment, and discharge for businesses.
- WRI and other international partners could facilitate Green Building Certification and/or LEED certification for those high-water users that properly implemented NbS and effectively reduce their hydrological footprint so as to incentivize them.

Outcome

In the longer term this action will help provide policy guidance to improve water use, treatment and discharge for businesses as well as develop a finance system that rewards innovative and efficient water use by large consumers.

VISION 2:

Equitable Access to Safe and Reliable Water

MODIFIED OPPORTUNITY

Improve safe and reliable access to water for marginalized communities and vulnerable groups.

CHALLENGE 2 DESCRIPTION

The lion share of the city's water demand (50-60%) is currently unmet and the future trend shows an exponential increase in the unmet demand due to rapid population and economic growth. On top of that, the low maintenance of water networks, which is compounded by poor leakage detection, is resulting in a high rate of leakage, wastage and inefficiency of the system. Particularly, previous studies show that the high elevation differences in the pressure zones of the water supply distribution sub-systems are causing the leakage and wastage, while the lack of sub-metering at the district level, is mentioned as a reason during stakeholder workshop, are responsible for the failure of timely detection of leakage.

More importantly, poor households are disproportionally affected by this problem. Despite the fact that there is little data on the population and their access to water, which is posing limitations to understand the extent of the problem, inequalities in access to water are generally prevailing in the city. Low pressure and frequent power disruptions are affecting communities living in elevated areas such as poor households in Gulele sub-city and Gulele district of AAWSA[1] are highly affected because of intermittent supply.

In addition, title deed is required for private connection to water supply (less than 60% of the households have private connection), while poor households living in informal settlements and slums get access from public fountains/ communal water tap or water distribution trucks. Water access through these communal services are available for limited times of the week, thus, there is a long queues and it is usually supplied at a difficult time to access water. The higher cost of connection fees and stringent requirement (such as title deed) are also one of the reasons for low level of individual connection. The city's utility (AAWSA) is facing financial constraints and challenges to cover the cost of extension to these poor neighbourhoods. Additionally, the limitations to increase the supply at city level because of political, financial, operational and climate change influences and challenges are further compounding the problem.

(1) A sub city is devolved administrative level which is mandated to administer, implement and facilitate conditions for services in its respective jurisdiction. Accordingly, Gulele sub city is one of the 11 sub cities of Addis Ababa City Administration. On the other hand, unlike other sectors and irrespective of the sub city administrative division, AAWSA has its own branch offices which are responsible to install, manage and operate tertiary lines and customer services. Whilst Gulele district of AAWSA is found in similar location with that of Gulele sub city, which both are found in the northern part of the city, however the boundaries and the surface areas are differing.

VISION 2

Because of these limitations, poor households are forced to buy water from private vendors at higher prices. Therefore, getting access to water takes considerable time and energy, as well as a significant proportion of the poor households' budget. Reduction in basic water consumption as a maladaptation to water scarcity is exposing households to multiple health risks. The limited access affects the hygiene of low-income residents increasing the health risks and shocks like water borne and infectious diseases. Moreover, because of scarcity and limited access, poor households tend to store water at home for a longer time which degrades the quality, further exposing them to health risks. Women and girls are particularly affected as they are the ones who are responsible for managing the household chores and water. Renters and/or tenants, particularly in low-income communities, are also significantly affected because of unstable rental conditions with limited contract time for staying and are frequently displaced because of the ever increasing and unregulated rental market, and the additional restrictions and regulations to access posed by the lessor.

VISION DESCRIPTION

This vision aims to achieve more equitable access to water by focusing on improving the safe and reliable access to water of the marginalized and vulnerable groups. A special emphasis and focus on marginalized and vulnerable communities and households is needed to narrow the gap and inequities in general at the city level. Ensuring equitable access will help to improve the health conditions, productivity and livelihood of the poor households and the city as a whole. Therefore, targeted pro-poor programs and projects are required to be developed to address the special needs of poor households and communities in regard to the access to safe and reliable water. This entails developing grounded and realistic strategies through research and experimentation that are well-articulated to the specific needs and more effective to address the above-mentioned complex problems and challenges. More flexible, inclusive and innovative approaches are thus needed for orienting towards pro-poor programs and projects.

Therefore, the following needs shall be addressed by the vision:

- More flexible and innovative approaches are needed to improve access to water and address the specific needs of the marginalized communities and vulnerable groups. Particularly, it is important to develop innovative and appropriate financial and institutional arrangements that best fit the needs of vulnerable groups (e.g., targeted subsidies, cross-subsidization schemes, flexible payment, institutional arrangement that includes off-grid approaches and small-scale providers, micro-finance institutions...).
- Developing more appropriate, relevant and effective monitoring systems and local data are also needed. This entails conducting research, piloting and testing in order to develop locally relevant indicators. In addition, this shall be conducted through participatory vulnerability assessment and mapping in order to devise an appropriate monitoring system.
- Supporting and capacitating existing grassroots actors who are best suited and placed to fill the gap in access to water for poorer communities are also required. Focus needs to be given while capacity building to grassroots informal small-scale providers, women and community initiatives. Empowering marginalized and vulnerable groups like women, girls, disabled people, etc. through training, and targeted financial (e.g., micro-finance programs) and technical support is important.
- Monitoring and regulating the costs and quality of water supply services in marginalized and vulnerable communities is also important.

VISION 2

- Increasing investment to address the mounting problems in poorer communities is needed.

RELEVANT ASSETS AND RESOURCES

- Water delivery during COVID- 19: AAWSA has rolled out 35 water tanker trucks in areas with water scarcity problems. Water supplied to industries, which typically accounts for 20% of the city's total demand, has been reduced by 75% and temporarily redirected to households to avoid water scarcity. Portable hand washing stations have also been deployed at various locations, such as transport stations, to promote proper hygiene and combat the outbreak. Different stakeholders supported and contributed to the technical innovations in public hand washing.
- Second Urban Water Supply and Sanitation Project (SUWSSP): Financed by a loan from the World Bank, the SUWSSP aims to increase access to enhanced water supply and sanitation services in an operationally efficient manner in Addis Ababa and selected secondary cities. The program will provide improvement to the water and sanitation services in Addis Ababa, as well as support for operational efficiency improvements and institutional strengthening of the city's water utility.
- WRI Urban Water Resilience Initiative Community Perspectives Project: This initiative is launched to document community stories and inform urban decision makers about the experiences of women, youth and disadvantaged community members affected by water challenges. It helps to get a detailed account of water challenges and how the disadvantaged community members cope with the problems. Therefore, it is well aligned and can contribute to the achievement of this vision, in particular to the understanding the local problems on the ground and the development of locally relevant indicators.
- Socio-economic Vulnerability Assessment Project: Is a WRI initiative, that aims to identify the nexus of water risks and socio-economic marginalization households face and prioritize place-based water resilience investments, for the most socio-economically vulnerable communities. Therefore, the WRI socio-economic vulnerability assessment project is directly aligned to and can be integrated with the actions and/or project outlined under this vision.
- Addis Ababa Resilience Strategy: This vision particularly focused on the implementation of goal 3.1 of the City Administration resilient strategy, which is to provide adequate safe and reliable water and sanitation service for all. Therefore, this vision can help to further articulate and to undertake the implementation of the city resilient strategy.
- National One Wash program: This vision contributes to the achievement of one of the targeted outcomes of the National One Wash program, which is enhancing equity. Testing and promoting appropriate technologies that address the needs of the urban poor and marginalized people, advocacy and awareness of equity in urban WASH needs, and gender responsive programming are among the planned activities of the National One Wash program which directly aligns with this vision. Therefore, the actions and/or projects outlined under this vision can be financed by the National One Wash Program, through which funding source from Federal and international donor agencies can be obtained.
- WRI Africa's Urban Water Resilience Framing Paper (forthcoming publication): The second priority pathway for action of the WRI Africa's urban water resilience framing paper, inclusive and secure water and sanitation access for households, contains strategies that are directly aligned

VISION 2

with this vision and helps to structure the actions. Therefore, in accordance to the strategies of the second priority pathway the actions for this vision can be structured into three sections. The three strategies are – targeted policies to increase water connections, affordability and availability for the most socially vulnerable; support in upgrading of water-insecure areas and localized innovations that increase access to safe water infrastructure and healthy spaces; integrated local data, knowledge and community participation in decision making.

- "... the Household Water Insecurity Experiences (HWISE) scale22 goes beyond measures of water availability and quality to capture the unique experiences of water-secure individuals using a cross-culturally validated scale. The HWISE scale provides data that can be used to assess the prevalence of water insecurity at the household level, identify vulnerable populations, monitor and evaluate interventions, and determine cost-effectiveness" (Habtemariam et al. 2021: 65[2]).
- Box 6. Community-managed upgrading in Kibera, Nairobi, improve access to safe water infrastructure and healthy spaces (Habtemariam et al., 2021: 63).
- Box 10. Channeling finance to locally led climate adaptation (Habtemairam et al. 2021: 85).
- Pilot programs using technology solutions to mainstream private/informal vendor services (tanker services, water cart vendors, pit latrine emptiers etc) in under-served areas to improve quality of services, by improving transparency, regularizing costs, and providing access to finance. For example, Kampala program with GSMA uses GIS technology on a mobile application for pit latrine emptiers to locate their customers collection point, document their actions, and record the location of the dumping. This digital tool in Kampala encourages customers and emptiers to use mobile money exchange through the app for accessible and reliable payments.
- Partnering for Green Growth and the Global Goals 2030 (P4G), Finance for WASH Access Partnership: This P4G partnership collaborates with banks and microfinance institutions to improve and increase private investment capital for WASH solutions. In Ethiopia, this partnership is led by Water.org which has developed and demonstrated a successful lending process and business model that is applicable throughout Ethiopia and across the world.
- Massive Open Online Course (MOOC) on Water Supply and Sanitation Policy in Developing Countries Part 2 - Developing Effective Interventions: The International Water Association (IWA) directs water professionals to this free, online course covering water pricing, tariff design structures, and subsidies. Throughout the course the instructors review policy interventions that donors, national governments, and water utilities have each implemented to improve water and sanitation conditions.

SHOCKS AND STRESSES

- Water shortage
- Water quality
- Disease outbreak and health stress
- Flooding
- Sanitation and hygiene
- Corruption: vandalism, petty corruption at local level, as well a sexual abuse faced daily by women and girls in underprivileged areas, to get access to water

VISION 2

OVERALL CHAMPIONS

- AAWSA - lead organization
- AARPO - co lead
- National One Wash Program Office[3] - executive champion
- Community organizations and Women Organizations (Iddirs, Equbs, Mahiber, faith-based organizations) - user champions
- Small scale water retailers - user champions
- Small and Medium-enterprise Development Bureau - project champion
- Local government (woreda administrations) - project champion
- Habitat for Humanity - project champion
- World Bank
- WRI
- JICA
- Sovereign funds
- African Development Bank

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(2) Habtemariam, L.W., Gelaye, F., Du, J. and Mahendra, A., 2021. Water Resilience in a Changing Urban Context: Africa's Challenge and Pathways for Action. World Resource Institute.
(3) This is from the Ministry of Water, Irrigation and Energy

VISION 2

ACTION 1.

Short term - Establish a baseline of water access in underprivileged areas and vulnerable groups, and integrate local data and knowledge through community participation, local advocacy and engagement with utility and third-party service providers.

DESCRIPTION

There are currently gaps to understand the extent of the challenge regarding the access to safe and reliable water in vulnerable communities and monitor the situations, as the factors are locally specific temporal and spatial variables e.g., "the change in the quality in between the source and point of consumption" (Habtemariam et al., WRI forthcoming publication). In the past, strategies and actions have not been well articulated or effective in improving the access to water to most vulnerable groups and to addressing their needs. This action is aimed to establish a baseline, create better understanding about local socio-economic factors further affecting equitable access and devise appropriate and relevant monitoring systems by integrating local data and knowledge. It provides an opportunity to have in-depth knowledge about the challenges and the situations from the perspective of the marginalized and vulnerable groups and to generate valuable feedbacks to policy makers for sharpening strategies and designing tailored programs for addressing the needs of vulnerable groups. This will include socio-economic vulnerability assessment, mapping of current water accessibility and means of access, documenting coping strategies of households in under-served areas through community participation so as to develop appropriate indicators.

Stakeholders

- AAWSA - lead
- AARPO - co-lead
- WRI-Africa - technical support
- Local community organizations (Iddirs, Mahibers, faith-based organizations) - partners
- Local authorities (woreda administrations) - facilitators and partners
- National One Wash Program Office - financer and oversee

Funding

The steps are chronologically set with relatively low finance in the beginning at a pilot level which will be increased correspondingly while scaling up in the later stages and the refined actions thus helps to effectively utilize the increased budget. Funding opportunities are already available from WRI to support the pilot initiative and the scaling up shall be financed through AAWSA and the Office of National One Wash Program.

Potential funding sources

This activity shall mainly be funded by the National One Wash program, which is directly aligned with the program. In addition, it can be partly financed as a pilot by WRI-Africa projects – Urban water resilience video and Community level vulnerability and resilience capacity assessment. Moreover, co-financing from AARPO and AAWSA is needed so as to ensure ownership and continuation of the process by the City Administration.

Next steps

- Gap analysis by AAWSA through stakeholder engagement (regarding network, connection, metering, funding)
- Selecting and identification of priority underserved areas through discussion with AARPO and AAWSA (recognition of informal settlements in the selected underserved areas)
- Undertaking WRI Urban Water Resilience Initiative Community Perspectives Project and Socio-economic Vulnerability Assessment Project focusing on the selected priority underserved areas as a pilot
- Documentation, sharing and dissemination of outcomes with members of underserved communities and key stakeholders through organizing community events so that the communities can own the process (joint work of AAWSA, WRI and a local partner community organization)
- Advocacy and capacity building around water accessibility and supporting organization of local groups, particularly women centered groups, for monitoring and follow up actions, including providing training and technical support
- Generating lessons and developing guidelines for future activities and scaling up

Outcome

Key lessons from pilot engagement can be generated as policy feedback. Locally relevant and appropriate indicators of access to water tailored to vulnerable communities are expected outcomes of this specific action. Increased knowledge and awareness on the challenges at different governance levels and improved local capacity, organizations and networking can be identified through the pilot scale project to address the inequalities in access to water.

VISION 2

ACTION 2.

Short term to medium term - Sharpen the existing policies and programs and develop innovative financing mechanisms in particular to reach out and develop affordable water access option to vulnerable and marginalized groups.

DESCRIPTION

This action helps to design more relevant policies and programs that could address the needs of vulnerable and marginalized groups and communities, which shall be based on the outcome of the first action so as to make it a research-oriented action. Revising and increasing tariffs of high-water users and improvement taxes and or development fees instituted in key public investment areas and high-income localities across the city can help generate finance for cross-subsidization of improving water access in underprivileged areas. This is to be followed by developing free connection and/or cross-subsidization schemes to water access in underprivileged areas, which shall be complemented with coordination of water programs through pooled funding schemes and open budgeting initiatives that would be openly publicized and monitored in partnership with independent oversight institutions and marginalized community groups.

Developing partnerships with and increasing support to community-managed water taps and kiosks, and small-scale water retailers shall also be part of the action. Delegated management model (an institutional model in which AAWSA can delegate operational responsibilities to small scale providers) and subsidized community bulk metering will be developed and applied.

Following the above policy actions, it is important to devise appropriate and relevant monitoring systems by integrating local data and knowledge. The quality of the services and the prices in the project areas (with the prioritized underprivileged communities) will thus be monitored in partnership with women centered local community organizations.

Stakeholders

- AAWSA - lead
- AARPO - co-lead
- Bureau of Land Development and Management - support
- Bureau of Finance - finance and coordination
- National One Wash Program Office - finance and oversee
- Local governments, Woreda Administrations of the selected prioritized underprivileged communities - support and facilitation
- Local community organizations in underprivileged communities, particularly women centered local community organizations - partners
- Small and Medium Enterprise Development Bureau - support and facilitation
- Small scale water retailer in the selected underprivileged areas - partners
- International Budget Partnership - technical support to open budget surveys

Funding

As described above this action shall be financed through the revenues generated from increased tariffs and property taxation. Furthermore, this action shall be financed through pooled funding schemes by coordinating sources obtained from donors and NGOs.

Potential funding sources

National One Wash Program, AAWSA's revenue from increased tariffs of high-water users, City Administration revenue from increased taxation in key investment areas and high-income localities, co-financing from Small and Medium Enterprise Development Bureau budget, revolving loan repayment and fees collected from beneficiaries can be potential funding sources.

VISION 2

Next steps

- Develop cross-subsidized connection schemes for underprivileged areas (AAWSA in collaboration with other key sectors such as Bureau of Land Development and Management to carry out development of cost recovery models and sustainable funding).
- Coordinate and develop pooled funding programs and open budgeting initiatives in conjunction with international organizations.
- Provide local enabling environment to support the development of microfinance institutions (MFI) and micro-credit programs among existing lending institutions to facilitate increase in access to finance and water to the most vulnerable communities.
- Work with partners such as Water.org, a member of P4G's Finance for WASH Access Partnership, to unlock additional capital through loans to enhance water and sanitation solutions in Addis Ababa.
- Develop partnerships with local community organizations, small scale retailers, MFI and International Budget Partnership.
- Devise and conduct locally appropriate and relevant monitoring system.

Outcome

More articulated policies, programs and finance systems tailored to address the needs of vulnerable and marginalized community groups. Improved water access in underprivileged areas shall be the ultimate outcome of this action.

VISION 2

ACTION 3.

Medium to long term - Support the upgrade of water insecure areas, through decentralized water services, and localized innovations that increase access to water of underprivileged areas.

DESCRIPTION

This action shall be undertaken partly in parallel with the second action, which can be complemented and synergized together as some of the activities are aligned. Invest to support localized innovations, off-grid providers, and undertake comprehensive upgrading in underprivileged areas (squatter settlements and slums). Support the development of off-grid and decentralized water services (such as rainwater harvesting and community boreholes) to complement the centralized pipe water supply to improve access in the underprivileged areas. Promote and support community-led upgrading efforts by ensuring tenure security, providing training and technical assistance and fundraising. Develop partnership with small scale providers and innovators. Promote and channelize funds through social impact investors, microfinance institutions and corporate CSR programs through innovation challenges like the City-fix labs to pilot projects in the most vulnerable communities. Jointly monitor and regulate the price and quality of services of the decentralized and off-grid water supplies in partnership with local community organizations and city government.

Stakeholders

- Urban Planning Institute-lead
- AAWSA - co-lead
- AARPO - co-lead
- Bureau of Land Development and Management- support and facilitate
- National One Wash Program Office- finance
- Small and Medium Enterprise Development Bureau- support and facilitate
- Local community organizations- partners
- Small scale off-grid provider - partners

Potential funding sources

This action shall be mainly funded by the City Administration and co-financed by National One Wash Water program. The action can also be co-financed by fundraising from corporate organizations, which shall be acknowledged and certified as part of their corporate social responsibilities.

Next steps

- Launch comprehensive upgrading pilot project in prioritized underprivileged areas in partnership with local community organizations
- Identify localized innovations and off-grid providers in prioritized underprivileged areas
- Develop support package and funding schemes to off-grid and decentralized small-scale water supply providers
- Provide training, technical and financial support to the off-grid and decentralized small scale water supply providers
- Develop monitoring system and jointly regulate the price and quality of services of the decentralized and off-grid water suppliers in partnership with local community organizations
- Build awareness and advocate for scaling up such local decentralized solutions by documenting and sharing proof of concept for the work

Outcome

Reliable, locally affordable, and widespread use of decentralized and off-grid water supply services in underprivileged areas can be achieved through this outcome. Improved safe and reliable water access in underprivileged areas shall be the ultimate outcome of this action.

VISION 3:

Clean Water Courses

ORIGINAL OPPORTUNITY

Target both the formal and informal education to build socioeconomic transformation, positive culture change and awareness around water source protection, development, environmental sensitivity, and sustainability.

CHALLENGE 3 DESCRIPTION

The city rivers are highly polluted mainly due to toxic industrial waste such as heavy metal, chrome and even radioactive waste directly discharged without proper treatment affecting public health and impacting livelihoods depending on the river such as urban and peri urban farmers. According to Addis Ababa Environmental Protection Authority, large and medium scale industries are breaching environmental laws, and releasing effluents that do not fulfil environmental standards. The majority have no treatment plant, while some have inadequate treatment systems just for lip service to regulators and very few have ISO 14001 Environmental standard Accreditation. There is lack of proper and regular inspection and the level of industrial waste and effluent released into the river system are not properly recorded. Most of the city's industries are using old and obsolete machines causing severe pollution. They have limitations in terms of financial and human capacity and facilities to recycle or properly treat their waste. Though there have previously been efforts to penalize the polluting industries, because of the inconsistency and weak enforcement measures, limited capacities and power of the environmental regulatory organizations, the polluting industries remain incompliant to the environmental laws (Amare, 2019).

In addition, during the city assessment and visioning workshop, the city stakeholders recognized that there is a lack of awareness and collective consciousness to support better environmental management of water assets in the city. Many in the community see rivers as waste carriers often dumping waste into these water sources. Further, a challenging topography along with poor sewage infrastructure, inadequate solid waste management and insufficient drainage services results in many areas being prone to riverine flooding as a result of the highly compromised flows of polluted natural water bodies. In addition, loss of green spaces as well as proliferation of impermeable areas and lack of environmental rehabilitation programs in upper catchments and along riverbanks leads to increased runoff and siltation issues.

Many urban poor communities living along riverbanks including those living in informal settlements and practising urban farming face increased exposure to water borne diseases resulting from polluted water ways, damage to housing and loss of livelihood from recurring flooding. Further high household poverty rates and unemployment limit the capacity of a third of Addis Ababa households to pay for environmental services and infrastructure improvements.

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This is coupled with the city's limited municipal budget, insufficient federal funding challenges the ability to invest in large public improvements.

In addition, the city lacks the capacity or expertise to plan and invest in lower cost, more effective, non-polluting technologies like nature-based solutions and the bias towards grey infrastructure solutions is strong. City planning processes often do not engage with the community and stakeholders, resulting in non-contextual interventions. Further city processes do not incentivize inter-agency, inter-sectoral interventions and inter-disciplinary thinking, leading to siloed approaches and wastage of limited city resources. It is therefore important to invest in capacity building measures to improve knowledge of alternate solutions that build community stewardship and offer multi-benefit solutions that create jobs.

VISION STATEMENT

The vision recognizes that the sole efforts of environmental regulators cannot protect the rivers from pollution and the conventional regulatory approaches of fines and fees to control pollution of water courses are not effective when the city agencies have low enforcement capacities. Cross sectoral cooperation and coordination between regulators, licensing and permit issuance authorities (such as binding agreement between Addis Ababa Environmental Protection Authority with licensing, investment and building permit sectors) and political commitment is needed to protect the rivers from pollution. In addition to penalties and code enforcement, there should be incentives and capacity building measures to ensure the implementation of environmental laws.

Furthermore, the skewed focus to invest in centralized, publicly owned grey treatment infrastructure as a lasting solution to domestic wastewater management is not effective for multiple reasons, such as, it might be cost prohibitive considering the limited municipal budget, funding opportunities and affordability of the city residents. On top of that, it might not be ecologically sound and effective in terms of filtering pollution. In addition, as the experiences from developed nations signify, in the long term the full dependency on centralized grey infrastructure is not sustainable. Therefore, decentralized solutions and community engagement is critical to create long term buy-in and ownership of public goods and raise the awareness on environmental issues. It is therefore important that the city promotes a whole of community approach to water pollution management. This includes improved awareness and collective consciousness of the ecosystem benefits offered by its natural water assets (rivers and streams) including improved micro-climate, natural storm water management, recharge of ground water aquifers, flora-fauna etc. Incorporating awareness building campaigns and citizen led clean-up activities that will help communities rethink their negative perception of rivers as waste carriers, reduce dumping and become stewards of the city's water assets, is key.

In addition, to support investment in pollution mitigation measures the city must consider nature-based solutions to reduce runoff, improve recharge and provide localized wastewater treatment systems. Such systems require less capital investment, have low operations and maintenance costs, can be owned and managed by local communities, civil society organizations or social enterprises. They can also attract other streams of funding such as philanthropic funding, corporate social responsibility funds, social impact investment and can create local employment opportunities for urban poor communities living along the polluted water courses. This is important considering the limited budgets and institutional capacity, as well as the

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urgency to invest in job creating investments that identify market-based opportunities for waste and pollution management through a circular economy approach and open-up stewardship opportunities for a wider group of city stakeholders.

The following needs are addressed by the Vision:

- There is a need to raise awareness about environmental laws, to signal the long-term benefits of building water resilience, and to build treatment capacity of industrial corporates.
- There is a need to improve public participation in decision making on planning implementation and M&E, and to encourage, enable and incentivize implementation of community and business led stewardship opportunities to sustain the city's critical water assets.
- There is a need to protect the environment from pollution by highlighting the impacts of pollution on public health, livelihoods, environment and economic development.
- There is a need to build institutional capacity in terms of technical and managerial skills and knowledge of alternate technical and financial solutions that integrate ecosystem-based solutions and leverage other streams of funding to bolster investment in public goods. In addition, to integrate community engagement into internal city planning processes and set up processes to incentivize cross agency and cross sectoral approaches to problem solving.
- There is a need to apply appropriate and applicable technologies that are low cost and low maintenance and leverage other streams of funding, examples could include community led green infrastructure interventions, local rainwater retention, harvesting and recycling solutions.
- There is a need to create a networking platform that supports learning from the best practices from other cities in the region.
- There is a need to strengthen political commitment towards environmental management and improve capacity of the city to monitor and enforce pollution prevention efforts through smart detection systems.

RELEVANT ASSETS AND RESOURCES

- The Addis Ababa River and Riverside Green Development Project, otherwise known as Beautifying Sheger Project, aims to clean up the rivers and runs from Mount Entoto to Akaki, developing 56km green spaces along the rivers. The development will be along the two most notable rivers in the capital city, stretching 27.5 and 23.8 kilometres respectively.
- The yearly event, The Ethiopian Prime Minister Green Legacy Campaign, can increase the tree cover in open spaces and along riverbanks which could contribute to the filtering of river pollution and reducing run off.
- Source to Tap and Back Project (Sendafa area rehabilitation project) implemented in joint collaboration between Meta-Meta and AAWSA with a financial support obtained from Dutch government.
- Establishment of Recycling Park (Addis Ababa Resilience strategy action number 40).
- Establishment of accredited environmental pollution monitoring lab and environmental data management system (Addis Ababa city resilience strategy action number 44).
- Establishment of water fund.
- uMngeni Ecological Infrastructure Partnership, https://www.wri.org/insights/water-resilience-lessons-durban-south-africa.

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SHOCKS AND STRESSES

- River pollution
- Water quality
- Water shortage
- Environmental degradation
- High unemployment
- Flooding
- Disease outbreak
- Corruption

OVERALL CHAMPIONS:

- Lead- Addis Ababa Environmental Protection Authority
- Partners- Addis Ababa Water and Sewerage Authority, Addis Ababa education bureau, Ethiopian Investment Commission, Ministry of Industry, Industrial Park Development Corporation, Addis Ababa Environment and Green development Commission, Addis Ababa job creation agency, Addis Ababa Health bureau
- Approval- Ministry of education, Ministry of higher education, Mayor's office, AAEGDC, Addis Ababa education bureau

VISION 3

ACTION 1.

Medium term - Awareness raising and education to build socio-economic transformation.

DESCRIPTION

Target both the formal and informal education to build socioeconomic transformation, positive culture and consciousness towards water source protection, development, environmental sensitivity and sustainability. There are programs important for awareness raising and hygiene related opportunity such as NGO school WASH program which can be further enhanced, expanded and strengthened so as to support the social transformation to water sensitive behaviour. Examples of such programs are Splash Ethiopia which is currently providing support for safe water to vulnerable children and school WASH in Addis Ababa. Millennium Water Alliance is another NGO working to offer sustainable solution to safe drinking water sanitation and hygiene through education, advocacy, shared knowledge and collaborative programming. Others like World Vision also engaged in supporting improvement of access to water and improved sanitation and hygiene practices in Addis Ababa. Water Action is another non-state actor active in Addis Ababa aiming to build alliance of Ethiopia WASH partners and building bondage of partners in learning and sharing, with an on-going project aiming to create collaboration between stakeholders to improve drinking water, toilets and systems for disposal of waste in slums in Addis Ababa. Water Aid is another prominent NGO working to provide support for improving access to clean water, hygiene and sanitation in poorest communities. Therefore, it is necessary to build up on these existing initiatives and further expand their work to develop water sensitive behaviour.

Stakeholders

- Lead- Addis Ababa Environmental Protection Authority.
- Partners - Addis Ababa Education Bureau, Addis Ababa Water and sewage Authority, Addis Ababa Environment and Green development Commission, Addis Ababa job creation agency, Addis Ababa Health bureau.
- Approval - Ministry of education, Ministry of higher education, Mayor's office, AAEGDC, Addis Ababa education bureau.
- NGOs – Splash Ethiopia, Millennium Water Alliance, World Vision, Water Action, Water Aid, etc.

Funding

It is estimated that the cost would be high as it requires a high initial investment because the intervention is on community attitude and culture, but the cost will decrease as the culture develops overtime (The intervention will be shorter while the impact could take long time).

Next steps

- **Short term:** Revision of policy, regulation, programs (Curriculum and methodology) and infrastructure design related to special projects and programs based on revision output.
- **Medium term:** Secure funding, launch program identified.
- **Long term:** Evaluate overall impact.

Outcome

Implementation could take up to 2 years.

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ACTION 2.

Near term - Strengthen Community Voices for Cleaner Urban Rivers.

DESCRIPTION

In early April 2021 WRI launched the community perspectives project in Addis Ababa, with the goal of documenting and increasing awareness of impacts of river pollution on community health and livelihood. The program aims to award a fixed price contract to a team of experienced media professionals in Addis Ababa to conduct interviews and shoot photos/videos to tell compelling narratives of how urban communities are experiencing water insecurity and risks - and how local community organizations are working to address water insecurity and risks. WRI has identified 2 community organizations to be profiled through this work. The Mekanissa-Gofa-Saris Vegetable Farmers' Cooperative, a farming community operating along the Little Akaki Riverbank. The cooperative is facing and coping with increased pressure on their livelihood from river pollution, flooding and shrinking of farming size and depletion of natural assets. The second organization is Tena Kebena, they work on Youth & Children's empowerment to protect rivers from pollution and support restoration of urban farming as well as develop and protect green areas. This content and storytelling will contribute to the public discourse around urban water challenges and interventions in Addis by providing multiple sources of information and community perspectives.

Stakeholders

- Mekanissa-Gofa-Saris Vegetable Farmers' Cooperative
- Tena Kebena

Funding

Secured and supported by WRI flex funds. Amount secured 50,000 USD.

Next steps

- WRI's team has reviewed applications from media partners interested in developing this media content and have finalized 2 partners to work with moving forward. The media partners are required to submit a detailed proposal and story outline by May 21st, 2021, after consultation with the selected community organizations. WRI aims to implement this work in time for the launch of the Addis Action Plan in December 2021.

Outcome

Change public perception of the benefits of the city's key water courses by bringing to the forefront the stories of communities that are dependent on the river for their livelihood and also share the effort the Youth organizations like the Tena Kebena are making to restore the water courses through community led interventions that sustain the livelihood opportunities the river supports.

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ACTION 3.

Medium term - Innovation lab for Wastewater treatment and waste management along water courses.

DESCRIPTION

To better link solution providers/entrepreneurs with local contexts and support implementation of innovative decentralized wastewater treatment solutions WRI and city partners to develop and implement an Innovation lab (like the CityFix innovation lab) focused on circular economy solutions for localized wastewater treatment, reduction of runoff, water pollution treatment and waste management along the riverfront that will create local employment opportunities. Entrepreneurial solutions that have a proof of concept and can bring in social impact investment or attract corporate social responsibility funds will be selected based on a screening criterion by a jury of experts and stakeholders. The top 4-5 selected solutions will receive virtual mentorship of approximately 10 hrs by a curated list of experts and organizations. Final selected solution will be presented an implementation prize to pilot the solution in a community identified by solution provider and city stakeholders.

Stakeholders

- Micro and small-scale Enterprise, Addis Ababa Resilience Project Office

Funding

Required funding USD 20,000.

Next steps

- WRI Africa team to consult with city stakeholders to identify communities/sites for implementing the innovation lab.
- WRI Africa to work with city stakeholders to seek consent from community stakeholders to host the innovation lab and finalize the problem statement.
- After consent is received from city and community WRI Africa to consult with WRI India team on the CityFix mini lab recently implemented in India to develop a work plan for the initiative in Addis and identify potential corporate stakeholders to approach to seed funding for the lab.

Outcome

An innovative decentralized solution for pollution control and waste treatment is implemented in a selected under-served community in Addis with support from city stakeholders and potential offer to invest in scaling from a corporate funder.

VISION 3

ACTION 4.

Short to medium term - Capacity building of regulators, sensitization and awareness building of licensing and permit issuance sectors.

DESCRIPTION

This action aims to create capacity of the key players from the government sectors who regulate industrial river pollution (such as Addis Ababa Environmental Protection Authority) as well as those with key roles for incentivising good practices of the industrial corporate organizations (such as Ethiopian Investment Commission). The capacity building of the key sectors of government is needed to effectively coordinate the regulatory works and enhance the city's enforcement capacity to protect the city rivers from pollution, as well as to clearly signal the market and effectively guide towards a water sensitive industrial development. Therefore, this action also helps the key sectors to develop capacity for preparing and organizing the required incentive packages for promoting good performing industrial corporates in terms of protection of the city environment, the rivers and waterways. The capacity building could include training, networking, financial and logistic support.

Stakeholders

- Addis Ababa Environmental Protection Authority
- Addis Ababa Water and Sewerage Authority
- Addis Ababa Resilience Project Office
- Oromia Bureau of Land and Environmental Protection Bureau
- Oromia Urban Land Development and Management Agency
- Ethiopian Investment Commission
- Addis Ababa Land Development and Management Bureau
- Ministry of Industry
- Industrial Park Development Commission
- WRI
- UNIDO
- UNEP

Funding

- Environmental, Forest and Climate Change Commission
- Addis Ababa Environmental Protection Authority
- UNIDO
- UNDP
- African Development Bank
- UNEP

Next steps

- Identify and map the key government sectors that have important roles in the regulation and incentivizing of industrial corporates and analyse mandates and working relationships pertinent to the regulation of river pollution and incentivization of industrial corporates.
- Conduct capacity and training needs assessment and also identify the level of awareness and awareness gap of the identified government organizations towards the issues of river pollution and their relative mandates and roles.
- Identify institutional problems and capacity gaps for enforcing the regulations and the execution of their mandates and roles.
- Organize and deliver awareness raising, training and capacity building programs including facilitation of south-south learning from relevant best experiences.
- Create networking and regular communication channels.
- Monitor and evaluate the awareness change and training programs and re-plan for further capacity building program.
- Draft binding agreement to be signed by regulatory, licensing and permit issuance sectors.

Outcome

Improved awareness and higher level of capacity of the key government sectors that could be able to undertake the enforcement of the regulation and incentivization of industrial corporates shall be the expected outcome to be achieved at the end of the action. Binding agreement between regulatory organs, licensing and permit issuance sectors shall be signed as an outcome, which ensures the coordination of key sectors in the regulation and incentivization of major industries.

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ACTION 5.

Short to Medium term - Build treatment, recycling, and pollution abatement capacities of major industrial corporates.

DESCRIPTION

Overall, this action aims to fill the capacity gaps of major industries and thus enable them to reduce their effluent and to play an active role in the cleaning of the city river and waterways. Building awareness is needed before undertaking the next steps i.e., monitoring, penalizing and incentivizing, which paves the way for effective undertaking of the consecutive steps. Accordingly, the monitoring of the effluent of the major industries shall be conducted based on the EIA guideline, such as the physicochemical content and BOD test of the effluents shall be inspected throughout the base year to establish a baseline. Based on the findings of a detailed assessment of the capacity of selected major industrial corporates, organize and conduct training and build the treatment capacities to reduce river and waterways pollution.

This action first helps to sensitize and create awareness of the industrial corporate organizations that have impacted the river pollution while they also have potential influential roles in the cleaning of the city rivers and waterways. Undertaking this action helps to establish a baseline of the effluents of each industrial corporate. Additionally, through this action a detailed assessment of the treatment and recycling capacity of the industrial corporates, as well as capacity and training need assessment, shall be conducted. Nature based solutions such as bio-filtration methods shall be prioritized under this action.

Stakeholders

- Addis Ababa Environmental Protection Authority
- Addis Ababa Water and Sewerage Authority
- Addis Ababa Resilience Project Office
- Oromia Bureau of Land and Environmental Protection Bureau
- Oromia Urban Land Development and Management Agency
- Ethiopian Investment Commission
- Addis Ababa Land Development and Management Bureau
- Ministry of Industry
- Industrial Park Development Commission
- Environmental, Forest and Climate Change Commission
- WRI
- UNIDO
- UNEP
- UNDP
- African Development Bank
- Industrial parks
- Leather and footwear industries
- Textile factories
- Chemical industries
- Beverage factories

Funding

- Environmental, Forest and Climate Change Commission
- Addis Ababa Environmental Protection Authority
- Industrial Park Development Commission
- Ministry of Industry
- UNIDO
- UNDP
- African Development Bank
- WRI
- UNEP

Next steps

- Identify major industrial corporate organizations polluting the river as well as those who can be exemplary model industrial corporates
- Conduct awareness gap assessment and analysis
- Organize and deliver awareness raising programs, facilitate peer to peer learning and experience sharing
- Monitor and evaluate the process and if needed organize another round of awareness raising action
- In succession to the awareness building, conduct periodical recording and documentation of inspection of the physiochemical content and BOD level of the effluent of major industries throughout the base year to establish the baseline and assess future targets for pollution reduction and improved productivity
- Establish SMART monitoring systems using technological inputs
- Conduct detailed assessment of the treatment and recycling capacity of the industries, as well as the capacity and training needs of the industries
- Based on the finding of the assessment, organize and conduct training, and build the treatment capacities of major industrial corporates to reduce river and waterway pollution.

Outcome

Increased awareness level on river pollution and effluent treatment capacity of industrial corporates. Increased positive attitude, voluntary initiative and attention of the industrial corporates towards reducing river pollution. Established benchmark and baseline of the quality of effluent and level of river and waterways pollution from major industries as well as the improved treatment capacity of the industries shall be considered as an outcome.

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ACTION 6.

Medium to Long term - Undertake activities to incentivize good performing industrial corporates while penalize the polluting industrial corporates and promote the fulfilment of corporate social responsibility of major industries.

DESCRIPTION

This action aims to enforce the regulations and to practically reduce river and waterway pollution. In addition to enforcement of regulation, organization of incentive packages for good performing industries is needed. Regular monitoring and inspection of effluents and pollution level from the benchmarked industries shall also be conducted. Accordingly undertaking and following up the implementation of necessary actions across the signatory sectors, which entail galvanizing political commitment and ensuring accountability of signatory sectors is needed for coordinated and effective protection of rivers and waterways from pollution. This action can also further be linked to vision 1 action 3, which is promotion of corporate social responsibility (CSR) of major industries to voluntarily contribute to and support the cleaning of the city rivers and waterways.

Stakeholders

- Addis Ababa Environmental Protection Authority
- Addis Ababa Water and Sewerage Authority
- Addis Ababa Resilience Project Office
- Oromia Bureau of Land and Environmental Protection Bureau
- Oromia Urban Land Development and Management Agency
- Ethiopian Investment Commission
- Addis Ababa Land Development and Management Bureau
- Ministry of Industry
- Industrial Park Development Commission
- UNIDO
- UNEP

Funding

- Environmental, Forest and Climate Change Commission
- Addis Ababa Environmental Protection Authority
- Industrial Park Development Commission
- Ministry of Industry
- UNIDO
- UNDP
- African Development Bank
- WRI
- UNEP

Next steps

- Conduct regular monitoring and inspection of effluents and pollution levels of benchmarked industries.
- Set performance targets between the benchmarked industries and signatory government bodies.
- Research and review policies that have enabled the behaviour change among corporate industries in other developing country contexts, to reduce pollution. Work with city stakeholders to devise incentive policy strategy that might be the right fit for Addis and work with city stakeholders for adoption of the incentive package
- Organize, award and provide incentive packages to good performing industries.
- Penalize and sanction polluting industries.
- Follow up the coordinated action of signatory licensing, permit issuance and regulatory government bodies and accordingly undertake corrective measures based on the agreement.
- Promote CSR and voluntary contribution of major industries to the river cleaning.

Outcome

The ultimate expected outcome of this action shall be cleaned city river and waterways.

VISION 4:

Reliable and Secured City-region Water Supply

ORIGINAL OPPORTUNITY

Build a coalition between Addis Ababa City Administration, Oromia Regional State and Finfine Surrounding Oromia Special Zone and strengthen local stakeholder groups to develop and implement Integrated Water Resource Management Plan and inter-regional water resilience program.

CHALLENGE 4 DESCRIPTION

Addis Ababa is one of the fastest growing cities in Africa with a 4% annual growth rate. However, water use has also been growing at more than twice the rate of the population increase in the last century. Currently, the total water supply is 580,000 m3 per day, while demand is 1.1 million m3 per day, resulting in a demand-supply gap of 40%. Water supply for the city is largely sourced from the Oromia region. The surface water and reservoir sources are outside of the city boundary and are susceptible to land use changes in the upstream catchment. Recent changes in the catchment of the surface water dams from primarily grassland to farmland and settlement is resulting in the siltation of reservoirs affecting the already stressed water supply for the city. Within the city, there are considerable water system maintenance challenges for the utility provider AAWSA - 36.5% of water is lost due to leakage and the two largest dams, which supply 60% of Addis Ababa's water have maintenance challenges. There is a need to diversify the city's water supply, as identified in the 10th Master Plan, which proposed ways to diversify water sources using rainwater harvesting and grey water recycling, however, implementation is lagging.

Above all, the broader political tensions and potential conflicts in the utilization of natural resources is a challenge for building city-region (Addis Ababa and Oromia Finfine Special Zone) water resilience. A joint agreement for an integrated water resource management plan and a roadmap to city-region water resilience building is lacking. In this regard, the complex identity of Addis Ababa entails to pursue a careful and sensible inter-regional political process to the building of city-region water resilience.

VISION DESCRIPTION

The city of Addis Ababa cannot develop water resilience in isolation. Ensuring reliable and secured water supply at the broader city-region level is crucial to the sustainable development of Addis Ababa and also for the hydrological linked cities and rural areas of Oromia region. Particularly, the city of Addis Ababa and the Finfine Surrounding Oromia Special Zone (FSOSZ) need to work together closely for ensuring water security for the existing and growing populations and economy of both regions and the building of inter-regional water resilience to climate change. Therefore, integrated water resource management (IWRM) system is needed at Akaki sub-basin level between Oromia Regional State and Addis Ababa City Administration. However, it is important to note the drawbacks and the lessons from the previous attempt to "integrated" master plan, the top-down decision making which was insensitive to the complex identity of the city overlooked the rights of particularly peri-urban farmers and the inter linked Oromia region has led to widespread

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unrest and protests (for further information refer to Alem. 2021[4]). Therefore, it is important to understand the cross regional nature of the river systems and the water resources within the sub-basin, and more importantly the political context and facilitate a genuine political dialogue and negotiation.

The collaboration between Addis Ababa City Administration and Oromia Regional State should be based on genuine political dialogue and consensus on the costs and resource sharing, and political commitment between the two parties. Reconciliation is needed of both regional and local interests, as well as the national interest, including the Basin High Council and Basin Development Authority (Ministry of Water, Irrigation and Energy) on the city-region integrated water resource management plan (such as managing the interface of urban growth and peri-urban farming) is needed. Therefore, setting up appropriate platforms to legitimize the integration process is of paramount importance to develop a suitable, collaborative Integrated Water Resource Management Plan (IWRM).

The IWRM Plan needs to include resource mapping and modelling, upstream catchment protection measures and livelihood improvements for the communities within the catchment of the surface and groundwater sources. Furthermore, development of new water sources (surface and groundwater sources, reuse of grey water and rainwater harvesting), leakage reduction, water conservation, advocacy around water issues, incentives and penalties to regulate water users shall be included in the plan.

Therefore, the following needs shall be addressed by the vision:

- Weak political coordination at a city, regional and federal level around water
- Cross regional water resilience
- A lack of transparent, agreed and legitimate process of IWRM planning and implementation
- Risk informed land management and protection of crucial water ecosystems
- Reconciliation of regional and local interests in the sharing of resources, benefits and costs
- Flexible and adaptive governance
- Collaboration and sharing experience between agencies
- Relevant assets and resources:
- Gerbi dam project: AAWSA has launched the construction of a dam on the Gerbi River, 30 kilometres away from the capital. With a total capacity of 73,000 m3 per day, the Gerbi dam will improve water supply in the north of the city.
- VEI Source to Tap and Back project: This project focuses on identifying water security issues and developing a holistic and integrated framework for improved Addis Ababa-Adama region water security. As part of this initiative, Dire, Legadadi, Gefersa reservoirs siltation: AAWSA, VEI, Royal IHC, Dutch Government are exploring reservoirs remediation and steps to improve their capacity, build local capacity for regular maintenance, and develop options to re-use sediments. Since the VEI initiative is directly aligned with this vision, it is important to complement and combine the joint efforts.
- The Nature Conservancy, Addis Ababa Water Fund: TNC is exploring setting up a water fund through which municipal utilities and businesses can invest in green protection and restoration initiatives to improve the security of water sources.
- Nature based solutions for water resources infrastructure and community resilience in Ethiopia: an initiative from the Ministry of Water, Irrigation and Energy in collaboration with UNECA, which aims to develop sustainable management of surrounding catchments of dams in Ethiopia through NbS, livelihood improvement of local communities, and reducing siltation. Therefore, funding resources can be incorporated from this initiative.

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- WRI City4Forest initiative: Addis Ababa is part of this initiative, which facilitates peer to peer learning by connecting different cities across the world and provides technical support to protect and manage forests in the cities and nearby watersheds. Therefore, the WRIs City4Forests initiative is directly aligned and linking the program to this vision is essential.
- WRI Africa's urban water resilience framing paper (forthcoming publication): The framing paper's first priority pathway, risk informed land management and water sensitive urban design, and the third pathway, innovative institutions and partnerships for water resilience contains relevant strategies that could inform this vision.
- Addis Ababa Resilient Strategy: Under goal 3.1 (provide adequate, safe and reliable water and sanitation service for all) action 32 (build a water resilient city) of the city resilience strategy it is planned to identify high water consumers and to prioritize ten of them for a targeted intervention to reduce water consumption, promote alternative use of water, and enhance water stewardship. Addis Ababa Resilience Project Office (AARPO) is also actively working to implement this specific action. Therefore, this vision helps to support and enhance the AARPO efforts.
- Ndebele, M.R., Mubaya, C.P., Pretorius, L., Mamombe, R., Lipinge, K., Nchito, W. Mfune, J.K., Siame, G. and Mwalukanga, B. 2020. City to city learning and knowledge exchange for climate resilience in southern Africa. Plos One 15(1), https://doi.org/10.1371/journal.pone.0227915.
- uMngeni Ecological Infrastructure Partnership, https://www.wri.org/insights/water-resilience-lessons-durban-south-africa
- Box 9, Coproducing knowledge on climate risks with an inclusive, reflexive learning approach (Habtemariam et al. 2021: 77)

SHOCKS AND STRESSES

- Future water demand
- Water quality
- Siltation
- Watershed degradation
- Failure of surface water dams
- Depletion of groundwater sources
- Water scarcity
- Pollution
- Flooding

OVERALL CHAMPIONS

- Basin High Council- Deputy Prime Minister (Lead executive champion)
- Addis Ababa City Administration- City Mayor (co-lead- executive champion)
- Oromia Regional State (co-lead- executive champion)
- AAWSA (project champion)
- AARPO (project champion)
- Oromia Water Mineral and Energy Bureau (project champion)
- Finfine Surrounding Oromia Special Zone (project champion)
- Addis Ababa Planning and Development Commission (regulation and facilitation)
- Oromia Urban Planning Institute (regulation and facilitation)
- Oromia Urban Land Development and Management Agency (regulation and facilitation)

VISION 4

ACTION 1.

Short term - Sensitize, raise awareness, improve cross sectoral communication and build leadership capacity at different levels around inter-regional water resilience

DESCRIPTION

This action helps to stimulate the political motivation to cooperate and take up the vision for reliable and secured city-region water supply. Building the leadership capacity is needed at different levels of governance through organizing training, facilitating, and supporting peer-to-peer learning experience It is also needed to identify or consolidate upstream and downstream community engagement groups and build advocacy and support. These activities shall better build on existing initiatives such as Vitens Evides International Source to Tap and Bank project, The Nature Conservancy Addis Ababa Water Fund and also WRI Cities4Forest initiative to strengthen networking and coordination (like Federation of Water and Sanitation Utilities of Ethiopia and African Water Association), among efforts that are very much aligned. WRI will work with key partners to establish and implement an opportunity to bolster and coordinate these existing efforts.

Stakeholders

- Basin High Council - Lead organization, executive champion
- Addis Ababa City Administration - City Mayor and Cabinet
- Oromia Regional State - President and Regional Council
- Awash Basin Development Office – General manager
- AAWSA - project champion
- AARPO - project champion
- Oromia Water Mineral and Energy Bureau - project champion
- Finfine Surrounding Oromia Special Zone - project champion
- Addis Ababa Plan Commission - regulation and facilitation
- Oromia Urban Planning Institute - regulation and facilitation
- Oromia Urban Land Development and Management Agency - regulation and facilitation
- Vitens Evides International - support, experience sharing and facilitation)
- WRI - facilitation and finance

Funding

- African Development Bank, African Green Stimulus Program
- WRI Cities4Forest
- Vitens Evides International and Royal IHC, Dutch Government
- Addis Ababa Water Fund

Next steps

- Undertake gap analysis with the existing water security groups and programs.
- Organize and provide leadership training program to higher and middle level officials of the Oromia Regional State, Finfine Surrounding Oromia Special Zone, Addis Ababa City Administration, Basin High Council and A wash Basin Development Office in partnership with Vitens Evides International.
- Undertake leadership training and needs assessment
- Prepare training manuals and guides focused on particular leadership skills pertinent to inter regional water resilient issues based on the findings of the assessment
- Deliver the training
- Facilitation of peer-to-peer learning with relevant cities within the country and internationally (e.g. Arrangement of exposure visit and experience sharing tour)
- Work to build advocacy and support upstream, middle stream and downstream community groups.
- Monitoring, knowledge management and facilitation of learning loops.

Outcome

Increased awareness and political motivation and willingness for building of inter-regional water resilience.

VISION 4

ACTION 2.

Short term to medium term and needs to be continued to long term as well - Assess and strengthen existing platforms and networks for promoting political collaboration and dialogue around water resilience

DESCRIPTION

Identify the existing potential platforms for promoting political dialogue around holistic inter-regional water issues between the city and regional actors, as well as ways to develop existing mechanisms and incentivise membership. Provide technical support and facilitate information sharing before, during and after convening. This action is needed for reaching to political resolution and agreement on inter-regional water resilience issues through facilitating the inter-regional dialogue and negotiation centring climate change and water resilience, which is an important milestone for galvanizing political commitment and guiding the city-region towards water resilience and sustainable pathways.

Stakeholders

- Basin High Council- Council members
- Addis Ababa City Administration- City Mayor and Cabinet
- Oromia Regional State- President and Regional Council
- Awash Basin Development Office – General manager
- AAWSA (project champion)
- AARPO (project champion)
- Oromia Water Mineral and Energy Bureau (project champion)
- Finfine Surrounding Oromia Special Zone (project champion)
- Addis Ababa Plan Commission (regulation and facilitation)
- Oromia Urban Planning Institute (regulation and facilitation)
- Oromia Urban Land Development and Management Agency (regulation and facilitation)
- VEI International (support and facilitation)
- WRI (facilitation and finance)

Funding

- African Development Bank, African Green Stimulus Program
- WRI Cities4Forest
- VEI International and Royal IHC, Dutch Government
- Addis Ababa Water Fund

Next steps

- Identify the existing platforms and networks.
- Strengthen the communication channel between officials of Oromia Regional State and Addis Ababa City Administration.
- Provide support and incentives to strengthen the platforms and networks (e.g., Federation of Water and Sanitation Utilities of Ethiopia).
- Facilitate political dialogue and build consensus on sharing resources, the costs and benefits of inter-regional water resilience building.
- Revise and align existing stakeholders' program based on new partnership and improve cooperation between regional and city agencies.

Outcome

Strengthened partnership for IWRM and inter-regional water resilience building between Addis Ababa and Oromia Regional State.

VISION 4

ACTION 3.

Medium to long term - Conduct assessment of water resources and develop Integrated Water Resource Management Plan (IWRM) and inter-regional program for water resilience

DESCRIPTION

Facilitate and strengthen a cross sectoral working group of key stakeholders for conducting a holistic water resource assessment at the Akaki sub basin level. The holistic assessment of the sub basin water, land and related resources (mapping and modelling of existing water sources, infrastructure, land use land cover, potential threats and trends, climate change, governance and institutional capacities) shall be done with participation of upstream, middle stream and downstream community groups and local governments. Identify gaps and priority issues, and formulate IWRM and inter-regional water resilience program, joint projects and plan for action. Convene inter-regional platforms and communicate the outcome for political discussion and decisions of higher-level officials. Establish joint monitoring system to follow up the implementation. Facilitate learning and feedbacks between different governance levels and scales.

Stakeholders

- Basin High Council - Lead organization and executive champion
- Addis Ababa City Administration - City Mayor and Cabinet
- Oromia Regional State - President and Regional Council
- Awash Basin Development Office – General manager
- AAWSA - project champion)
- AARPO - project champion)
- Oromia Water Mineral and Energy Bureau - project champion
- Finfine Surrounding Oromia Special Zone - project champion
- Addis Ababa Plan Commission - regulation and facilitation
- Oromia Urban Planning Institute regulation and facilitation
- Oromia Urban Land Development and Management Agency - regulation and facilitation
- VEI International - support, finance and facilitation
- WRI - facilitation and finance
- Upstream, middle stream and downstream local community representatives and local administrations

Funding

- African Development Bank, African Green Stimulus Program
- WRI Cities4Forest
- Vitens Evides International and Royal IHC, Dutch Government
- Addis Ababa Water Fund

Next steps

- Identify relevant existing and on-going plans and programs both in Addis Ababa and Oromia region.
- Organize workshops.
- Organize incentives and grant funds to stimulate inter regional cooperation and joint program.
- Facilitate the information flow between different governance levels and scales.
- Formulate joint program and IWRM.
- Establish joint monitoring system.

Outcome

Implementation of IWRM and joint water resilient programs supported by both parties (Addis Ababa City Administration and Oromia Regional State) based on accurate resource mapping shall be the outcome of this particular action. The ultimate outcome shall be a water resilient city-region (Addis Ababa and FSOSZ).

VISION 5:

Comprehensive & Participatory (Structure) Planning and Implementation

OPPORTUNITY STATEMENT

City to strengthen and develop cross sectoral agency to encourage integrated planning and collaboration between institutions to better facilitate the implementation of the structure plan.

CHALLENGE 5 DESCRIPTION

Since the turn of the 19th century, ten plans have been prepared to guide the development of Addis Ababa. Generally, the implementation of these plans have lacked strategy, integration, adequate resourcing and have had limited participation. Lack of meaningful participation and cross sectoral and cross boundary resource planning and implementation has also resulted in weak implementation. In the absence of a cross sectoral and cross boundary agency that has effective mandate to manage and coordinate such integrated resource planning, business as usual siloed planning and management continues resulting in competing priorities threatening long term sustainability of water resources in the region for all users dependent on them. With a growing population and related increase in demand of scarce resources, increasing tensions exist between Addis Ababa and the surrounding areas and rural settlements, resulting in open conflict.

VISION DESCRIPTION

At this point in time, integrated comprehensive and inclusive planning is crucial not only to address the conflict but also sustain mutually complementary/supplementary growth.

Participatory cross boundary planning that includes stakeholders across sectors, layers of government and communities (upstream and downstream) is critical to enable this.

Strong city and catchment/city-region level planning and resource management will improve environmental sustainability and lay the foundation for comprehensive and integrated green, blue, and grey infrastructure development.

Inclusive and integrated planning that includes a systemic and holistic approach to water resource planning and management will lead to increased capacity to manage risks with better understanding of upstream activities. Introducing a cross- sectoral and cross- boundary agency to coordinate actions/projects will broaden governance around water resource planning and management and allow participation of communities which are critical. Revised Institutional mandates, laws and regulations that allow for seamless integration among the key actors under the auspices of this agency will lead to coordinated management of critical resources like water.

VISION 5

The following needs are addressed by the vision:

- Strong political will: ensuring political leadership and commitment at different layers of government, community, and private sector are needed.
- Establishing city-region (metropolitan/sub basin) level governing body, accountable to a higher body. The role of this legal body is to plan and manage resources, coordinate activities between the city and surrounding it and ensures strong communication and data sharing as well as guide investment when necessary.
- Integrate/synergize land claiming and non-land claiming development. This planning process must include infrastructure, utilities, aquifers management, protecting flooded areas, etc., and non-land claiming resources including finance, skilled manpower etc.
- Strong institutional mandate to enforce rules and regulations.
- Data Repository i.e., access to comprehensive and up to date data.
- The right technology to support planning processes, data management and plan implementation.
- Participatory planning process and inclusion of the poor and vulnerable groups.
- Sustainable access to infrastructure financing including alternative financing mechanism e.g., land value capture, ecosystem services, and apply different versions of polluter pay principles.
- Laws and regulation to enforce implementation and ethical practices.

RELEVANT ASSETS AND RESOURCES

- WRI UWR Framing Paper/Spatial Mapping
- The Future of Addis Ababa, AA strategic Development Framework (here)
- 10 years Prosperity Plan of Addis Ababa City Administration
- IWRM, 4WASH (here)
- Addis Ababa Resilience strategy
- Strategic Comprehensive Transport Planning

SHOCKS AND STRESSES

- Open conflict
- Environmental degradation

OVERALL CHAMPIONS

- Lead: Addis Mayor's Office, AAWSA, Addis Ababa Plan Development commission, Ministry of Water Resources i.e., Basin Development authority.
- Partners: Governmental actors and NGOs, Academic Institutions as well as planning bodies, city administration and regional government including Oromia Special Zone.
- Approval: Oromia Regional government, Addis Ababa City Administration, Local Community, Oromia special zone &Federal government.

VISION 5

ACTION 1.

Medium term - Establish a City-Region Catchment/watershed Resource Planning & Management Agency

DESCRIPTION

Establishing a government body that integrates planning at city and catchment level and encourages communication and coordination among institutions. The goal of the body is to ensure that planning and implementation of resource planning is an iterative process inclusive of local knowledge and culture.

Stakeholders

- City Government of Addis Ababa, Mayor's Office,
- Oromia Regional Government
- Oromia Special Zone,
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Addis Ababa Plan Development Commission
- Environment forest and climate change commission
- Oromia special zone including Neighbouring municipalities.
- Ministry of Finance and Economic Development
- Ministry of Urban Development and Construction
- The World Bank

Funding

WRI Works with partners and AAWSA to develop the agency structure, staffing, governance, roles and responsibilities and budget in collaboration with key offices in Oromia Special Zone.

Next steps

Short-term:

- Map and analyse roles and responsibilities of stakeholders at different government levels, real estate developers and community organizations.
- Convene all actors for political dialogue including the Addis Ababa's Mayor's office, Oromia Regional State, President's office, Oromia Region Special Zone & Ministry of Water, Irrigation and Energy, as core committee to kick start the discussion.
- Identify key stakeholders and resources to establish the entity including budgetary support.
- Develop incentives and enablers for coordination between existing agencies.
- Establish Clearly Mandated Entity (city region/catchment) accountable to high political body.

Medium-term:

- Creating a platform to convene and discuss with larger set of stakeholders.
- Develop shared vision & strategy.
- Prioritize programs/projects & Implementation strategies.
- Put in place indicators to measure, participation, integration, and efficiency in resource planning and management M&E mechanisms.

Long-term:

- Budget allocations for investment that benefit all stakeholders in the city region.
- Develop a strategy to transform the agency's role to development of policy and regulation.

Outcome

A legally empowered entity (Agency responsible for bringing integrated and participatory plans within the city-region/ catchment, e.g. Integrated Water Resources Management Plan) as well as managing ongoing plans. Over times this role will shift from implementor to regulator.

VISION 5

ACTION 2.

Capacity building on regional or metropolitan governance.

DESCRIPTION

Partner with organizations/institutions focused on assessing, recommending and building metropolitan governance structures, regulations and capacity such as UCLG and Metropolis to organize a learning session and training on metropolitan governance and strategic planning for stakeholders from Addis Ababa city, Oromia state, Oromia special zone and surrounding towns, and MoFCo and MoWIE. Specifically, Metropolis has developed an online Learning Station for public officials to easily access knowledge and capacity building programs focused on metropolitan governance. Metropolis's courses provide information on topics such as the key aspects of metropolitan governance, challenges facing metropolitan areas, governance models, and planning for the future. The goal of their organization is to connect leaders globally to ensure that the future of metropolitan governance addresses all aspects of social life and increases equity among every citizen.

Stakeholders

- City Government of Addis Ababa, Mayor's Office,
- Oromia Regional Government
- Oromia Special Zone,
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Addis Ababa Plan Development Commission
- Environment forest and climate change commission
- Oromia special zone including Neighbouring municipalities.
- Ministry of Finance and Economic Development
- Addis Ababa Resilience Project Office
- Accademia (EiABC, AAIT, AASTU)
- Environment forest and climate change commission
- The World Bank
- EU, Sweden Embassy

Funding

WRI to look at fundraising options from BMZ, Sweden, Norway etc.

Next steps

- WRI to identify and engage organizations like UCLG to define training program.
- AARPO to write proposal to organize training and funding.
- AARPO and partners to implement training online for key professionals and decision makers in city;
- AARPO to form thematic working groups for ongoing work;
- AARPO to organize convenings /discussions to facilitate integration and participation.

Outcome

Informed and trained professionals and decision makers. Working groups, which could transform to standing committee or group similar to UCLG in Ethiopia. New knowledge partners developed.

VISION 5

ACTION 3.

Capacity building on investment & land-based financing mechanisms.

DESCRIPTION

Land-based financing that includes collection of property taxes, improvement fees, development fees, leasing fees, etc. are all important sources for local revenue for city governments. In Addis, despite the fact that most land is on a lease hold system, the city has underutilized this source of revenue to invest in future infrastructure needs and capture value from investments already made. One of the key challenges for the city has been the poor land records and low effectiveness in collection of leasing fees. To improve city/ local government capacity to generate revenue from public investment and to support the new cross sectoral agency, the city needs to look at increasing Land Value Capture and Payment for Ecosystem Services opportunities. Land based revenue sources are more sustainable since land management is local government's discretion. This initiative aims to support the city in further assessing the barriers to improving its land-based financing capacity and taking measures to address the same through assessment and capacity building workshops with key experts.

Stakeholders

- City Government of Addis Ababa, City Data Repository
- Addis Ababa Plan and Development Commission
- Addis Ababa Resilience Project Office
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility)
- Private Sector (e.g. Real Estate Developers)
- Academia (EiABC, AAIT, AASTU)
- Neighbouring Cities/Municipalities in Oromia special zone
- Addis Ababa Bureau of Finance and Economic Development
- Ministry of Urban Development and Construction
- Ministry of Finance and Economic Development

Funding

- Align activities with TOD (Liveable Neighbourhood) funded by Ross Flexible.
- Partner with ITDP and UN-Habitat, the World Bank.
- Fundraise to scale.

Next steps

- Partner with institutions to train experts and decision makers on land-based financing mechanisms (e.g., Lincoln Institute of Land Policy for LVC).
- WRI to share WRR Working paper here on Land Value Capture on Addis Ababa , Sao Paulo and Hyderabad for discussion.
- Organize training on Land Value Capture with IOs (Brazil, India) & Lincoln Institute; Build Knowledge partners with local universities.
- WRI (water program) to share experience and provide training on PES.

Outcome

Infrastructure Investment financing Mechanisms including LVC, PES and similar tools and approaches for Addis Ababa and neighbouring cities in Oromia region.

VISION 6:

Access to reliable and up to date data to build water resilience

MODIFIED OPPORTUNITY

Ensure access to reliable and up to date data in urban water resilience work across Addis Ababa.

CHALLENGE 6 DESCRIPTION

Addis Ababa city requires high quality data to base decisions on to ensure water resilience. Data informs planning which enables benchmarking and measuring of progress, allowing for alternative pathways for development and policy and program implementation. However, collecting, accessing, processing and maintaining data is resource and time intensive, and requires specialized expertise.

In data scarce environments, like Addis Ababa, data sets are often unavailable or inaccessible for decision making. In Addis Ababa, data is held by different public agencies, mostly at the hands of individuals. Available data is not clear and is usually stored in a non-digital format, making it hard to share. In most cases, essential data are not collected.

Advancement in technology has made data collection and storage relatively easy and affordable. Remote sensing and crowdsourcing have created opportunities for cities like Addis Ababa to invest in data collection that can be shared and used by different government and private actors to make better decisions, formulate relevant policies and facilitate implementation.

Previous attempts to collect, store and use data have failed due to capacity limitation including finance and skilled human resources. Collecting, maintaining, sharing and using data has also proved to be challenging. Data collection, analysis and maintenance system accessed by public and private agencies is crucial for Addis to ensure its resilience.

VISION DESCRIPTION

The city needs to build data collection and analysis capability and promote evidence-based decisions around water resilience through the use of appropriate technology and graduate to a more sophisticated and comprehensive system. Central to this process is building community-based data collection practices supported by awareness creation efforts at all levels, to give value to data.

Building systems to collect hydrological data, including pollution of water bodies should be prioritized for data collection.

Establishing a dedicated data centre supported by appropriate technology, e.g., mobile apps, to collect, archive and manage data as well as generate and disseminate additional information,

VISION 6

would reduce duplication of data collection efforts and foster capability around water resilience. The centre will build capabilities to include spatial and non-spatial data collection and analysis as well as embed continuous skill and technology enhancement practices. There is an opportunity to create an improved data governance system including centralized data management and information sharing/ dissemination based in ethical practice and security.

The following needs are addressed by the vision:

- There is a need to build a well-established, sustainable, technology-oriented data centre. Learning from experience, data centres fail upon withdrawal of outside support (e.g., The World Bank). Embed continued skill building and revenue generation options into the centre and partner with international platforms (e.g., Resource Watch).
- There is need for prioritization and incremental expansion of data collection.
- There is need to build compatible technology and timely maintenance.
- There is need to demonstrate data use to decision makers to gain support and application.
- There is need to establish responsible agency to collect and manage data, enforce data sharing policy/regulation and scale.

RELEVANT ASSETS AND RESOURCES

- Action 11 in the resilience strategy: Build a centralized data centre
- WRI Resource Watch; WRI Africa
- Addis Ababa University specially EiABC

SHOCKS AND STRESSES

- Corruption and theft
- Declining political commitment.
- Poor planning practice
- Weak Integration

OVERALL CHAMPIONS

- Lead: Federal Ministry of Water, Irrigation and Energy; Water Development Commission
- Partner: Regional governments; City government, NGO's, universities, and academic institutions
- Approval/buy-in: Ministry of council; Sector office at federal government level

VISION 6

ACTION 1.

Medium term - Establish a new data centre around water resilience and build capacity of agencies to contribute and coordinate.

DESCRIPTION

Build capacity in existing organizations and establish a new data centre around water resilience. Through enhanced capacity of organizing data, the centre will collect and make other organizations to avail data to the centre. This will help to put data centrally available to any kind of users, create integration among institutions, make the government and NGO to plan accordingly. In addition to that, it will save time and money by avoiding redundant data collection.

Stakeholders

- City Government of Addis Ababa, City Data Repository (Policy support + repository (public or semi-public)
- Addis Ababa Water and Sewerage Authority (AAWSA): (Anchor & Mange data)
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE): (Technical and Financial assistance)
- Ministry of Science and technology (Technical assistance in selecting and identifying appropriate technology, training and couching.)
- Addis Ababa Plan & Development Commission (Lead the implementation of the project through AARPO; Disseminate?? Integrated and share data to sector offices.)
- Addis Ababa Resilience Project Office (Lead the implementation of the project with AAWSA)
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility…): (Co-create) Provide Base data; Use data)
- Environment forest and climate change commission: (Data cocreator & user)
- Private Sector engaged in data development (Technology supplier, training)
- Accademia (EiABC, AAIT, AASTU): (Educating and training)
- Oromia special zone including Neighbouring municipalities (Data co-creator)
- Ministry of Finance and Economic Development (budget)
- Traditional Funders, WB (Funders)
- Community Based Organization (Data co-creators and users

Funding

- Align with WRI's effort to support city of Addis Ababa build data repository, opt for a phased strategy for incrementally integrating and building a comprehensive data centre/ platform.
- Look for funding to scale.

Next steps

Short-term:

- Introduce the concept of water resilience to key government actors at different administrative layers, non-governmental organizations, and private actors.
- Identify key partners for investment and partnership in new data centre.
- Establish a 'best practice' baseline for policy document on data collection in selected priority themes/areas of need.
- Develop data use and sharing policy, regulation, practice guides and manuals.
- Define strategy to include more themes.

Medium-term:

- Formulate policies, manuals, guidelines, and directives.
- Bring in experts in data management as hires for data centre and train other staff to reinforce institutional capacity.
- Capacity building workshop and training for cost effective non-revenue water reduction strategies, including leak detection, operations and maintenance procedures and accounting systems.
- Create centralized database and risk atlas to orient risk informed decision making.
- Work with existing open-source data and WRI data platforms and tools to access updated info and datasets linked to water resilience.

Long-term:

- Establishing M&E system to ensure effective checks and balance.

Outcome

Strong Data Centre informing research and decision makers (city level repository).

VISION 6

ACTION 2.

Engage with Regional Actors like FRACTAL (Future Resilience for African Cities and Lands) to develop a research partnership model for Addis Ababa.

DESCRIPTION

Local research and academic institutes can offer a talent pool, knowledge base and research capacity to support city governments in assessing and defining strategies to address complex integrated planning challenges, through systematic data and analysis. In recent years various forms of research partnership models between academic institutes, city governments and civil society actors have emerged to support climate adaptation planning. Most recently many long term research partnership models have emerged which go beyond project based partnerships. Many such models have filled critical capacity gaps in research and analysis as well as provided cross sectoral planning and decision-making support to city governments. Stakeholders in Addis have identified such capacity gaps exist in Addis city government. The city therefore intends to build such partnerships to support urban water resilience work in Addis. The city will partner with organizations like FRACTAL to assess, identify and set up a research partnership model that will support the city in long term data collection and data informed decision making in Addis Ababa to build Urban Water Resilience.

Stakeholders

- AAWSA
- Addis Ababa University (EiABC, School of Civil and Environmental Engineering, Addis Ababa Institute of Technology/AAiT, etc.)
- Wondo Genet College of Forestry
- FCCC
- WRI
- Donor organizations (DFID, ICLEI, ACC, Africa Climate & Development Initiative)

Funding

WRI to work with the city to assess funding opportunities available to facilitate such a research partnership and training. Collaborate with city (technical support & advisory service) to develop proposal and connect to funders.

Next steps

- Benchmark key (minimum) city wide data, technology and facility needs including standard/specifications, governance structure and service delivery models.
- Establish working group made up of academia, implementing institution, and NGO. Map and engage with training institutions (e.g., FRACTAL). Tailor training needs and delivery methodologies. Build tools and processes for deeper understanding of water resilience to key city actors including the private sector. Establish learning Labs to coproduce relevant knowledge and data. Organize peer to peer knowledge sharing exchanges.

Outcome

- Build hands on knowledge and skills on water resilience through research partnerships.
- Develop Research products on water resilience;
- Review of Curriculum to integrate resilience in higher education.
- Apply (contextualize) tools to collect data and produce research outputs.

VISION 6

ACTION 3.

Community Mapping/Survey for resilience assessment.

DESCRIPTION

Participatory or community-based mapping/ survey if done well can fill a important gap in mainstream forms of data by providing more granular information at a household/ neighbourhood level and highlight the differentiated impacts same physical risks can have on people and communities based on their socio-economic characteristics and vulnerability. Due to the lack of good quality public data the city stakeholders understand that innovative strategies to collect data directly from the most vulnerable communities (through mobile apps, surveys, focus group discussions etc) can fill important data gaps and help the city better understand water risks and stresses communities are facing and identify targeted policies and strategies to address these challenges.

The city aims to implement pilot surveys in 2 selected marginalized communities with the aim of integrating local knowledge and data through community participation. This assessment will help the city establish baseline data for water challenges and resilience capacities in marginalized communities and establish locally relevant indicators for vulnerability and resilience to water challenges. These pilot projects will be implemented in partnership with local and international academia institutions (e.g., ITC) and technology partners like GSMA.

Stakeholders

- AAWSA
- Addis Ababa Plan & Development commission
- Local community, Local administration
- EiABC
- WRI
- UN- Habitat

Funding

WRI to collaborate with the city actors /AAWSA & Plan Development & Commission) to pilot community survey. Raise funds to scale to other communities in the city.

Next steps

- Map Academic/research institutions
- Identify data gap and collecting methodology
- Identify locations for community survey
- Engage with local government (Administrations & Community)
- Implement 2 community level assessments of vulnerability and coping capacity

Outcome

Knowledge products incorporating a deeper understanding of community resilience challenges and coping mechanisms and tools.

VISION 7:

Resilient Infrastructure for Addis Ababa

MODIFIED OPPORTUNITY

Develop the use of 'Smart' data systems for assessing Water Loss including leakage monitoring and management of Non-Revenue Water, as well as integrating a payment system to improve financial sustainability of the water system in Addis Ababa.

CHALLENGE 7 DESCRIPTION

Addis Ababa is said to have reached 76.7% (2017) water supply coverage. However, the water supply system is believed to have very high-water loss due to leakage and unaccounted for water, 20% and 17% respectively. The distribution system, as well as the two dams, have significant maintenance need which is key to address to avoid future failure and loss of resources. Focus on new investment and limited consideration for maintenance, have aggravated the problem.

The city does not have well organized data to guide maintenance nor a clear plan. Shortage of skilled staff and lack of asset management practices have left the system dependent on an ad hoc decision-making process dependent on community reporting of leakage or failure.

Furthermore, there are no emergency planning or institutional arrangements to ensure resilience of critical infrastructure during shocks such as flooding and stresses such as droughts. There is no redundancy planning in water supply and treatment systems to ensure spare capacity in case of disruptions.

Supply chain risks such as availability of chemicals and mechanical and electrical equipment, need to be considered to plan and manage infrastructure.

The Covid-19 pandemic has shown the fault lines and the need to overhaul the system. The city needs to prioritize investments on water as there are many competing demands on city budgets.

VISION DESCRIPTION

In a city where the water supply system has more than 40% loss of potable water, maintaining the existing system is the best and most sustainable option to meet the growing demand of quality water supply. The city needs to tackle unaccounted for water (non-revenue water) before investing in another dam to address shortage of water. Overhauling the water supply system is necessary before investing on the network, which is likely to be exposed to similar challenges. Introducing advanced computerized technology which detects any leakage in the system could inform timely maintenance or replacement of all pipes.

The ICT based NRW detection system enhanced with a digital leakage sensor, must be installed from catchments up to household level. The detection system is a sophisticated yet worthwhile solution as well as investment. With this system, the city can minimize network related water loss, and enhance revenue from increased water sold, which in turn can be invested to improve infrastructure.

VISION 7

The digitalization of the infrastructure network needs to be integrated with a well-organized payment system to cut out tedious, unreliable and labour-intensive door to door water meter reading. A well-developed inventory of existing infrastructure networks is required to build a reliable database system that can be controlled from a single station. Revamping the existing regulatory practice including reviewing laws and regulations to improve infrastructure and water usage is needed.

The following needs shall be addressed by the vision:

- The vision addresses the need to consider smart solutions to address problems of loss and wastage of existing resources.
- The vision addresses the need for solutions that can improve financial sustainability of existing systems before investing in new ones.
- There is a need to prioritize and design/plan community engagement and awareness creation to promote sensible water use.
- There is need to consider environmental protection and conservation of existing resources.
- There is need to engage private sectors and broaden governance to water management including clear responsibility/accountability of all actors and stakeholders.
- Introduce systems that enable use of recycled water for industrial and other purposes.

RELEVANT ASSETS AND RESOURCES

- Addis Ababa City Resilient strategy
- WRI UWR Framing Paper
- CRGE and newly revised National and sectoral long-term plans
- Water Fund
- Morais, C. and White, Z. 2020. Scaling digital solutions in the water sector: Lessons from city taps and wonderkid, GSM Association.

SHOCKS AND STRESSES

- Flooding
- Drought
- Ground water depletion
- Unaffordability
- Water quality

OVERALL CHAMPIONS

- Lead: AAWSA- Addis Ababa Water and Sewerage Authority; Addis Ababa City Government; MOWIE - Ethiopia's Minister of Water, Irrigation and Energy
- Partners: Ministry of Science and technology, Addis Ababa Plan Commission, Addis Ababa Resilience Project Office, Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility) Environment Forest and Climate Change Commission, Private Sector, Higher Education institutions, Neighbouring municipalities
- Approval/buy-in: Ministry of Finance, donor community and communities

VISION 7

ACTION 1.

Medium term - Assessing, identifying and developing an appropriate smart data system for water loss monitoring in Addis Ababa.

DESCRIPTION

For the city to take an evidence based and targeted approach in addressing water loss, leakage issues across the city's distribution network the city needs to have reliable & regularly updated data. Many smart systems are now available that can monitor both flow and pressure using sensors and ICT technology thus allowing for assessment of leaks and theft in a transparent and automated/semi-automated manner. In Addis potable water loss is estimated to be 40%, this represents a significant resource loss and is a cost burden to a city that is struggling to provide adequate and safe drinking water to a significant portion of its population. The city partners aim to assess, identify and develop an appropriate 'Smart' data system in Addis Ababa for monitoring water loss including leakage monitoring and management of Non-Revenue Water.

The city partners will evaluate appropriate technologies that consider competencies and skills required and ICT infrastructure required for proper implementation and effective use. Consider challenges with introducing new technology as they demand significant capital investment, complex hardware, and software logistics. Implementation of the technology also requires professional expertise, including research, understanding of the law (local as well as international).

In addition, the city will support community engagement and awareness building about water loss and wastage with the city and neighbouring municipality. Such engagement with stakeholders, can in future help with implementing water use efficiency measures, as well as create buy-in for implementing leakage repairs and action on illegal/improper connections.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa Plan & Development Commission
- Addis Ababa Resilience Project Office
- Institutions for Higher Education
- Addis Ababa Bureau of Finance and Economic Development Ministry of Finance
- Donor community

Funding

Align with WRI plan to pilot data collection. Provide technical support to AAWSA for funding.

Next steps

Short-term:

- Collect baseline spatial data, engaging the community, stakeholders, and neighbouring municipality to understand the root cause of leakage and develop a strategy to tackle the challenge.
- Develop media coverage and communication strategy.
- Publicize the project.
- Social media campaign about reducing leaks and wastage.
- Campaign around AAWSA's response to issues.
- Acquire Funding for pilot.

Medium-term:

- Pilot project. Monitor and evaluate the pilot project. Learn from the pilot project and strategize to scale, including funding roles of private sector and broader stakeholders and design bankable projects.

Long-term:

- Scale up and institutionalize.
- Review policy and legal framework to improve infrastructure and water management, informed by iterative process based off capacity and technical development.
- Introduce suitable/sustainable infrastructural development finance.

Outcome

Improved water management system & ITC based water leakage control system.

VISION 7

ACTION 2.

Capacity Building on Water Loss Reduction strategies and solutions.

DESCRIPTION

Sustainable water loss reduction is complex and involves many aspects. For technical solutions to be effective it requires that all political, financial, policy, governance and management aspects be considered clearly before adopting technical solutions. Often technical solutions like GIS web-based systems, with sensor technologies etc. need to be customized to specific needs, institutional and policy contexts and are not easily transferable. Successful implementation needs building the human, institutional and social infrastructure as well. Development of adequate competencies of technical staff in management, operations and maintenance is key, in addition to structures for communication and co-operation with all responsible actors.

Therefore, city partners aim to design and implement a Capacity building workshop and training to review, assess and support an improved understanding of a number of cost-effective solutions and strategies to advance water loss reduction and non-revenue water reduction strategies for Addis Ababa. This would include leak detection, operations and maintenance procedures, governance and regulatory strategies, management approaches, policy incentives and enforcement capacities and accounting systems required to achieve loss reduction results. As a first step to designing this workshop city partners will map, identify and engage local and international institutions, like UNW, UNU, UN-Habitat, GCA, IHC, TU Delft that could support the development of an accelerator program that helps city government and the utility assess strategies for reducing loss and wastage of water resources that would be most effective in the Addis context.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Ethiopia's Ministry of Water, Irrigation and Energy (MoWIE)
- Ministry of Science and Technology
- Addis Ababa Plan and Development Commission
- Addis Ababa Resilience Project Office
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility)
- Academia: EiABC, EIT, AASTU, etc.

Funding

WRI to fundraise from Embassies BMZ.

Next steps

- Survey skill gaps and limitations of key actors and stakeholders.
- Identify the right local and international partners to lead the capacity building process.
- Tailor training material to local context.
- Raise funding.
- Plan training and implement.

Outcome

Knowledge and technical skills to support water loss reduction.

VISION 7

ACTION 3.

Short monitoring campaign to assess problem areas.

DESCRIPTION

Water loss, its nature and magnitude could result from various types of issues in the distribution system including improper pressure management, known or unknown pipe failures, partly closed pipes, encrusted pipes, incorrect data, non-metering, theft etc. In addition, reservoir overflows and damage could also result in water loss in the overall water system of the city. To locate problems within the distribution system will require a detailed monitoring campaign that can identify problems both in the main distribution systems and the supply zones.

For the city to make the case for a larger and more sophisticated monitoring system for the entire network one approach is to assess the problem over a few supply zones through a short monitoring campaign that tests flows and pressures over a few weeks. This would help assess and identify the nature of management and upgrade challenges facing the system and can facilitate some interim measures like pressure management and repairs to reduce water loss in the smaller zone to make the case a more sophisticated smart system for the whole network.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Ministry of Science and Technology
- Addis Ababa Plan and Development Commission
- Addis Ababa Resilience Project Office
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility)
- Academia: EiABC, EIT, AASTU, etc.
- WRI

Funding

Align with other WRI programs/projects (e.g., Base-line data collection).

Next steps

- Identify high risk zones.
- Confirm city commitment for the monitoring campaign.
- Identify local or global knowledge partners to provide technical assistance to city champions in scoping the campaign.
- Support the city partners in submitting a proposal to raise funding for the campaign.
- Run an RFI based process to identify the best approaches to run the campaign including use of technology, methods and costs.
- Select site/neighbourhood/supply zones in Addis and pilot.

Outcome

A short pilot monitoring campaign that lays the foundation for a city-wide monitoring campaign using smart technology.

VISION 8:

City-wide Inclusive, Resilient and Sustainable Sanitation

ORIGINAL OPPORTUNITY

Develop a sanitation information system to support policymakers, service providers and funders to improve decision making, planning, monitoring and implementation.

CHALLENGE 8 DESCRIPTION

Although the number of residents with access to improved sanitation increased significantly over the decade, progress in Addis Ababa has been outpaced by rapid urban growth. One of the major bottlenecks identified hindering improving access and effective resources allocation is lack of clear arrangement for service delivery, particularly in on-site sanitation. Furthermore, investment and planning decisions are based on outdated and unreliable data and information. Planning processes do not consider the whole sanitation chain (access, emptying, transport, treatment, and reuse). Overall, capacity in the public and private sector is limited and lacks both capacity development plans and coordination at the sub-national level.

In terms of budgeting and financing, there is a double bottleneck of a low level of available funds in relation to the needs, and a low capacity to spend those available funds due to unclear roles and responsibilities. The ability of the city to regulate and monitor sanitation including pollution levels and water quality particularly in surface waters is limited and building codes and technical standards particularly for decentralized systems and industrial wastewater treatment are not enforced.

There is also a lack of projects and innovative service concepts that can attract new financing or approaches to scale sanitation interventions focusing specifically on private sector involvement including SMEs, industrial wastewater management as well as increasing access to safely managed sanitation particularly in low-income areas. Although the link between urban sanitation and solid waste management is obvious there is a clear lack of coordination and integration between relevant stakeholders and government entities.

The expansion of Addis Ababa has not been matched with a growth in sanitation and wastewater infrastructure let alone reliable high-quality services. Unregulated urban growth and a proliferation of informal settlements make the assessment of the provision of sanitary conditions for Addis Ababa a difficult task. As a result, available data on the city's state of sanitation tends to be dated. Sector and investment decisions are made based on limited knowledge of the situation on the ground and the needs and demands of the population.

VISION DESCRIPTION

A sustainable and resilient sanitation system is an integral piece of sustainable development and essential to not only minimize health and

VISION 8

environmental risks associated with open defecation and poorly managed waste disposal, but it also yields multiple benefits in areas from health to food security, resilient livelihoods, business growth, energy, and ecosystem services. A sustainable sanitation system maximizes social and public health benefits and minimizes unintended negative consequences on communities, particularly for those who are most vulnerable. Sustainable sanitation systems are an important part of building a circular economy as they can contribute to sustainable growth by increasing productivity, allowing innovation and new ideas to emerge due to the integration of energy production and resource recovery. Approaches taken to promote sustainable sanitation must be designed to ensure that infrastructure and service provision respond to the needs and requirements of the users, are affordable and at the same time financially viable. Sanitation services and infrastructure need to be technically sound and manageable at the household, community and city level by relevant stakeholders and institutions and a variety of service providers to safeguard long term viability. Several criteria must be considered ranging from risk of exposure, waste collection, transport, treatment, to reuse and disposal. Practicality of the entire system must be carefully considered from the planning and designing phase to development, construction, operation, and monitoring phases with households, the community, and the technical teams of local utilities in mind.

The sustainable sanitation vision recognizes that relevant, up-to-date sanitation related data and information is lacking or not easily accessible. This reduces the city's ability to understand its sanitation, health and environmental risks and vulnerabilities, communicate these risks to its population, and design, target and develop required infrastructure and services. It also hinders the City's ability to develop effective policy, strategy and regulation including effective monitoring and evaluation systems. To address the data and information gap, it is essential to develop a sanitation information system and dashboard that can inform policy and strategy, develop services and monitor service provision, identify risks and vulnerabilities as well as foster integrated planning of resilient urban infrastructure.

The information system will allow and help all relevant stakeholders to better understand the current sanitation situation including service levels across the city and project future sanitation scenarios in the city. The platform will be populated through a comprehensive baseline data collection exercise that will allow the city to develop a comprehensive sanitation profile that includes water supply, wastewater, solid waste, storm water, access to toilets, decentralised and centralised systems, natural infrastructure, and water quality information. Mapping of sanitation infrastructure and associated risks as well as service levels enhances transparency and accountability within the sector. The platform respectively can be used as an advocacy tool providing citizens and local governments with information and arguments to demand improved services and plan infrastructure investments to increase access to safely managed sanitation and, on an operational level, to improve the sustainability and equity of service delivery. Regular data updates and reporting will enhance the transparency in the sector and allow for better decision-making, ultimately informing future planning and policy. The data platform will enable stakeholders to plan infrastructure and services provision based on needs and local requirements and to create models and predictions for the future growth of Addis Ababa and hence service provision.

VISION 8

The following needs are addressed by the Vision:

- The need for updated and reliable, geo-referenced data and information on the whole urban sanitation system and sanitation chain including the capture, storage, transport, treatment and disposal or reuse of human excreta and wastewater to better understand risks and vulnerabilities and enable equitable improvement in services.
- The need for innovative and resilient sanitation concepts that can encourage the private sector to take a centre stage as a source for additional investments in sanitation service provision, mobilize additional commercial finance and contribute to strengthening financing systems upon which sustainable service delivery relies.
- The need for a holistic governance mechanism that supports coordination, collaboration and integration between relevant stakeholders and government entities for sustainable sanitation for all.

RELEVANT ASSETS AND RESOURCES

- Addis Ababa Resilience Strategy:
- Action 32: Build a Water Resilient City
- Action 35: Promote decentralized waste treatment and water sensitive design
- Action 36: Improve sanitation service provision
- Action 44: Establish an accredited environmental pollution monitoring laboratory and data management system
- Action 48: Build a sustainable and resilient city-region food system
- Second Ethiopia Urban Water Supply and Sanitation Project (SUWSSP): Financed by a loan from the World Bank, the SUWSSP aims to increase access to enhanced water supply and sanitation services in an operationally efficient manner in Addis Ababa and selected secondary cities. The program will provide improvement to the water and sanitation services in Addis Ababa, as well as support for operational efficiency improvements and institutional strengthening of the city's water utility.
- Consolidated Water Supply, Sanitation (WSS), and Hygiene Account Project for Ethiopia funded by the World Bank.
- One WASH National Program (OWNP): OWNP is a sector wide approach (SWAp) whose broad objectives are to achieve water, sanitation and hygiene (WASH) results in Ethiopia through official policies, strategies and development plans in a harmonised and coordinated way involving sector stakeholders. It is a flagship Government programme supported by several development partners (DPs) and NGOs, in which different actors come together to address water supply, sanitation and hygiene as an integrated package.
- Addis Ababa Riverside Green Development Project entitled "Sheger Beautifying Project".
- Decentralized wastewater treatment program: To increase the city's wastewater treatment capacity, AAWSA expanded the existing Kality Wastewater Treatment Plant (WWTP) with support from the World Bank. Completed in 2018, the expansion project has increased the WWTP's capacity from only 7,000 m3 per day to 100,000 m3 per day. The expansion included the construction of 18 km of new trunk main from the centre of the city to the treatment plant. While the plant is currently operating at only 40% of its capacity, at full capacity it is expected to serve one million residents in seven sub-cities. Efforts are currently underway to further expand the sewerage network and increase the number of connected households across the city.

VISION 8

- Addis Ababa Drainage Master Plan: The Addis Ababa City Roads Authority (AACRA) is currently developing a comprehensive, citywide drainage master plan that will help address localized flooding caused by stormwater run-off.

SHOCKS AND STRESSES

- Inadequate sanitation systems
- Flooding
- Aging infrastructure
- Environmental degradation
- Water scarcity
- Poverty
- Unemployment
- Insufficient institutional and technical capacity
- Water and environmental pollution

OVERALL CHAMPIONS

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Ministry of Science and Technology
- Addis Ababa City Planning Commission
- Private Sanitation Service Providers

VISION 8

ACTION 1.

Medium term - Baseline Data Collection & Stakeholder Engagement.

DESCRIPTION

In the short term, actions to achieve the overall sustainable sanitation objective will focus on collecting and mapping relevant baseline data and information, engaging with the community and relevant stakeholders to better understand risks, vulnerabilities and needs as well as the root causes of problems identified by the communities and develop a well-defined strategy to address these risks and vulnerabilities, identify priorities and align the vision. Based on immediate priorities identified suitable pilot activities and projects will be designed including communication and sensitisation campaigns to leverage funding for pilot activities.

Stakeholders

Lead Organizations:

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government

Government partners:

- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Ministry of Science and technology
- Addis Ababa Plan Commission
- Addis Ababa Resilience Project Office
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility)
- Environment forest and climate change commission
- Ministry of Finance
- Neighbouring municipalities

External partners:

- Private Sector
- Higher Education Institutions
- Donor community
- The Community

Funding

USD 2.0 Million to set up a sanitation information system and map existing sanitation infrastructure and services including centralized and decentralized infrastructure as well as relevant socio-economic and water quality data for the whole city.

Initial funding should be provided through donor, philanthropic or CSR funding to collect data, set up the database, develop the dashboard and design and implement related capacity development as well as standard operating procedures and reporting to operationalise the information systems. Maintaining and updating of the information system requires further investment in personnel and IT licenses.

Next steps

The city-lead and partners plan to develop initial project concept and obtain political and public buy-in. Following the project concept, it is critical to conduct gap and needs assessment and develop a detailed scope of work and establish a steering committee and partnerships for the development and funding of the work. See below short-, medium- and long-term steps highlighted below.

Short

- Develop initial project concept and obtain political buy in.
- Establish steering committee and partnerships for the development and funding of the work.
- Conduct gap and needs assessment and develop detailed scope of work

Medium

- Identify most suitable data collection methods, tools and instruments
- Prepare and conduct data collection including training
- Develop the data repository
- Integration of database with existing databases in the city
- Identify a host for the database and develop dashboard
- Train staff to administer and manage the database and dashboard

Long

- Maintain and continually update database
- Potential to further develop into a City dashboard that enables Addis Ababa to post curated data so its citizens can more easily understand the city's progress toward its main goals and priorities.

VISION 8

Outcome

Sanitation information system is set-up and used by core decision-makers to manage and improve service provision as well as to inform decision-making on sector investments. The information system will support the design and effective enforcement of public health regulations for water and sanitation, provide information on operation and routine maintenance performance of sanitation infrastructure and services as well as sanitation coverage and needs, and quality and affordability of sanitation services.

VISION 8

ACTION 2.

Short term - Develop a capacity building program on water loss reduction strategies and solutions.

DESCRIPTION

Although progress has been made towards addressing the lack of proper sanitation in Addis Ababa over the last years, increasing pollution and COVID-19 highlight the critical importance of sanitation which remains a persistent challenge in many places in the city. While there are many feasible solutions from an engineering standpoint, policy makers and the City, as well as AAWSA, are often unclear which of these they should promote and adopt. Furthermore, the lack of reliable data and information on the current situation, preferences, and service levels hinders development and informed decision making in the city. City officials and AAWSA are aware that business as usual – where conventional sewerage and wastewater treatment are considered as the only solution – will not help the city to ensure that all citizens in their jurisdiction have access to safely managed sanitation. There is a clear need to better understand infrastructure options and related supply and service concepts to deliver city-wide, inclusive, sustainable and resilient sanitation services.

Supporting Action 1 therefore proposes to organize a City Sanitation Exchange and Learning Event in Addis Ababa with a selected number of other African cities that have made significant process in advancing city-wide sanitation planning and service improvements to increase access to safely managed sanitation, address multiple risks including pollution, water scarcity, climate change, and utilize sanitation as a driver for a thriving local economy. Together with selected partners, the City Sanitation Exchange will facilitate the exchange of knowledge and experiences, allow cities to discuss, examine and obtain inspiration from others. The objective of the City Sanitation Exchange is to highlight good practices and innovative solutions to urban sanitation service delivery, provide insights into experiences and solutions that work from similar environments, to facilitate peer-to-peer learning and knowledge exchange and to promote a public service approach that incorporates resilience principles and supports an effective response and resilient recovery after COVID-19. It will highlight case studies from other cities that sustain sustainable, inclusive, and resilient sanitation services across highly urbanized service areas, drawing on a full range of available and appropriate technologies including onsite and sewers, centralized or decentralized as appropriate, as well as different service concepts along the whole sanitation chain.

The City Sanitation Exchange Program will focus on the importance of standardized methodologies to source, monitor and aggregate data on the quality and reach of sanitation services particularly in urban, low-income areas to inform investment and service delivery decisions that allow for multiple co-benefits. It will highlight experiences and case studies from other cities and countries that can help the City of Addis Ababa to articulate and advance its sanitation and resilience building goals including strengthening its data and information management systems on sanitation, water quality and wastewater and inform the design of transformational sanitation projects, service delivery concepts and business models that have the potential to disrupt traditional service concepts and create new business and enterprise models that can help the city to address high youth unemployment rates and provide new jobs in a recovering local economy.

Additionally, the City Sanitation Exchange will create new city partnerships and allow interested African Cities to help one another to provide quality sanitation services to all. Selected partners will bolster knowledge sharing and peer partnerships between cities and will provide insights into new solutions, technologies and innovations in the sanitation sector.

VISION 8

The City Sanitation Exchange will also help the City of Addis Ababa and its peers to better understand the intersection between urban resilience, water resilience, and city-wide sanitation planning, to source new ideas and solutions for existing city challenges, and to more effectively navigate the often-difficult politics and governance systems associated with improving sanitation services. The City Sanitation Exchange aims at creating a strong and trusted peer group, that shares knowledge and leverages this knowledge across cities for collective action that becomes a catalyst for more awareness on the role of sanitation in the context of city water resilience, climate adaptation and investment in respective initiatives and efforts.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Addis Ababa City Government Plan & Development Commission
- Private Sector
- Higher Education
- Neighbouring municipalities
- Donor community

Funding

City Lead and partners aim to secure approx. 20,000 USD in funding to design and implement City Sanitation Exchange in Addis.

Next steps

WRI, Global Resilient Cities Network and interested local stakeholders, including Addis Ababa City Resilience Project Office, identify a core group of cities, partners and key experts to design the City Sanitation Exchange and Learning Event and to compile best practices and case studies relevant for the city.

Outcome

Most suitable data collection methods, tools and instruments are identified, and relevant data are collected. The data repository is developed and integrated with existing databases. Dashboard is developed and their staff and technical personnel are trained to manage the data and dashboard to support end users.

A peer group of African cities is established that collectively identifies and advances urban sanitation action to improve access to safely managed sanitation for all citizens, enhance water and urban resilience and help cities to adapt to climate change.

VISION 8

ACTION 3.

Medium term - Implement a targeted short term water loss monitoring campaign to assess key problem areas.

DESCRIPTION

To kickstart, test and pilot the process of setting up a sanitation information system and to establish first initial use cases and examples of how more reliable data and information can inform integrated and city wide, sustainable and resilient sanitation planning. Supporting Action 2 proposes to select an urban low-income area within the city together with the relevant stakeholders to develop a comprehensive data collection approach, related tools and methodologies, and pilot data collection and mapping to provide a first initial data set for the information system that can inform place-based sanitation planning and decision making to design infrastructure measures and improvements in service provision.

Data collection will include spatial mapping of existing sanitation infrastructure (centralized, decentralized, on-site, household level, institutions like schools and clinics) and service levels as well as information on risks and vulnerabilities like water quality, pollution sources, etc. Furthermore, the data collection concept and methodology will be designed to include complementary urban systems and services including water supply, drainage, greywater management and solid waste management that impact or will be impacted by sanitation and provide an opportunity to leverage co-benefits in infrastructure design and service delivery.

In addition to surveying and mapping the sanitation situation in at least one urban low-income area with low service levels and limited or no access to safely managed sanitation, Supporting Action 3 will establish an inventory of decentralized wastewater treatment systems. The City Government together with AAWASA and the Addis Ababa Housing Development Project Office (AAHDPO) have adopted decentralized wastewater systems for the City's affordable condominium schemes and systematically introduced them in newly built condominiums since 2014. However, clear guidance and standards are lacking. As part of Supporting Action 2, their design and functionality will be assessed, and recommendations will be provided how decentralized sanitation systems can optimize reuse and resource recovery for greener, more sustainable buildings with reduced environmental footprints looking forward.

In addition, existing institutional and governance structures and processes will be assessed to compile recommendations for the design of a regulatory and policy framework that guides city wide sanitation planning, improves accountability, and attracts finance including opportunities or requirements for institutional restructuring if necessary.

Supporting Action 2 will help the city to develop a blended sanitation service delivery approach based on different contextualized solutions that include onsite sanitation systems with faecal sludge management (FSM), decentralized or small-scale systems for areas too far from existing sewers or too dense for individual, household solutions and, where applicable, piped sewers (e.g., central business districts). Guidance will include design recommendations that incorporate resource recovery and re-use where feasible, outline operation and management requirements of decentralized sanitation systems and will highlight key institutional commitments, enabling factors with aligned incentives, potential service arrangements and partnership opportunities to be utilized between government institutions, AAWSA, civil society and communities as well as the private sector.

Recommendations for the integration of the information system into service delivery will be outlined including systems and incentives

VISION 8

for decision makers and service providers to monitor sanitation service performance and to allow strategic and tactical changes to optimize performance and service delivery. Furthermore, linkages to other critical urban systems will be established including solid waste management, drainage, water supply, land-use management, and housing to ensure that sanitation improvements and service delivery are planned and managed in a coordinated, integrated and resilient way including all citizens, rich and poor, living in formal and informal settlements. Supporting Action 3 aims at shifting the urban sanitation paradigm towards an inclusive approach that helps deliver safely managed sanitation services to all in an increasingly efficient way and will help the city to reflect sanitation requirements in other sectors and services as the city becomes increasingly open to alternative ideas, technologies, and partnerships that target underserved communities and reorient the city's approach to sanitation service provision and infrastructure development based on an innovative culture interested in improving critical services and increasing institutional legitimacy.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Addis Ababa City Government Plan & Development Commission
- Addis Ababa Resilience Project Office
- Infrastructure Agencies (Addis Ababa Road Authority, Telcom, power utility)
- Higher Education
- Neighbouring municipalities
- Donor community

Funding

Maintaining the database requires further investment in personnel and IT licenses etc. Funding opportunities need to be identified to support repository and dashboard updates as well as capacity development and resources for long term maintenance of the database. Potential funders include the World Bank and One WASH programs.

Next steps

City partners identify a pilot site for mapping and engage with community stakeholders review mapping approach and purpose and secure consent for the mapping pilot. The city partners then identify potential funding sources and develop proposals to secure funding. Once funding is secured and pilot mapping is completed. City uses the pilot map to review and assess the state of the centralized and decentralized assets, ownership patterns and management systems and then assess and identify governance mechanisms to better support integrated closed-loop and circular economy approaches to wastewater management and coordinated management of blended sanitation systems.

In addition, city partners commit to use the learning from the pilot to further develop the model for the City dashboard that enables Addis Ababa to post curated data so its citizens can more easily understand the city's progress toward its main goals and priorities

Outcome

The city uses the spatial database to implement integrated management of centralized and decentralized sanitation services.

VISION 9:

Sustainable Stormwater Management

ORIGINAL OPPORTUNITY

Develop and implement the widespread use of green-blue infrastructure through education (training), revision of city policies and programs to support sustainable stormwater management.

CHALLENGE 8 DESCRIPTION

There are several challenges contributing to stormwater management issues ranging from social causes related to awareness, environmental degradation, technological gap, financial limitation, political instability, institutional capacity and structural arrangement. Lack of public awareness in distinguishing stormwater from wastewater, and people connecting stormwater into the sewer pipes and manholes overwhelms the central wastewater treatment plant. On the other hand, connecting wastewater to drainage canals increases pollution of waterways and flooding. Informal settlements are often built on riverbanks exposing them to flood hazard causing degradation of the riverbank. Dumping solid waste into drainage canals and unregulated construction activities cause significant clogging, subsequently causing the system to overflow.

The overall mandate of Addis Ababa City Roads Authority (AACRA) to protect roads from stormwater related damage leads to heavy reliance on solely conventional infrastructure. Insufficient considerations to watershed management and green and blue infrastructure in the design phase exacerbates the challenge of managing stormwater. The channelization, transporting long distances and accumulation of runoff using mono-functional grey infrastructure (drainage canals) is increasing pressure on specific spots exacerbating flooding, erosion, and environmental degradation. Although a drainage master plan has been prepared by AACRA, it has yet to be shared with other relevant stakeholders such as Addis Ababa City Riverbank and Green Administration and Development Agency (AARBGADA) and AAWSA, which highlights a sectoral fragmentation. Reviewing AACRA's bidding documents for road and drainage construction revealed they consider neither a watershed approach nor blue-green solutions.

Political instability and regional tensions also constrain the implementation projects that consider a landscape approach, which exacerbate environmental degradation and deterioration through delayed conservation activities and increasing competition to exploit natural resources. The political instability poses palpable difficulty to deal with trans-regional environmental issues between Addis Ababa and the Oromia region. Financial constraints are also an impediment to address stormwater infrastructure and management challenges. Historically, less attention has been given to blue-green solutions, in particular for stormwater management during budgeting.

VISION 9

Institutional capacity gaps, lack of proper coordination between relevant organizations, and inadequate enforcement of policies also contribute to the poor state of stormwater management.

VISION DESCRIPTION

The sustainable stormwater management vision recognizes the need to restore degraded watersheds, protect watersheds and natural waterways, repair and improve infrastructure, and properly manage dams and treatment plants. To address the stormwater management challenges, it is essential to develop and implement the widespread use of green-blue infrastructure through education (awareness and capacity building, providing training), revision of city policies, and widespread pilot projects.

It is essential to restore and protect watersheds from degradation to reduce soil erosion and run-off that can overwhelm the stormwater system through green infrastructure solutions such as forest restoration. Physical infrastructure can also be insufficient to handle existing loads due to repair and expansion needs. Improving the quality and coverage of conventional grey infrastructure can also add to sustainable stormwater management. Bringing awareness through education to communities to reduce waste disposal into stormwater lines and manholes can reduce clogging and overflowing. Addressing city policy gaps and improving enforcement of existing stormwater and sanitation policies can advance storm water management and sustainability.
While orientating to sustainable storm water management it is essential to focus on reducing runoff from the source, which entails small scale localized interventions at individual property and/or community level adapting approaches and technologies of nature-based solutions and water sensitive urban design. Examples of small-scale localized interventions includes multi-functional green spaces, rain gardens, green roofs, swales, porous pavements, bio retention and filtration ponds.

RELEVANT ASSETS AND RESOURCES

The strategies outlined in the WRI UWR framing paper which includes a shift in urban planning and decision-making to account for hydrologically linked regions and climate risks provides an opportunity to instil stormwater management. This effort can help incorporate vulnerability assessments through updating and analysing hydrologically linked regional topographic, weather and climate data and incentivize spatial expansion towards less hazard prone areas, the protection of crucial water ecosystems, and the retrofitting of existing infrastructure. It can further diversify water management options by investing in water resource conservation, combining grey and green infrastructure and decentralized solutions, and building capacity.

Existing efforts such as upper catchment (Entoto) water and soil conservation, water harvesting projects formulated by Addis Ababa City River Basin and Green Area Development and Administration, and nature-based solutions for water resources infrastructure and community resilience in Ethiopia. Addis Ababa Water Fund project linked to address the challenges of catchment degradation by addressing barriers to increasing forest coverage, minimize erosion, to reduce siltation of reservoirs. The establishment of water fund can also help to generate funding to implement catchment rehabilitation and livelihood improvement in upper catchment of the surface water sources of the city. In addition, the WRI initiative “strategic planning for nature-based solutions to advance urban water and heat resilience” can help to identify potential areas for implementation of nature-based solutions (NbS), and the selection of appropriate NbS options.

SHOCKS AND STRESSES

- Flooding
- Further damage to property and water management infrastructure
- Increased traffic congestion and mobility problems because of increasing flooding during rainy seasons
- Pollution and public health issues related to overflows, stagnant water, and damage caused to wastewater treatment facilities and infrastructure

OVERALL CHAMPIONS

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Infrastructure agencies
- Addis Ababa City Planning Commission
- Municipalities
- Communities

VISION 9

ACTION 1.

Short to medium term - Ensure the consideration of climate risks and natural water flow patterns in the city-region planning and implementation of urban infrastructures

DESCRIPTION

Align city shaping and structuring infrastructures (such as major transport routes and trunk infrastructure) towards areas less prone to climate risks (floods, landslides etc) and influence the direction and pattern of urban growth away from crucial water assets and natural ecosystems. Incentivize spatial growth to less hazard prone areas to curb the encroachment and degradation of crucial ecosystems. This needs to be synchronized and coordinated with vision 4 and 5, which entails the engagement and commitment of not only Addis Ababa City Administration but also the inter-related Oromia regional state.

Stakeholders

- Oromia Regional State, President and the regional Council
- Oromia Finfine Special Zone
- Oromia Urban Planning Institute
- Oromia Urban Land Development and Management Agency
- Addis Ababa City Administration, City Mayor and Council
- Addis Ababa City Plan Commission
- Awash Basin Development Office
- African Development Bank
- VEI International
- WRI-Africa

Funding

-

Next steps

- Incentivize the joint inter-regional resilience building efforts
- Update population, topographic, weather and climate information
- Apply latest modelling technologies (participatory GIS, Aqueduct Floods and OurWater tool) to understand the risks in the interconnected Oromia and Addis Ababa inter-regional water and related resources
- Develop growth scenarios using multi-criteria model
- Engage city and Oromia regional state actors to jointly decide on averting risks, hazard prone areas and identify less hazard prone areas for future growth areas
- Galvanize political commitment towards protecting key ecosystem
- Develop incentive package in less hazard-prone areas/future growth areas
- Accordingly align infrastructural investment (such as road networks) and service delivery.
- Jointly monitor and evaluate the implementation and take appropriate measures

Outcome

-

VISION 9

ACTION 2.

Medium term - Develop a Strategic green infrastructure plan to address storm water management challenges in Addis.

DESCRIPTION

To better prioritize and reduce water (flooding and pollution) and heat risks (heat island impacts) across the city using nature-based strategies, that are low costs, low carbon and can generate low skill jobs WRI and partners are developing a 3-part analysis. This analysis includes a city asset scan, a hazard scan and NBS suitability scan. The spatial modelling on land use types and changes (blue, green cover and built-up areas, land use types, trends in growth or depletion), flood risk and heat risks modelling is in progress. The next step is to develop NBS suitability assessment based on the mitigation needs (considering hazard, exposure and vulnerability) and the urban typologies and their limitation. The end goal is to make recommendations of a prioritized suite of NBS strategies that the city could deploy in the different city typologies based on exposure levels and hazard types impacting the most vulnerable.

If the city commits to prioritize this work, additional scope could be added to the above analysis to assess point/no-point sources of pollution. Mapping diversified NBS to guide place-based interventions to reduce runoff and related contamination including sediments, balance impervious surface increase and deforestation caused by built-up infrastructure in buffer zones around rivers) and limit downstream water quality pollution could be developed.

Stakeholders

- AAWSA
- AARPO
- Environmental Protection Authority

Funding

Secured and supported by WRI flex funds, 100,000 USD.

Next steps

- WRI and partners plan organized a stakeholder consultation in late May 2021 to introduce the initiative to city stakeholders and seek inputs on the overall approach, sought feedback in selecting urban typologies and data needed to develop the NBS suitability analysis, and confirmation on the risk priorities, exposure and vulnerability
- During June-August 2021, WRI team will complete flood risk assessment and water supply analysis mapping
- During Sept-Oct, 2021 WRI team will complete NBS suitability assessment and prepare pre-liminary recommendations to be shared with key city stakeholders
- During Nov 2021, WRI will present findings to key stakeholders in the city to receive feedback on overall assessment and priority interventions suggested
- In December 2021, WRI will finalize the assessment in the form of a recommendations report that will be drafted, edited and designed to be shared with the key city champions for their use

Outcome

Provide the city stakeholder a decision-support framework to Identify, select, prioritize and implement NBS solutions that help address various water and heat risks the city faces.

VISION 9

ACTION 3.

Medium term - Implement a resilience academy to integrate a multi-benefits resilience approach in existing green infrastructure projects to improve storm water management

DESCRIPTION

One of the flagship place-making initiatives the city is undertaking is the Sheger river rehabilitation project. The project aims to help improve the natural waterway and restore some of the ecosystem functioning through pollution mitigation measures. However, this project as currently designed does not address many climate resilience challenges the communities living along its riverbanks face. The city is impacted by increasing incidents and severity of riverine flooding and pluvial flooding. Many urban poor communities living along the riverbanks are dependent on river water for their livelihoods and are impacted by these risks. It is therefore important that the project stakeholders not only consider beautification efforts but also resilience challenges in the planning and design of the project and engage the community in making design decisions that will best benefit them.

Through the urban water resilience initiative city partners aim to design and host a resilience academy focused on prioritizing integrated resilience opportunities in the design of the Sheger river-rehabilitation project, this will include consideration for decentralized and small scale localized interventions that reduce runoff . A focus on closing the loop of the urban water system is also necessitated by linking place making to storm water management measures and the development of alternative water supply options (rainwater harvesting, grey water recycling, decentralized wastewater treatment etc). This in turn entails working at a community level to support community organizations and households to select the specific NbS measures and adapt the technologies that help to address the local water challenges and at the same time support livelihood improvement (e.g., community farming). Another strategy is to approach the corporate organizations with large land holdings and roofs to implement NbS to reduce runoff from each of their premises and complement their water needs which can be linked with vision one.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Infrastructure agencies
- Addis Ababa City Planning Commission
- Sub city and woreda administrations

Funding

City lead and partners will identify funding from global or local philanthropy and or CSR funding to fund the implementation of a resilience academy to support integrating climate resilience consideration in the Sheger River rehabilitation project.

Next steps

- Share LA river resilience academy outputs with key Sheger river champions and confirm interest in conducting a resilience academy.
- Conduct stakeholder mapping to assess and identify all key project impacted communities and stakeholders to include in the resilience assessment and visioning process.
- Review existing Sheger river project documents, conduct initial resilience opportunity assessment and develop detailed workshop plan.
- Prepare workshop materials and conduct stakeholder outreach.
- Schedule and conduct workshop, share key takeaways, and identify next steps.
- Review, assess, synthesize all stakeholder inputs from the workshop and share back a report of key recommendations with all participants.

Outcome

Capacity building to deploy a stakeholder engagement and resilience planning tool in Addis to help the city identify, assess, and select green and blue infrastructure strategies to address stormwater management challenges along the river corridor. Identification of resilience strategies to be integrated in the Sheger river rehabilitation plan.

VISION 9

ACTION 4.

Pilot community level sustainable storm water management project.

DESCRIPTION

Sustainable storm water management entails reducing runoff from the source and decentralized and localized interventions particularly at local community level. This action requires working at pilot community level to adapt sustainable storm water management. In parallel with awareness building interventions at local community level are needed to push forward the implementation of sustainable storm water management, and it can be coordinated and linked with vision 2. This initiative shall not be confined to water challenges but addressing multi-faceted livelihood challenges through water lens particularly linking to support local economic development and creating job opportunities are needed. Therefore, orientating towards community-based approach and linking community issues to broader multi-level governance issues is important.

Stakeholders

- AARPO
- AACRA
- Addis Ababa Urban Planning Institute
- Community Organizations (local women and youth organizations)
- Habitat for Humanity
- WRI-Africa
- Local authorities (Woreda Administrations)
- National One Wash Program Office
- Academia, e.g., EiABC (can support research-oriented adaptation of NbS at community level)

Funding

This action shall be mainly financed by the City Administration revenue from increased tariffs and taxation in high income and key public investment areas. Other financial sources that can be tapped for implementing this action are funding from National One Wash Program and CSR funding.

Next steps

- Select priority communities for NbS.
- Conduct participatory assessment of livelihood and local water challenges.
- Consolidate local community groups and cooperatives particularly focusing on local youth and women groups.
- Conduct participatory water sensitive urban design and community action planning at the pilot community level (develop multi-functional local green spaces that helps to address local water challenges, multi-faceted livelihood issues and reduce runoff).
- Organize and provide capacity building and training in entrepreneurial leadership and management of NbS and green development.
- Gender sensitization and awareness.
- Networking with potential partners.
- Create source of income and economic bondage on harvesting water and link with urban farming.

Outcome

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VISION 9

ACTION 5.

Near term - Implement a pilot sensitization campaign for citizen stewardship on stormwater management.

DESCRIPTION

City lead, and partners will design and implement a baseline survey on citizen awareness and attitude towards storm water management and challenges. The survey will help identify gaps to assess and develop campaigns to improve sensitization of the scale of problem and the importance of runoff management and reduction, and pilot and/or model project implementation within 2years. The baseline survey will not only help in assessing solutions but also provide data to monitor progress once a pilot sensitization program is implemented.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Infrastructure agencies
- Addis Ababa City Planning Commission
- Municipalities

Funding

City lead and partners will identify funding from global or local philanthropy and or CSR funding to fund the implementation of a citizen awareness campaign on stormwater management.

Next steps

- City lead and partners will review, and research successful & impactful sensitization campaigns implemented in cities to improve stormwater management and reduce pollution and flooding risks in cities.
- City leads will assess potential funding sources/grants to target to implement such a program in Addis Ababa and submit proposals to secure funding.
- Once funding is secured the city will work with partners to conduct the baseline survey on awareness and attitude of citizens towards stormwater challenges the city faces and identify gaps to fully understand the scale of the problem and the value individual action can add to address stormwater management challenges.
- City leads will then work with partners to design and implement an awareness building campaign that will target specific stakeholders with key messages for the highest impact at this pilot stage.
- Once pilot is completed city leads and partners assess and develop a strategy for scaling up to a citywide awareness building program that considers revising laws and policies to support the awareness building program on an ongoing basis.

Outcome

Baseline survey on awareness is conducted, gaps are identified, and pilots provide insights to support subsequent actions.

As a medium-term measure city leads and partners will commit to scaling up efforts to full-fledged awareness program (particularly at grassroots level), revising laws and policies (such as drainage master plan) to support the awareness raising program, and green-blue infrastructure development (soil and water conservation, rain gardens, retention and detention ponds at local level).

VISION 9

ACTION 6.

Retrofitting existing infrastructure to integrate a water sensitive agenda.

DESCRIPTION

Retrofitting existing infrastructure to integrate a water sensitive agenda is needed as part of transitioning to water resilient city. Particularly road infrastructure (highway, streets, walkways, alleys, parking areas...) makes up significant part of the built environment which are impacting the storm water flow and flooding, and therefore retrofitting the existing road infrastructure could help to significantly advance towards the realization of water resilient city. Because of the mind-set of engineers and officials locked in the conventional grey infrastructure solutions, in the past the city's infrastructure were not designed and implemented sensibly to address water resilience issues. A study (Habtemariam 2016[5]) noted that particularly road construction in the city is insensitive to the natural water flows impacting flooding and livelihoods.

(5) Habtemariam, L.W. 2016. "Integrated and Coordinated Physical and Transport Infrastructure Planning and Development in Addis Ababa." Unpublished Working Paper for the Addis Ababa City Government Transport Programs Management Office and Addis Ababa University

Stakeholders

- AACRA
- AARPO
- WRI-Africa
- African Development Bank

Funding

- African Green Stimulus Program
- Road Fund
- WRI NbS program

Next steps

- Auditing the existing infrastructure sensitivity to water (using multiple methods – observations, interviews, lab testing, site investigation).
- Identify opportunities and constraints.
- Organize stakeholder workshops.
- Devise structural and non-structural measures for retrofitting.
- Mimic the natural drainage while retrofitting.

Outcome

-

VISION 9

ACTION 7.

Community participation for watershed management.

DESCRIPTION

As the city and surrounding regions continue to grow many of the city's key reservoirs and their catchments are facing degradation. Watershed forests are being lost at a rapid rate and green cover is increasing replaced by built up and impervious surfaces. This is challenging water quality at the reservoirs (the Gefersa reservoirs is a case in point facing severe risks) due to increased sedimentation as well as causing failures due to blockages at key inflow points due to both increased runoff and increased siltation.

While the city should continue to work with regional authorities to better manage growth and protect these key watersheds the city is dependent on, the city can also learn from many successful community-led watershed management programs to support action through mass mobilization to implement a community led watershed replanting program in the critically impacted watersheds.

The city of Freetown is successfully implementing a community led replanting plan to revitalize the city's watersheds. The program has successfully created a grassroots movement that partners with community organizations to create a model with an organizational structure and implementation strategy that supports long term sustenance and localized management. This initiative will support peer-to-peer exchange between Addis Ababa and Freetown stakeholder to support the design of similar program in Addis Ababa.

Stakeholders

- Addis Ababa Water and Sewerage Authority (AAWSA)
- Addis Ababa city government
- Ethiopia's Minister of Water, Irrigation and Energy (MoWIE)
- Infrastructure agencies
- Addis Ababa City Planning Commission
- Municipalities

Funding

- African Green Stimulus Program
- Road Fund
- WRI NbS program

Next steps

In the short-term city leads and partners identify potential funding sources to tap for this community led watershed replanting program through a linkage to the nationwide "Green Legacy" initiative that aims to plant 20billion trees by 2024.

In the medium term the city leads also review and assess linkages to governance and financing strategies like the water fund that is currently being initiated in Addis by The Nature Conservancy to support long-term watershed management.

Outcome

City stakeholders and partners scale up the green-blue infrastructure and watershed development through mass participation and mobilization.

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