Addis Ababa Adaptation Network (AAAN): Addressing water security challenges under uncertain futures (Kickoff workshop)

01 and 02 April 2022

Workshop Report

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Acknowledgement

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Acronyms

AACRA	**Addis Ababa city road authority**
AAEPA	**Addis Ababa environmental protection authority**
AAHC	**Addis Ababa house corporation**
AAPDC	**Addis Ababa planning and development commission**
AASTU	**Addis Ababa science and university technology**
AAU	**Addis Ababauniversity**
AAWSA	**Addis Ababa water and sewerage authority**
AMU	**Arba Minch university**
ECDSWC	**Ethiopian construction design water works corporation**
IWMI	**International water management university**
IWMI	**International water management institute**
MOWE	**Ministry of water and energy**
WLRC	**Water and land research center**
WRI	**World resource institute**

Introduction

The Addis Ababa Adaptation Network (AAAN) workshop was undertaken on April 1-2, 2022,at the Top ten Hotel in Addis Ababa, Ethiopia. Mrs. Mihret Mersha kicked off the workshop by addressing a welcoming speech to the participants on behalf of the organizing team. She invited Mr. Dagnachew Girma to open and deliver an opening speech officially. Mr. Dagachew Girma (Director of the training center) Addis Ababa Water and Sewerage Authority (AAWSA) officially opened the conference. In his opening speech, he indicated the importance of this consortium to sustainably manage the water resources of Addis Ababa and neighboring zones. In his speech, He also indicated that the issue is timely and essential to all involved.

Day One

The next session was carried out by Mrs. Mihret Mersha on"Introduction to AAAN and its objectives" to the participants. She started the presentation by introducing AAAN, a collaboration initiated by Newcastle University, AAWSA, International Water Management Institute (IWMI), and Adaptation Research Alliance. She underlined the rationale and importance of AAAN establishment to stakeholders and the public. The rapid urbanization and population growth in Addis Ababa led to water management issues such as water scarcity, flooding, and health issues. In addition, she also highlighted that water resources in the city are majorly from the surrounding Oromia zone, lack of treatment facilities, and strong collaboration between stakeholders led to water management issues. Hence, there is a need for collaboration to address the challenges, bridge gaps, and search for solutions.

The next section of the presentation covered the objectives and project elements. She emphasized the AAAN objectives are:

- Identify priorities of different stakeholders with water related issues in the city
- Develop a knowledge co-production approach
- Facilitate interactions between government, stakeholders, researchers, financial organizations and civil organizations through iterative process
- Bolster existing collaborative networks between various water-related organizations
- Develop new collaborations in the near future, to enable the network to share information, work on priority issues
- Ensure feedback to improve future water management

Then she gave a short presentation on the elements of the AAAN to the participants. She showed that AAAN consists of one to one interaction, workshop, webinars and sustaining the network. Finally, she asked participants to introduce themselves and share thoughts on the value of the AAAN for them as well as for Addis Ababa.

The following are the major comments and suggestions forwarded by the participants:

- This workshop enabled several of the stakeholders to gather together under one roof. It is very interesting and important for the stakeholders to meet and discuss water management issues. I would like to appreciate the organizers for organizing such a workshop.
- AAAN shall focus on problems and action plans. The network needs to consider the issue of solid waste management in the city as it is related to water management.

The next session included three presentations discussed hereafter:

The first presentation was entitled “Water supply of Addis Ababa: existing situation and plan” by Mr. Getnet Ejigu (AAWSA). The presentation indicated AAWSA is mandated to treat the wastewater and potable water supply for Addis Ababa City. Since the Akaki catchment has enough and abundant water resources potential to supply either from ground or surface water resources. Meanwhile 65% of water for Addis Ababa city has been supplying from GW

resources. This groundwater is located at the Akaki, Legedadi and at different locations within Addis Ababa city. However, different challenges and opportunities were faced during supplying and treating the potable water.These challenges may occur due to the natural climate variability and anthropogenic (urbanization, industrialization, rural urban immigration etc.) effects. For instance, high water consumption is observed during the dry season. Improper catchment and water resource management, lack of ground-based research also altered the water security of Addis Ababa city. That led to enhance unbalanced water supply and demands on Addis Ababa city.

The second presentation entitled "Wastewater Management in Addis Ababa: existing situation and plan" by Mr. Zelalem Ketema (AAWSA). His presentation covered the administrative structure of AAWSA and wastewater master plan of Addis Ababa city. Moreover, he showcased the expansion, number and types of WWTPs installed, and upgrading undertakings with the help from international funders like world bank. The number of sewer customer connections in the city with WWTPs is growing from time to time. His presentation also addressed the AAWSA plan to use treated wastewater for irrigation, greenery, carwash and construction activities. The sludge from the WWTPs could also be used for power generation and as fertilizer.

His presentation showed development of waterborne infections caused by illegal connections of septic tanks to roadside storm drainage systems and improper wastewater disposal procedures in the city. Land (due to a scarcity of space) is being used to build sanitation facilities for urban slum populations is a major challenge in Addis Ababa to address the issue.There are opportunities by clearly identified short, medium and long term water and sewerage development strategic documents. There is a need for additional water supply and wastewater treatment facilities to cope up with the increasing demand of the city. He wrapped up his presentation by addressing the need for improvement, need for training, mega medium- and long-term projects.

The third presentation of the session "Groundwater situation in Addis Ababa - challenges and opportunities for collaboration" By Mr. Engida Zemedagegnehu (ECDSWCo.). Mr. Engida emphasized on the short history of groundwater resources of Addis Ababa, groundwater potential of AA city and its suburb, current challenges of groundwater abstraction, and recommendations to tackle the problems. The presentation shows the potential of Legedadi, AA

and SANF, and Akaki groundwater prospective sites are estimated 220 - 400 MCM/year or 600,000 to 1,000,000 m^3/day. The major challenges of ground water abstraction 1) bad impressions and notion on groundwater useful resource of AA and its suburbs 2) Unprepared for large scale groundwater abstraction and 3) absence of groundwater. He also revisited the significant challenges of groundwater abstraction in the city due to no culture or interest, keeping within pump test limits is assumed to be enough, boreholes are not automatically equipped with a monitoring device, and the absence of no statutory (regulatory) requirement for monitoring. Recommendations on groundwater management of the city were also discussed.

Some comments were forwarded from the participants, including:

- The present capacity of the vacuum pumps of AAWSA are not going in line with customers demand. Subsequently this dents the collection and treatment efficiency of WWTPs.
- Most of the MBR treatment plants in the city are not working currently. What is the reason?
- The discharge of industry heavily pollutes the rivers in the city. What is the future plan of AAWSA regarding this issue?
- What are plans to manage the sewage in the condominium housings?
- The focus on wastewater is less than the focus on potable water. Why is there such an imbalance?

The presenters responded to the questions mentioned above; the main points addressed include:

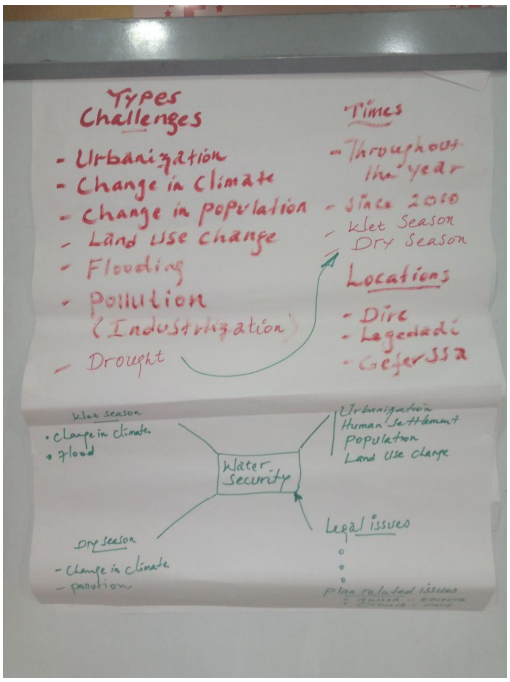
- Capital investments are under recovery after the Covid-19 pandemic
- AAWSA's plan to undertake wastewater collection mainly with sewer lines but not only with vacuum collection. The main challenge is Addis Ababa's structural plans to enhance the number of sewer lines.
- Currently AAWSA is much more engaged in pilot projects regarding wastewater management. The projects are expected to begin very soon.

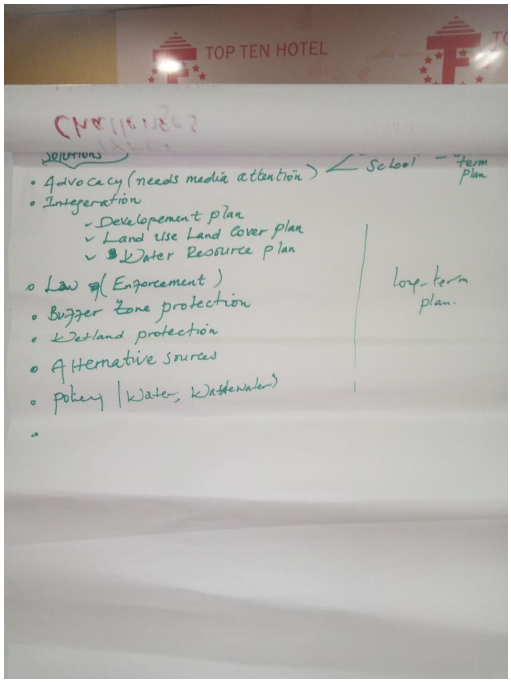
- Industrial pollution is becoming a serious problem, Yet AAWSA does not recommend industrial sewer connection to the municipal sewer line. Nowadays, for AAWSA controlling the issue is a big problem.
- There are technical proposals undertaken on reuse of water. Yet practically the idea did not progress further.

The next session included group break out discussion on the issue of water security challenges in Addis Ababa discussed hereafter:

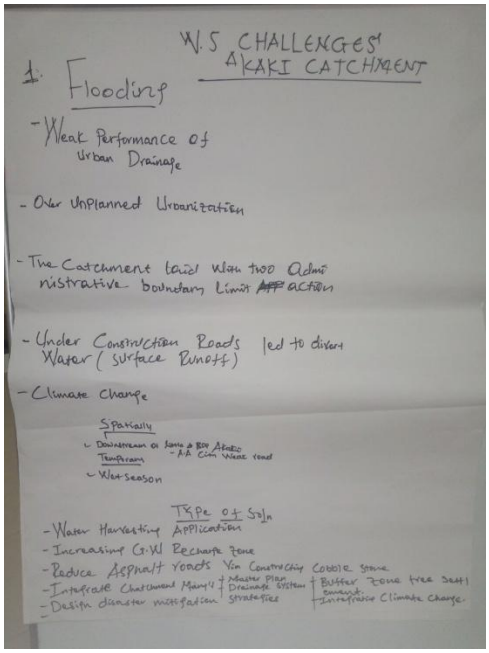
1, Solutions and strategies for water security challenges in Addis Ababa. Its objective: In groups discuss and specify different water security issues and challenges in Addis Ababa.

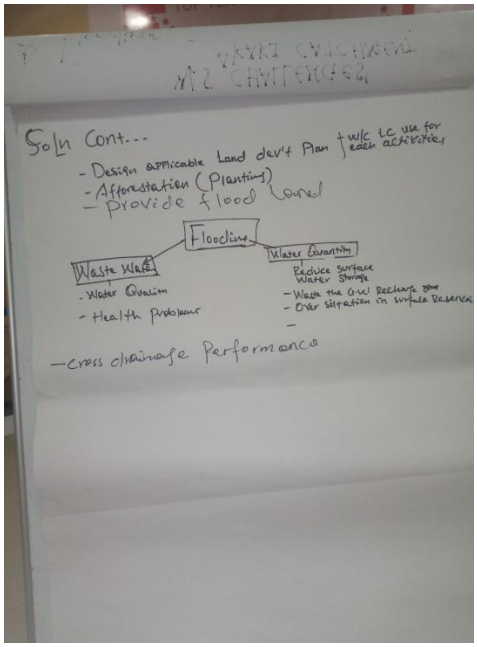
Group one



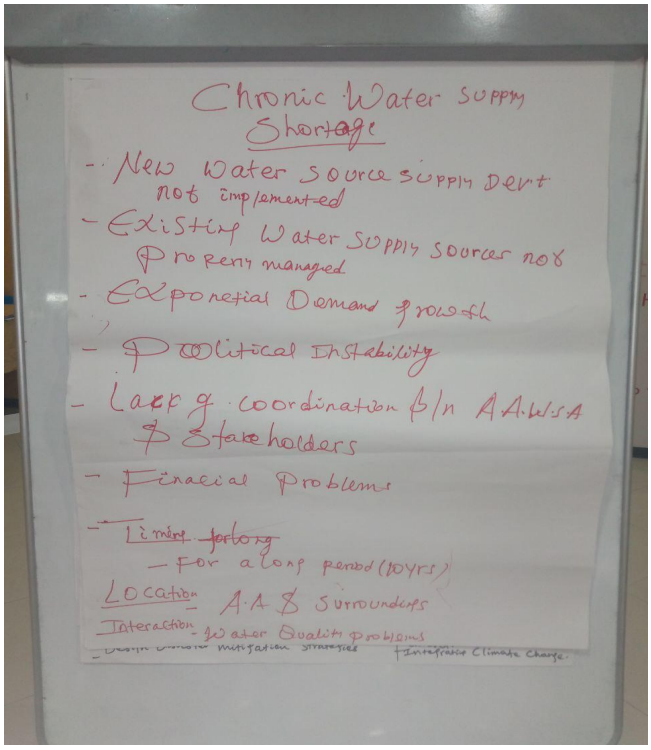


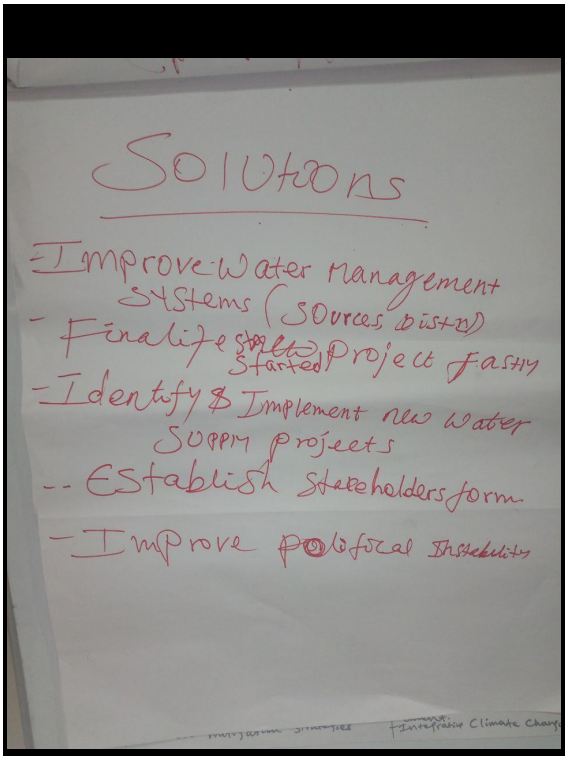
Group 2





Group Three





Three groups entitled with water supply, waste water treatment and natural hazards challenge on the water security of Addis Ababa city were formed and discussed. The spatial and temporal variability of these water security challenges were determined.

In Addis Ababa city, more than 95% of the population attain water on schedule. For instance, different sub-cities were obtaining water for 6 hours per a week, whereas some were obtaining water 24 hours, 3-4 days per a week. However, for the town where the government head office existed (4 kilo) water supplying 7/24. Additionally, the water consumption varies since high water conception is observed during the high temperature dry season. This indicated that the natural climate variability led to high challenges in water supply to Addis Ababa city.

In addition to this, the natural climate variability has a high effect in water availability of the catchment to consistently supplying water in Addis Ababa city. Thus, high water amounts can be withdrawn during the flood season and high-water deficiency can be occurring during drought season. Therefore, multi-disciplinary studies that consider climate variability and projecting its effect on rainfall availability are important for sustainable water supply. For instance, high flooding was observed during the wet season of (end July to September) at the central Addis Ababa city where the drainage system is weak and blocked by the solid wastes and peri-urban of the catchment. However, not only water withdrew from the catchment during flooding, but a high number of wastes affected the river and streams water quality.

Therefore, wastewater is a major problem for the case of Addis Ababa city water security. Average, 600000 m^3/day water supplied for Addis Ababa city. Whereas, 100000 m^3/day wastewater counted in treatment plants. This indicated that 83.3% of the waste water not counted in the treatment plant but led to pollute the river water. However, AAWSA focused on the water supply rather than waste water treatments, while 4000 staff members participated in water supplying but nearly 1000 staff participated in the waste water treatments. This indicated that high water abstracted but no re-use applied to control the water security of Addis Ababa city.

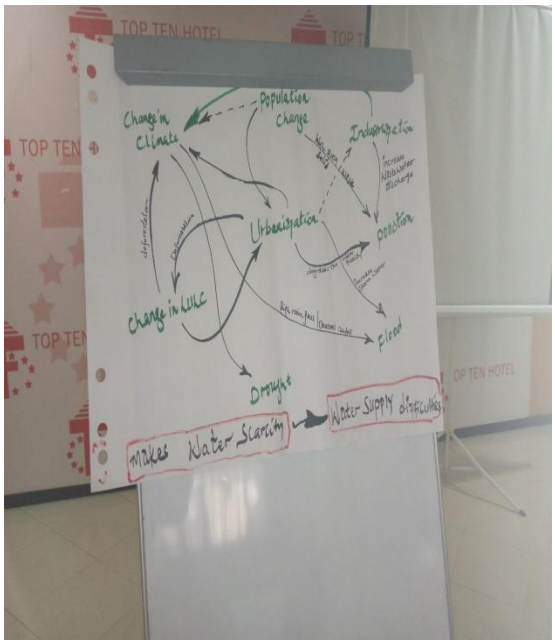
Day Two

The second day of the workshop addressed many issues and aspects of water resources management of Addis Ababa city through presentations, group discussions, questions and answering. The second day started with recap of day one activities by Dr. Ajay Behave.After the recap of dayone Dr. Ajay Behave started to present Climate change projections, adaptation, uncertainty and examples from water sector issues. Discussion on key drivers of change and Explain the systems diagram exercise.

Dr. Ajay Behave presentation addressed issues effect of climate change on drought, water resources, and associated risks. The effects of climate change are magnified from time to time.

The next session included group breaks out discussion: develop a systems diagram of the key issues, their relationships, and intermediate elements that undermine the water resources system in Addis Ababa.

Group 1



Group 2

Group 3

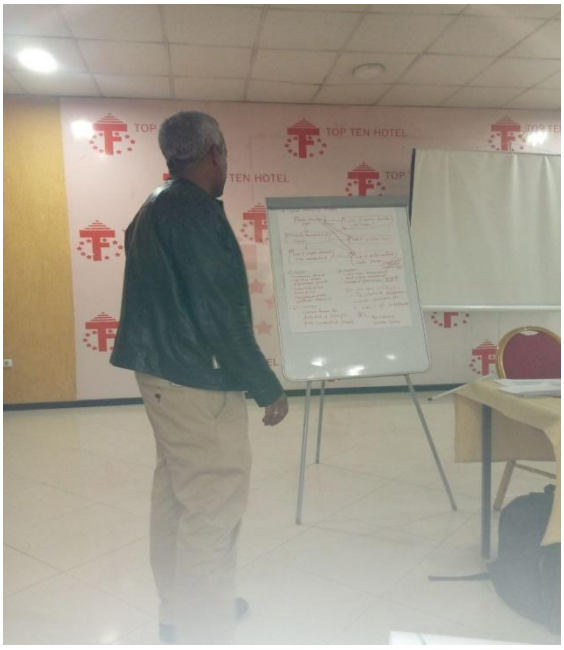


Photo: Group discussion presentations

The next session was carried out by Nasser Tuqan from Newcastle University on "Costing for water treatment, wastewater treatment and sanitation solutions" to participants.

The last session of the workshop focused on the summary of one-to-one interactions and its objectives was presented by Mrs. Mihret Mersha. The presentation showed the interaction with stakeholders was carried out to gather initial inputs on the establishment and sustainability of the network. The main objective of One-to-one interaction was:

- To identify the interest of the stakeholders in the network
- Short- and long-term strategies for networking
- Potential solutions for water management and
- Gather recommendations and potential contributions to establish and sustaining the network

Three questions were drafted for the one-to-one interaction process

Question 1

Identify their interest in joining the network or what value they could derive from the co-production process: – their reasons for why such a network will be exciting and valuable for them (capacity building, more representation, networking, technical support, feedback on their activities, etc.). Will they be able to engage with the process and who (person and contact details) could be appointed/take responsibility?

Question no 2

What steps or procedures were proposed for establishing the network in the short-term and sustaining the network in the long term?

Question no 3

Identify a list of solutions/adaptation options / hard or soft management measures for discussion in the co-production process, and which of these do they could be explored by the network? Elicit any data/documentation they may have on those solutions.

The following stakeholders were involved in the one-to-one interaction:

- Governmental Organizations (AAWSA, Ministry of Water and Energy, Oromia Special Zone, AAC Road Authority, Plan Commission, AAEPA, AA Housing Agency, and Ethiopian Construction Design & Supervision Works Corporation)
- Research Institutes (IWMI, Newcastle University, Awash River Basin, and GCRF)
- NGOS (VitensEvides International, World Bank, World Resources Institute) and
- Other Organizations (Addis Ababa Science and technology university)

Stakeholders' responses to the questions were presented, and critical points were summarized hereafter for each question:

Question 1

Stakeholders are interested in AAAN due to ease of communication, identifying and undertaking collaborative research, getting and sharing technical support, and sharing knowledge.

Question 2

Establish the network awareness creation campaigns, define the roles and responsibilities of the network, develop a communication platform (webinars, workshops, and others), and make the network open to academicians and researchers were found to be important according to stakeholder's responses.

For sustaining AAAN, the following suggestions were forwarded from the stakeholders. AAWSA shall avail offices and staff for the network, link with local and international institutions, organize periodic workshops, and continuously update the stakeholders about network activity.

Question 3

The main points raised on the third question were:

- Review and evaluate previous projects, reports, strategy, policy, and design documents

- Narrow the water supply and demand by realizing and planning new projects
- Support AAWSA with spatial and temporal data of water supply and sewerage facilities databases.
- Practical solutions for water solution problems
- Enhanced cooperation between stakeholders through:
    - ❖ Legal frameworks,
    - ❖ Forming regional and national institutions and
    - ❖ Prepare strategic document on water resource management of the city
    - ❖ Implement a robust communication system
    - ❖ Sign Memorandum of Understanding between stakeholders
    - ❖ Support MOU implementation

The future activities of AAAN were also discussed as the way forward includes:

- Draft and Sign MOU
- Enhance collaboration by implementing co-production
- Formation of a legal framework for collaboration
- Undertake awareness campaigns, workshops, and webinars
- Undertake legal framework and collaboration gaps with research and
- Sustaining AAAN

The following comments and suggestions were forwarded from participants for sustaining the AAAN

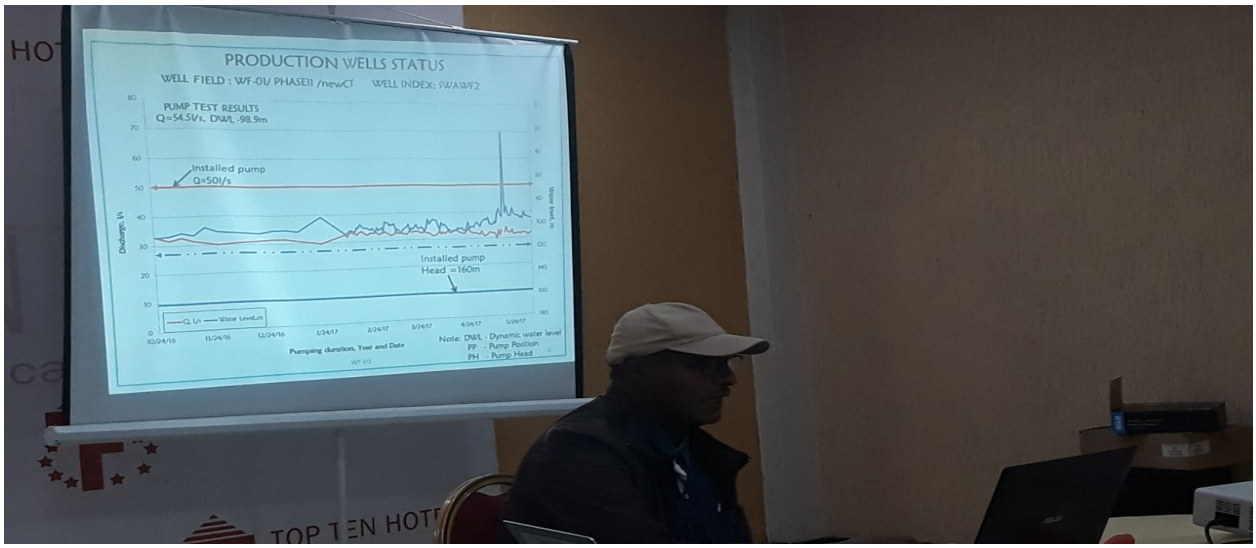
- Creating a platform used for the sustainability of the AAAN
- Craft rules and regulations for stakeholders participating in groundwater exploration
- Collaboration works with different stakeholders and experts (flooding, water quality,
- Addis Ababa health and solid waste management) are crucial.
- Keeping the river buffer zone
- Who is the owner of AAAN, and does it require permanent staff members?
- The project office required a research unit, implementation unit, and management unit.
- Regulations for the industries during supply wastewater are very crucial.

ANNEX

List of workshop participants

S.N.	Name of Participant	Organization
1	Engida Zemedageghu	ECDSWC
2	Ermias Alemu	ECDSWC
3	Yosef Abebe	MOWE
4	Genet getachew	Includuvate
5	Tilayeworku	AMU
6	Getahun kebede	AASTU
7	Meron teferi	IWMI
8	TinebebYehanes	WRI
9	OlaneYadesa	AAWSA
10	Getachew Tegegne	AASTU
11	Abebe Tesfaye	AAWSA
12	Zelalem Ketema	AAWSA
13	Getnet Ejigu	AAWSA
14	BamlakuTadese	WLRC
15	Asie Kemal	AAWSA
16	Asnake Berhane	ECDSWC
17	Misbah Elias	AAWSA
18	Solomon Tadesse	AAWSA
19	Lakech Haile	AAEPA
20	BalewYibel	MOWE
21	Andualem Mekonnen	AAU
22	ZelekeTeferi	AAWSA
23	Mihret Mersha	AAWSA
24	Dagnachew Girma	AAWSA
25	Jemila Mohammed	AAWSA

S.N.	Name of Participant	Organization
26	Alemseged Tamiru	IWMI
27	BirukSisay	AAPDC
28	EneyewLema	AACRA
29	AwerarisMekuwanent	AAHCC
30	Ajay Bhave	Newcastle University
31	Nasser Tuqan	Newcastle University
32	David Werner	Newcastle University



Workshop Time table

Day 1 (01 April 2022)		
Time	**Item**	**Responsible person**
8.30 - 9.00	Registration	Organizers
9:00 – 9:15	Welcome speech	Mr. DagnachewWorku (AAWSA)
9:15 – 9:30	Introduction to AAAN	Mrs. Mihret Mersha (AAWSA)
9:30 - 9:45	Self-introductions by participants	Participants
9.45 -10:00	Participants share their thoughts on the value of the AAAN for them as well as for Addis Ababa	Participants
10:00-10:30	**Coffee break**	
10:30 -11:00	Water supply of Addis Ababa: existing situation and plan	Mr. Getnet Ejigu (AAWSA)
10:30 - 11:00	Wastewater Management in Addis Ababa: existing situation and plan	Mr. Zelalem Ketema (AAWSA)
11:00 - 11:30	Groundwater situation in Addis Ababa - challenges and opportunities for collaboration	Mr. Engida Zemedagegehu (ECDSWCo.)
11:30 - 12:30	Wastewater management in Addis Ababa - challenges and opportunities for collaboration	Participants
12:30-14:00	**Lunch break**	
14:00 – 14.40	Group break-out discussion: the water security challenges in Addis Ababa	Dr Ajay Bhave (Newcastle University)
14.40 -15:00	Group break-out presentation	Group representative
15:00-15:30	**Coffee break**	
15:30-15:55	Group break-out discussion: Solutions for the water security challenges	Dr AlemsegedTamiru Haile (IWMI)
15:55-16:30	Group break-out presentation	Group representative
16:30	**Closing**	

Day 2 (02 April 2022)		
Time	**Topics**	**Responsible person**
8.30 - 9.00	Recap of Day 1	Participants
9:00 – 9:45	Climate change projections, adaptation, uncertainty and examples from water sector issues, with examples	Dr Ajay Bhave (Newcastle University)
9:30 - 9:45	Discussion on key drivers of change	Dr Ajay Bhave (Newcastle University)
9.45 -10:00	Explain the systems diagram exercise	Dr Ajay Bhave (Newcastle University)
10:00-10:30	**Coffee break**	
10:30 -11:15	Group break-out discussion: develop a systems diagram of the key issues and their relationships that undermine the water resources system in Addis Ababa	Participants
11:15 - 11:30	Reflections	Participants
11:30 - 12:00	Tanzania water quality issues and reflections	Prof. David Werner (Newcastle University)
12:00 - 12:30	Costing for water treatment, wastewater treatment and sanitation solutions	Dr Nasser Tuqan (Newcastle University)
12:30-14:00	**Lunch break**	
14:00 - 14.15	Summary of one-one interaction	Mrs. Mihret Mersha (AAWSA)
14.15 -15:15		Group representative
15:00-15:30	**Coffee break**	
15:30-16:00	Discussion on actionable research areas that the network could investigate	Dr AlemsegedTamiru Haile (IWMI)
16:00-16:15	Discussion on what participants can contribute/pledge to AAAN	Dr AlemsegedTamiru Haile (IWMI)
16:15-16:30	Vote of thanks	Mrs. Mihret Mersha (AAWSA)
16:30	**Closing**	