



BUILDING FOREST-WATER KNOWLEDGE AND CAPACITY FOR FOREST AND LANDSCAPE RESTORATION

Mekelle, Ethiopia - 18th - 24th June 2018

WORKSHOP REPORT



Food and Agriculture
Organization of the
United Nations



implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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1. Executive Summary

WeForest, in collaboration with FAO's Forest and Water Programme and GIZ delivered a forest-water capacity building workshop in Mekelle, Ethiopia during 18th - 24th June 2018. The six day workshop trained 16 technical participants from a wide range of government, NGO and research organisations operating at the regional and local level. The overall objective of the workshop was to build the capacity and knowledge of forest-water monitoring in Ethiopia, particularly as it relates to forest and landscape restoration. In order to increase impact, the workshop followed a train-the-trainer approach, where participants were encouraged to become potential facilitators who can build capacity within their own organisations.

The workshop was participatory and interactive with information imparted through presentations and multi-media, participants engaged in group discussions, activities and presentations, Q & A sessions with facilitators, hands-on fieldwork and data analysis sessions. The workshop also provided the first application of FAO's Forest & Water Capacity Building Facilitation Guide which is currently under development.

As a result of the workshop, participants:

- Produced a draft Forest-Water Monitoring Plan for Desa'a Forest (see Annexe 3). Once consolidated this will form the basis for the long-term monitoring of forest-water processes in WeForest's Desa'a forest restoration project.
- Formed the Ethiopia ForWater Interest Group to support further cooperation and strengthening of capacity between forest and water stakeholders.
- Expanded their knowledge of the forest-water nexus and forest and landscape restoration.
- Gained hands-on experience of measuring topsoil infiltration in the field and received training on how to analyse and interpret the field data.
- Produced draft plans to transfer knowledge within their organisations.

Takeaways and Next Steps

The participants evaluated the workshop highly. All participants were pleased or very pleased with the workshop in general, the facilitation of the workshop and its organisation. Participants valued the workshop content and practical field work. Most participants felt that the FAO forest-water monitoring framework was either useful or very useful. All participants claimed they would apply their newly acquired knowledge in their areas of work, in many cases, as part of ongoing restoration programmes. Moving forward, WeForest will consolidate the draft forest-water monitoring plan for Desa'a Forest. To establish the long term value of the training workshop, WeForest will monitor the uptake of forest-water monitoring activities among participants and participating organisations.

2. Introduction

2.1 Workshop objectives, learning outcomes and performance criteria

The overall objective of the workshop was to build the capacity and knowledge of forest-water monitoring in Ethiopia, particularly as it relates to forest and landscape restoration. The workshop followed a train-the-trainer approach, where participants become potential facilitators who can build capacity within their own organisation.

Specific objectives were:

1. To build knowledge related to the forest-water nexus in the context of forest and landscape restoration.
2. To build the capacity of key stakeholders in monitoring forest-water interactions.
3. To initiate the development of a forest-water monitoring plan for WeForest's Desa'a project.
4. To enable and encourage participants to integrate forest-water considerations within their own organisational agendas and activities.

Workshop objectives with corresponding expected learning outcomes are shown in Figure 1.

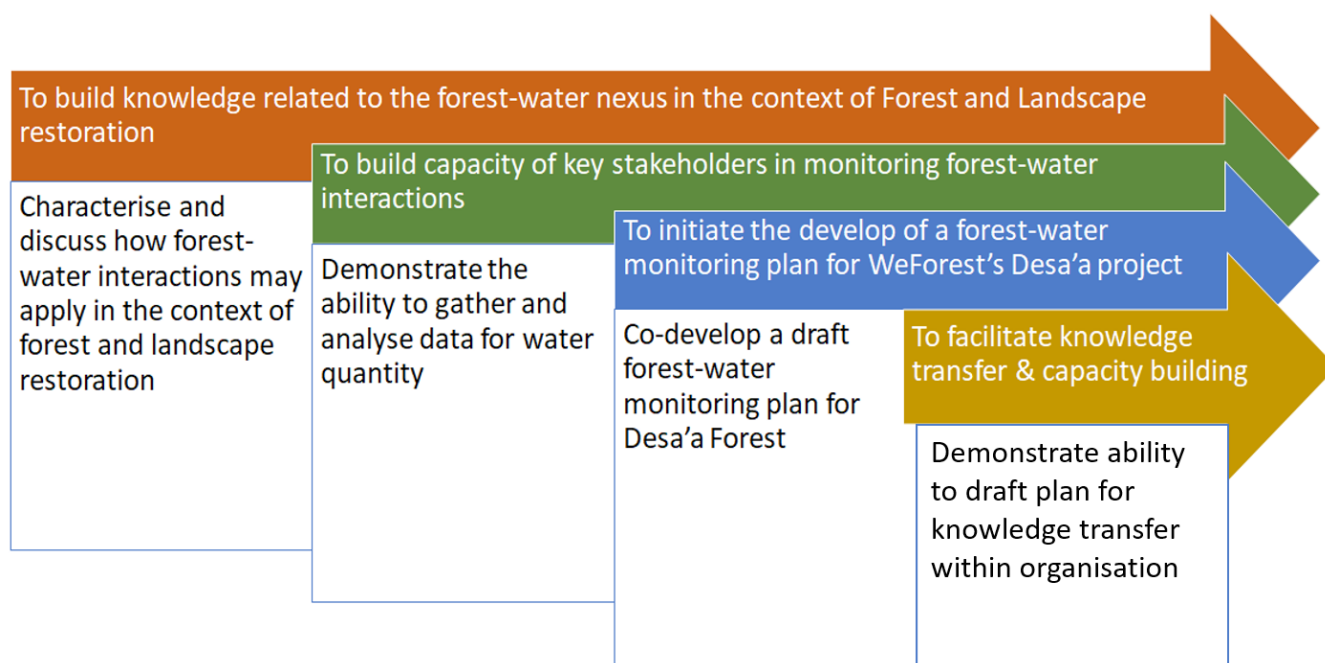


Figure 1. The objectives and corresponding learning outcomes of the capacity building workshop. With these, the workshop sought to support participants in developing their understanding of forest-water interactions and their practical and analytical skills for monitoring interactions.

As a basis to gather information on the progress made by the participants, performance criteria were used. Information pertaining to progress was obtained through a pre and post workshop survey, through group work that generated discussions, presentations and draft plans for forest-water monitoring and knowledge transfer resulting from group and individual work.

Workshop Performance Criteria

- Participants take part in group discussions and group work to demonstrate an understanding of Forest and Landscape Restoration (FLR) and how forest-water interactions may be considered in the context of FLR.
- Participants demonstrate the ability to measure topsoil infiltration in the field according to a specific protocol and the ability to analyse and interpret the resulting data.
- Participants take part in group work to produce a draft monitoring plan for Desa'a forest.
- Participants produce a draft plan to transfer knowledge within their own organisation.

2.2 Workshop organisation and participation

The workshop was organised by WeForest, in close collaboration with FAO. Funding for the workshop was made available by WeForest, FAO and GIZ. Kings College London & Ambiotek provided an automated weather station which will support ongoing monitoring of climatic variables in the project area (Figure 2).



Figure 2: Building the automated weather station provided by Kings College London & Ambiotek.

Throughout the week, 16 people with technical training in forestry, water, REDD+, biodiversity and agriculture participated in the workshop (Figure 3). Fifteen different organisations were represented including governmental, NGO, and scientific research organisations operating at the regional (Tigray, Afar & Southern Nations, Nationalities and Peoples (SNNP)) and local level. Refer to workshop participants list in Annexe 1.



Figure 3: Workshop participants with facilitators on fieldwork.

3. Workshop Programme

The approach to training throughout the workshop was participatory and interactive. In addition to information imparted through presentations and multi-media, participants engaged in group discussions, activities and presentations, Q&A sessions with facilitators and hands-on fieldwork (Figures 4 & 5).

The workshop programme was the first application of FAO's Forest & Water Capacity Building Facilitation Guide which is currently under development. It was structured to first consolidate and strengthen participant knowledge and understanding of forest-water relationships, the importance of integrating forest-water considerations in land management and the concept of Forest and Landscape Restoration (FLR). Participants were then introduced to the key elements of forest-water measurement and monitoring including the selection and use of forest-water indicators and variables. Group work on this topic involved designing an appropriate monitoring plan for the Desa'a Forest. All participants gained hands-on experience of measuring soil infiltration capacity during the fieldwork component of the programme and learnt how to analyse and interpret the data they had collected (Figure 5). Finally, participants were encouraged to plan how to transfer the knowledge gained through the workshop within their own organisations. Participants were provided with all materials used in the workshop (presentations, case studies, exercises etc.) to help enable knowledge transfer.

The full detailed 6 day programme for the workshop can be found in Annexe 2.



Figure 4: The workshop was delivered through presentations, interactive group work and discussion sessions.



Figure 5: Participants gained hands-on training in measuring soil infiltration capacity and were then shown how to analyse and interpret the field data.

4. Workshop Output

The workshop produced the following main outputs:

- A draft Forest-Water Monitoring Plan for Desa'a Forest (see Annexe 3). Once consolidated this will form the basis for the long-term monitoring of forest-water processes in Desa'a forest restoration project.
- Formation of the Ethiopia ForWater Interest Group. The Interest Group will be co-ordinated jointly by WeForest, Ethiopian Environment and Forest Research Institute (EEFRI), Mekelle University and GIZ.

Ethiopia ForWater Interest Group Key Objectives:

1. To build capacity of all stakeholders on forests and water
2. To facilitate and scale-up forests and water interventions in Forest and Landscape Restoration (FLR) and Integrated Watershed Management (IWM)
3. To promote knowledge-sharing and best evidence-based practices on forests and water
4. To strengthen networking and cooperation in forests and water.

5. Moving Forward

This section outlines individual intentions and group commitments moving forward. We summarise participants' views, projects and motivation to utilise the knowledge and skills acquired during the workshop within their organisations.

5.1 Participants' views on how they see themselves incorporating forest-water monitoring in their respective areas of work:

All participants claimed they would apply their newly acquired knowledge in their areas of work, in many cases, as part of ongoing restoration programmes. Doing so will be important given the level of land degradation observed, particularly in Northern Ethiopia.

The participants identified the following applications:

- During the planning of projects; species selection; critical assessment of restoration projects.
- Piloting projects in Desa'a following FLR.
- Implementing soil & water conservation structures, erosion control techniques.
- Promoting the importance of forest-water knowledge; organising events to raise awareness, for both high-level officials and grassroots; training local communities on forest-water relationships; in forums aiming to stop deforestation.
- Practical monitoring plans.
- Integrating forest-water knowledge in the management of other natural resources.
- Integrate new concepts learned in 'water management' undergraduate course at Mekelle University.
- Review existing works in forest-water nexus in Ethiopia.
- Develop research proposal that incorporates forest-water.

5.2 Forest-Water monitoring plan for Desa'a

WeForest will consolidate the draft forest-water monitoring plan for Desa'a Forest. Such a plan will be incorporated in the project's management plan and implemented on an annual basis. Data collected in this way will be used to study the effect of forest restoration on infiltration capacity. Discussions to develop a collaboration between the Swedish University of Agricultural Sciences (SLU) and WeForest are underway.

5.3 Long-term evaluation of the workshop

To establish the longer term value of the training workshop, WeForest will monitor the uptake of forest-water monitoring activities among participants and participating organisations. In particular, WeForest will record how many participating agencies have implemented in house training on forest-water monitoring, whether associated knowledge and skills have been applied in any way and whether new considerations have been given to forest-water monitoring. A follow-up survey will be planned approximately one year after this workshop.

6. Workshop Evaluation

6.1 Method of evaluation

A pre and post survey and daily feedback were used to evaluate the workshop and to assess the progress of participants against performance criteria. The pre-workshop survey was designed to gauge the level of knowledge and experience of the participants and to learn about their perceptions of forest-water interactions and forest restoration and their expectations for the workshop. In this way the pre-workshop survey helped to guide workshop content and preparation.

Throughout the workshop daily feedback was verbal and in written form via a 'parking lot' where the participants could write questions and topics that they wanted to discuss on the board at any point. Sessions in the morning opened with a review of what each participant had learnt the previous day (Figure 6). The interactive format of the delivery and group discussions facilitated an open exchange of views and expectations about the workshop.



Figure 6. 'Parking Lot' for participant questions and discussion items (left) and re-capping what participants had learnt the previous day (right).

In the pre-workshop survey 73% of respondents indicated that they were either confident or very confident talking to others about forest-water interactions. At the end of the workshop 94% of participants said they were confident or very confident talking to others about forest-water interactions. However, for the ten participants who both responded to the pre-workshop survey and attended the workshop, there was no statistically significant difference in the level of their confidence before vs after the workshop.

Participants said that the active interaction with experts working in the area, the theoretical and practical content increased their self-confidence. In listing their 3 key learning achievements, participants most frequently mentioned that they had learnt about issues concerning the forest-water nexus.

“Previously I always thought that forest and water have direct relationships but now I understood that they have complex relationships and affected by many other factors” (A participant)

The participants evaluated the workshop highly. All respondents were pleased or very pleased with the workshop in general, the facilitation of the workshop and its organisation. They valued the workshop content (100% of respondents claimed that the workshop content was useful or very useful to them) and practical field work.

Most participants (94%) claimed that the FAO forest-water monitoring framework was either useful or very useful and 88% said that it would either be useful or very useful in their work.

Recommendations and suggestions for improving the workshop were few but included incorporating more practical field work and ensuring that there is follow up to monitor the progress of participants and strengthen the newly formed Ethiopia ForWater Interest Group.

Refer to Annexe 4 for a detailed description of pre and post workshop survey responses.

ANNEXE 1. WORKSHOP PARTICIPANT LIST

Organisation	Name	Position
Afar Biodiversity Office	Mr. Nuredin Mohammed	Biodiversity Expert
Afar Bureau of Pastoral Agriculture Development (BoPAD)	Mr. Gebreegzabher Hagos	Forest Development Higher Expert
Afar Bureau of Water Resources Development Bureau	Mr. Aregawi Lemlem	Senior Horticulture Officer
Afar Pastoral and Agricultural Research Institute (APARI)	Mr. Abraham Gebru	Senior Forest Researcher
Caritas International	Dorry Hagos Ghebray	Country Representative
Ethiopian Environment and Forest Research Institute (EEFRI)	Mr. Berihu Tesfamariam	Director, Mekelle Env't and Forest Research Center
Ethiopian Orthodox Church Development and Inter Church Aid Commission (EOC-DICAC)	Mr. Zemicheal Bogale	Head of EOC-DICAC co-ordination office in Tigray National Regional State
EthioTrees	Mr Seifu Gebreslasie	Local Project Coordinator
GIZ Ethiopia	Tadele Gebreyohannes	Regional Project Officer
GIZ Ethiopia	Mr. Goytom Berhe	Site Project Officer
Mekelle University	Fisseha Gebru	Lecturer in the Department of Land Resources Management and Environmental Protection
Nature and Biodiversity Conservation Union (NABU)	Asaye Alemayehu	Forest and Resource Officer from Kafa Biosphere Reserve
REDD+ North and Central Region office	Mr Haftamu Deribe Zenebe	Senior Forest Officer
WeForest	Mr Birhane Etay Reda	Project Assistant
World Vision Ethiopia	Abrham Girmay	DryLands Development Programme Coordinator
Atsbi Wunberta Agriculture & Natural Resources	Hiwet Kahsay	Forest Expert (Atsbi Wunberta Woreda/Desa'a forest)

ANNEXE 2. WORKSHOP PROGRAMME

<p>ANNEXE 2. WORKSHOP PROGRAMME</p> <p>Day 1 (18th June)</p> <p>Module 1: Understanding Forest-Water Interactions</p> <p>8:30 Welcome and Introduction</p> <p>10:00 Coffee Break</p> <p>10:30 Session 1: Reflecting on forest-water relationships - how do forests and water relate? (brainstorming and Q & A)</p> <p>12:10 Session 2: Reflecting on forest-water relationships - the need for forest-water monitoring in the context of FLR</p> <p>13:00 Lunch Break</p> <p>14:00 Session 3: Reflecting on forest-water relationships - FAO's Forest and Water Programme</p> <p>14:20 Session 4: Water quality and quantity</p> <p>15:30 Coffee Break</p> <p>15:45 Session 5: Benefits of forest-water relationships - group activity</p> <p>16:20 Session 5: Presentation of group activity</p> <p>17:05 Summary & Evaluation of Day 1</p>	<p>Day 3 (20th June)</p> <p>Module 2: Monitoring Forest-Water Interactions</p> <p>8:30 Recap of Day 2 and Introduction to Day 3</p> <p>8:45 Session 9: Key elements of F&W monitoring</p> <p>10:00 Coffee Break</p> <p>10:30 Session 10: Introduction to field study. Desa'a Forest</p> <p>11:00 Session 11: Monitoring: selecting indicators and methods - group work</p> <p>12:00 Session 11: Monitoring: selecting indicators and methods - presentation of group work</p> <p>13:00 Lunch Break</p> <p>14:00 Session 12: Measuring soil infiltration capacity</p> <p>14:20 Session 13: Designing a monitoring plan - group work</p> <p>15:30 Coffee Break</p> <p>15:45 Session 14: Measurement exercise</p>	<p>Day 6 (23rd June)</p> <p>Module 4: Designing A Concrete Forest-Water Action Plan</p> <p>8:30 Introduction to Day 6</p> <p>8:50 Session 18: Next steps I: moving forward - how will you use F-W knowledge within your organisation?</p> <p>10:00 Coffee Break</p> <p>10:30 Session 18: Next Steps I: creating a group network</p> <p>11:30 Troubleshooting, Q & A, Workshop Evaluation & Discussion</p> <p>13:00 Lunch Break</p> <p>14:00 Session 19: Next Steps II: you as facilitator</p> <p>15:30 Coffee Break</p> <p>15:45 Presentation of workshop certificates & workshop close</p>
<p>Day 2 (19th June)</p> <p>Module 1: Understanding Forest-Water Interactions (F-W in Changing Landscapes)</p> <p>8:30 Recap of Day 1 and Introduction to Day 2</p> <p>8:45 Session 6: The forest-water nexus in changing landscapes - What impacts of land use/land cover change have you observed?</p> <p>9:45 Session 6: The forest-water nexus in changing landscapes</p> <p>10:15 Coffee Break</p> <p>10:45 Session 7: Restoration in practice</p> <p>13:00 Lunch Break</p> <p>14:00 Session 8: Case studies: Integration of F-W considerations in forest or tree-based restoration - group work</p> <p>15:45 Coffee Break</p> <p>16:00 Session 8: Presentation of case study analysis</p>	<p>Day 4 (21st June)</p> <p>Module 3: Field Study - Entire Day</p>	<p>Day 5 (22nd June)</p> <p>Module 3: Field Study (workshop sessions)</p> <p>8:30 Introduction to Day 5</p> <p>9:15 Session 15: Data analysis</p> <p>10:30 Coffee Break</p> <p>11:00 Session 15 (continued)</p> <p>12:00 Session 16: Reflecting on results, experience, troubleshooting - brainstorming & discussion</p> <p>13:00 Lunch Break</p> <p>14:00 Session 17: Designing/improving a forest-water monitoring plan for Desa'a - group work</p> <p>15:30 Coffee Break</p> <p>15:45 Session 17: Improving a monitoring plan - presentation of group work, Q & A</p>

ANNEXE 3. DESA'A DRAFT FOREST-WATER MONITORING PLAN

Objectives:

- 1) To design a long-term forest-water monitoring plan for Desa'a that monitors restoration and water availability at site and landscape levels
- 2) To study the impact of forest restoration (intervention type) and elevation on water availability (infiltration capacity/dry season flow) in Desa'a, controlling for level of forest degradation.

Treatment 1. Type of FLR intervention.
Treatment 2. Elevation.

We will focus on highlands (2300-3100 m a.s.l) and midlands (1500-2300 m a.s.l)
In the highlands the core zone is dominated by *Juniperus procera*, while in the midlands the core zone is dominated by *Olea europaea*.

Intervention type	Elevation	Designated project zone	Control for Level of degradation
Enrichment planting/ANR	H	Buffer zone1	Slightly degraded
	M		
Enrichment planting+ANR	H	Core zone	Slightly degraded (gaps within forest)
	M		
ANR	H	Core zone	Degraded (gaps within forest)
	M		
Conservation/No active intervention	H	Core zone (reference forest)	Intact
	M		

Combinations Treatment 1 and Treatment 2:

There are 8 (4x2) possible combinations

20-30 measurements / combination =160-240 measurements/year

ANNEXE 4. WORKSHOP EVALUATION

Pre-workshop survey responses used to inform programme.

A total of 11 participants responded to the pre-workshop survey.

Questions to gauge expectations

Most respondents indicated that their reason for joining the workshop was to gain more knowledge and experience related to forests and water. In addition, three mentioned that they wished to connect and share experiences with a network of professionals in the field, two mentioned a desire to learn more about forest restoration and two mentioned that they would use the training to “cascade” knowledge to others. When asked what they would like to learn during the workshop the majority of respondents (55%) stated a desire to learn methodologies for monitoring forest and water relationships, others mentioned learning about agroforestry and reforestation in dry-lands, hands-on field work and forest-water relationships.

Questions to gauge knowledge level, experience and perceptions

In the pre-workshop survey 73% of respondents indicated that they were either confident or very confident talking to others about forest-water interactions. All respondents were able to describe at least one way in which trees and forests are connected to water. Answers included mention of processes such as transpiration, evaporation, precipitation, cloud formation, hydrological cycle, soil infiltration, groundwater recharge, flood and drought control.

In their professional capacity, the participants who responded to the pre-workshop survey were all involved in activities related to forests and/or water in some way. Respondents listed activities such as; agroforestry, afforestation, research, teaching, assisted natural regeneration, ecosystem services development, livelihood development, forest protection, forest landscape restoration, construction of rainwater harvesting structures and small scale irrigation infrastructures.

Respondents highlighted a broad range of problems they thought were related to forests and/or water in their area - water scarcity and forest loss (deforestation and degradation) were the most frequent responses given as ‘the most important problem’. Other problems listed fit broadly into themes such as; mismanagement of resources, resource conflict, migration and land tenure issues, lack of local data/knowledge, weak law enforcement, climate change and lack of community involvement. In solving these problems, respondents listed the activities mentioned above as interventions implemented in their areas however, over half of the respondents also mentioned approaches such as; capacity building & training, stakeholder involvement, involving local community and awareness campaigns.

The majority of respondents (64%) reported that they did not have an existing system or plan for monitoring forest and water relationships. Of those that said they did have a system/plan for monitoring (4 respondents), two mentioned measuring a metric associated with monitoring forest-water processes (“water discharge from protected enclosure” & “Flow (surface discharge), groundwater levels”).

All respondents thought that trees and forests are relevant for water and reasons cited included reducing soil erosion and degradation, regulation of hydrological cycle (including runoff, surface and groundwater flow, infiltration) and regulation of water availability and quality.

“..... forest and trees play a crucial role in the hydrological cycle. Forests influence the amount of water available and regulate surface and groundwater flows while maintaining high water quality.”

All respondents perceived forest restoration as important for water resources with many respondents re-stating the forest-water connections given above. However, some respondents did explicitly make the link between forest restoration and improvement of water resources.

“Forest restoration improves vegetative cover of areas which in turn improves microclimate, recharges area of catchments’, reduces evaporation loss, contribute to withstand effect of climate change”

When asked, the majority of respondents (64%) either somewhat disagreed or disagreed with the statement “Because trees consume water they should not be planted in areas where water is scarce”.

Post-workshop Evaluation

All 16 workshop participants completed the post-workshop evaluation survey.

Post-workshop survey responses used to evaluate the programme.

By the end of the workshop 94% of participants said they were confident or very confident talking to others about forest-water interactions. For the ten participants who both responded to the pre-workshop survey and attended the workshop, there was no statistically significant difference in the level of their confidence (in talking to others about forest-water interactions) before vs after the workshop ($Z=-0.70$, $p > 0.05$).

Participants said that the active interaction with experts working in the area, the theoretical and practical content increased their self-confidence. In listing their 3 key learning achievements, participants most frequently mentioned that they had learnt about issues concerning the forest-water nexus.

Learning about the Forest and Landscape Restoration approach was the 2nd most frequently mentioned learning achievement, followed closely by monitoring of forest-water interactions. Participants also mentioned learning technical skills such as measuring topsoil infiltration and analysis to calculate infiltration rates.

“Yes (my views changed during this week). Previously I always thought that forest and water have direct relationships but now I understood that they have complex relationships and affected by many other factors”.
(A participant)

The participants evaluated the workshop highly. All respondents were pleased or very pleased with the workshop in general, the facilitation of the workshop and its organisation. They valued the workshop content (100% of respondents claimed that the workshop content was useful or very useful to them) and practical field work.

Most participants (94%) claimed that the FAO forest-water monitoring framework was either useful or very useful and 88% said that it would either be useful or very useful in their work.

Recommendations and suggestions for improving the workshop were few but included incorporating more practical field work and ensuring that there is follow up to monitor the progress of participants and strengthen the newly formed Ethiopia ForWater Interest Group.

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