

Towards Sustaining Healthy Flows and Functions in the Omo-Gibe Basin: Second Stakeholder Workshop

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Abbreviations

BCM	Billion cubic metres
e-flows	Environmental flows
IWMI	International Water Management Institute
MAR	Mean annual runoff
MFL	Multifunctional Landscapes (CGIAR Program)
Mm³	Million cubic metres
MoWE	Ministry of Water and Energy (Ethiopia)
MW	Megawatt
RDRM	Revised Desktop Reserve Model
SDG	Sustainable Development Goal
SPATSIM	Spatial and Time Series Information Modelling
SWAT+	Soil and Water Assessment Tool (revised version)
XGBoost	Extreme Gradient Boosting

Summary

The second day of the stakeholder workshop built on the May 2026 consultation and brought together evidence on hydro-climate, ecosystem services, hydrological monitoring, naturalized streamflow modelling and stakeholder perceptions. The meeting was designed to present and validate the proposed environmental-flow assessment for the Omo-Gibe Basin and identify priorities for the next phase.

The sessions reinforced a consistent message: environmental-flow planning in the Omo-Gibe should move beyond a single minimum-flow value. It should account for seasonal variability, flood pulses, water quality, ecosystem functions, downstream livelihoods and the operational realities of dams and irrigation systems. Evidence strength varies among themes. Dam regulation and sediment-related pathways are comparatively well represented, while groundwater recharge, atmospheric controls, ecological response and several governance links remain under-evidenced.

Monitoring emerged as the principal enabling condition. The Ministry of Water and Energy presentation described rehabilitation progress alongside persistent operational, data-quality and spatial-coverage gaps. The modelling work demonstrated a practical approach for estimating naturalized flow in ungauged catchments using open satellite and reanalysis inputs, but highlighted limitations for small streams, coarse-resolution data and inconsistent gauge records. Questionnaire results similarly pointed to weak coordination, inadequate continuous monitoring, limited modelling capacity and weak regulation or enforcement as major barriers.

Together, these findings provide a clear and actionable agenda: strengthening monitoring, data sharing and modelling capacity would not only address current evidence gaps but provide the foundation for more adaptive and credible environmental-flow management across the basin.

Overall direction: Advance a basin-wide, ecologically informed and adaptive environmental-flow process that combines improved monitoring, transparent modelling, stakeholder validation and operational decision support.

1. Background

The September workshop followed the May 2026 consultation on environmental flows in the Omo-Gibe Basin (Simaika and Haile 2026). The earlier workshop identified linked priorities around water conflict, dam operation, water quality, environmental-flow frameworks, data quality and availability, and flood and drought risk.

The May consultation also proposed an Omo-Gibe environmental-flow workplan, a data and monitoring gap assessment, draft indicators for priority reaches, and clearer institutional responsibilities for data sharing, coordination, validation and follow-up modelling. The September meeting was therefore structured as an evidence-building and validation step rather than a stand-alone awareness event.

The basin context requires integrated consideration of hydropower, irrigation, livelihoods and ecosystem services. The lower Omo, its floodplain, delta and connection to Lake Turkana are particularly important because changes in flow timing, flood magnitude, sediment and nutrient transport can propagate across ecological and social systems.

2. Workshop aim and objectives

Aim

Build on the May 2026 consultation to present and validate the proposed environmental-flow assessment for the Omo-Gibe Basin and agree priorities for the next phase of work.

- Present progress since May, including flow requirements, ecosystem functions, water quality and downstream ecosystem and livelihood needs.
- Revisit hydro-climatic realities, development pressures and environmental flows through field perspectives and expert insights.
- Review ecosystem services and the hydrological monitoring network and basin monitoring strategy.
- Discuss preliminary environmental-flow modelling and the pre-workshop questionnaire.
- Validate the research approach and identify commitments and priorities for future engagement.

3. Summary of sessions

3.1 Findings and outcomes of the May workshop

John P. Simaika summarized the May workshop (Simaika and Haile 2026) and showed how the earlier problem and objective trees converged around six connected themes: water conflict, dam operation, water quality, environmental flows, data quality and availability, and flood and drought. These issues should be addressed as one basin-management agenda, with reliable data and institutional coordination as cross-cutting requirements.

Table 1. Priority themes, problems and directions identified at the May workshop

Priority theme	Problem highlighted	Direction identified
Water conflict	Declining availability, abstraction and upstream regulation	Regulate abstraction, secure flows and protect livelihoods
Dam operation	Weak forecasting, limited skills and coordination	Improve information, early warning and reservoir planning
Water quality	Catchment degradation, sedimentation and untreated waste	Restoration, treatment, nature-based solutions and enforcement
Environmental flows	No basin-specific operational framework	Develop legal, institutional and technical mechanisms
Data	Sparse stations and fragmented records	Monitoring strategy, telemetry, sharing platform and capacity
Flood and drought	Climate variability and weak preparedness	Strengthen early warning, basin management and adaptation

Source: Simaika and Haile 2026.

Table 2. Progress from May to September and the contributions requested from participants

From May to September
The May workshop set the priorities. We have since developed the proposed e-flows assessment for the Omo–Gibe Basin and dived into the ecosystem services that the system delivers.
What we need from you
• Feedback on the proposed assessment: flow requirements, ecosystem functions, water quality and downstream ecosystem and livelihood needs • Validation of the research approach and the priority reaches and indicators put forward • Commitments on data sharing, monitoring and institutional roles to make the work possible • Agreement on priorities for the next phase, feeding into the e-flow workplan and follow-up modelling

Source: Unpublished workshop presentation by J.P. Simaika, "Findings and Outcomes of the May Workshop," September 25, 2026.

3.2 Hydro-climate, development and environmental flows

Sirak Tekleab presented hydro-climatic analysis, hydrological modelling, water-resources development and field observations from the lower basin. The presentation described the basin as spanning four regional states and supporting a cascade of existing and planned hydropower projects. Climate analysis using 43 years of satellite-merged data (1981–2023) showed strong spatial and interannual variability in rainfall, with one rainfall peak in parts of the upper catchment and two peaks in the middle and lower basin. Rainfall trends were generally positive across most stations, although a few locations showed negative or statistically insignificant trends. Minimum and maximum temperatures also increased, with the rise in minimum temperature generally more pronounced and statistically significant.

A preliminary rainfall–runoff model was calibrated and validated at key gauging stations using precipitation and potential evapotranspiration inputs to estimate naturalized flows at major water-development sites. The simulations, flow-duration analysis, and a simplified environmental-flow method were used to assess seasonal water availability and downstream release requirements. Results indicated that releases from the major upstream scheme vary considerably, while intervening tributaries provide additional downstream inflows.

The session recommended comprehensive climate and hydrological analysis, careful validation of satellite products against ground observations, multidisciplinary collaboration and benchmark meteorological and hydrological stations. Environmental-flow scenarios presented during the session should be treated as analytical inputs requiring ecological and stakeholder validation rather than final prescriptions.

Table 3. Hydropower developed and planned in the Omo-Gibe Basin

Project	Capacity (MW)	Status
Gibe I	184	Functional
Gibe II	420	Functional
Gibe III	1,870	Functional
Gibe IV (Koyscha)	2,160	Under construction
Gibe V	560	Planned
Halele Werabessa I / II	96 / 326	Planned
Total	~2,474 developed; 3,142 planned	MoWE (2024)

Source: Unpublished workshop presentation by S. Tekleab, "Revisiting Hydro-climate, Development, and Environmental Flows in the Omo-Gibe Basin: Field Perspectives and Expert Insights," September 25, 2026. Totals as cited in the presentation from MoWE (2024).

Table 4. Field evidence from the Kuraz main diversion site (August 2026) and surface-water potential

Item	Key finding
Kuraz sugarcane project	Aimed at developing 175,000 ha; constructed about nine years ago
Right-side intake	Intended to develop 125,000 ha for Kuraz 3 and 5
Left-side temporary diversion	Supplies Kuraz 1 and 2 through four temporary box culverts; ~10,000 ha (6%) of the planned area developed
Flow variability at Kuraz headwork (1981–2023)	Monthly coefficient of variation from 32.2% (September) to 78.4% (March)
Basin surface-water potential	17.02 BCM (MoWE 2024, as cited in the presentation); approximately 19–20 BCM/y (unpublished estimate presented at the workshop)

Source: Unpublished workshop presentation by S. Tekleab, September 25, 2026, including field observations from August 2026.

3.3 Ecological functions and ecosystem services

Alemseged Tamiru Haile presented a literature review on ecological functions, ecosystem services and water-management challenges (Simaika et al. 2026). The review framed the seasonal flood pulse as a central connector among floodplain fertility, groundwater recharge, wetlands, fisheries, riparian vegetation and livelihood practices. It also recognized benefits from flow regulation, including renewable power, steadier, higher dry-season flows, attenuated flood peaks and stored water for irrigation.

Six causal pathways organized the evidence: river-flow regulation, irrigation abstraction, sediment and nutrient change, groundwater recharge, evaporation and wind, and land and climate change. Evidence was uneven. Dam regulation and sediment-nutrient pathways were more densely covered, while groundwater and atmospheric pathways, ecological responses and governance interactions require further evidence-building. Because the major causal claims contained both supporting and contradicting evidence, model-based values and contested propositions should not be treated as settled facts.

Table 5. Key ecosystem services of the lower Omo-Gibe Basin and their links to the SDGs

Service	What it provides	Who/what benefits	SDG link
Provisioning	Food, grazing areas, fisheries, and floodplain resources supported by seasonal river flows	Agropastoral, pastoral, and riverine communities that depend on flood-recession farming and grazing	SDG 1, 2, 15
Regulating	Floods move sediment and nutrients, recharge groundwater, and help maintain floodplain wetlands	Floodplains, wetlands, riparian forests, aquifers, and downstream communities	SDG 6, 15
Supporting	River flows support fish, wetlands, riparian forests, and connected habitats	Riverine and floodplain ecosystems, including aquatic and flood-dependent species	SDG 14, 15
Cultural	Seasonal floods shape farming, grazing, movement, settlement, and cultural calendars	Communities whose livelihoods and cultural practices are linked to the river and floodplain	SDG 2

Source: Adapted from Simaika et al. 2026, as summarized in the workshop presentation by A.T. Haile, September 25, 2026.

3.4 Hydrological monitoring network and basin monitoring strategy

Surafel Dawit reviewed the hydrological station network, rehabilitation activities, data quality and the Basin Monitoring Strategy. The presentation reported 52 hydrological stations in the wider network, four telemetry stations and 12 non-functional or closed stations. But coverage is uneven, with denser monitoring upstream and important gaps in the middle and lower basin. Of 42 assessed stations, 22 had completed maintenance or rehabilitation, four new stations were pending establishment and 16 existing stations remained pending maintenance or rehabilitation. The assessment identified problems including unstable riverbeds, outdated cross-sections and rating curves, vandalism, limited observer capacity, and inconsistent measurement practices. Monitoring gaps were also highlighted around the Gilgel Gibe reservoirs and their main inflows and outlets.

Priority gaps included inflow-outflow monitoring around the hydropower cascade, routine discharge measurement, rating-curve updating, operational capacity and vandal-resistant infrastructure. The ten-year Basin Monitoring Strategy for 2026-2035 covers surface water, groundwater and water quality. The strategy uses short-, medium-, and long-term phases to prioritize urgent sites, expand the network, and sustain integrated monitoring of surface water, groundwater, water quality, and meteorology across the basin. For the Omo-Gibe, the strategy presented 42 existing and 32 proposed new stations, giving a total of 74.

Table 6. Basin Monitoring Strategy (2026–2035): proposed monitoring stations for the Omo-Gibe

Basin	Existing	New	Total	Short term (1–3 y)	Mid term (4–6 y)	Long term (7–10 y)
Omo-Gibe	42	32	74	17	6	9
All basins (national)	253	538	798	237	179	122

Source: Unpublished workshop presentation by S. Dawit (Ministry of Water and Energy), “Omo-Gibe Basin Hydrological Station Network Status, Data Quality and Basin Monitoring Strategy,” September 25, 2026. Values as shown on the slide.

Monitoring implication: Environmental-flow assessment should be developed together with a monitoring and data-management plan. Model refinement, compliance assessment and adaptive management depend on sustained observations, quality assurance and accessible records.

3.5 Naturalized streamflow modelling and preliminary e-flow assessment

Lishalan Lorance presented a desktop environmental-flow assessment using naturalized streamflow modelling. The approach combined an XGBoost regression model with open-access precipitation, reanalysis and catchment data to estimate daily and monthly naturalized flows, including for ungauged catchments, and provide inputs for SPATSIM and the Revised Desktop Reserve Model.

The model used observed records from four stations for 1982-2005 and tested daily and monthly configurations. The work showed potential for extending baseline analysis to ungauged locations, while identifying limitations related to small streams, coarse satellite resolution and inconsistencies in gauge records. Preliminary class-based requirements were presented for upstream, middle and downstream locations, but require validation against ecological, water-quality and livelihood objectives.

Environmental-flow requirements were then estimated with the Revised Desktop Reserve Model (RDRM), a desktop hydrological method developed by the Institute for Water Research at Rhodes University, South Africa, and run within SPATSIM. The RDRM uses a monthly naturalized flow series to estimate the low-flow and high-flow requirements needed to maintain a river in a chosen ecological category, from A (natural) to D (largely modified), for each month of the year. The model was run at 15 sites, five in each of the upper, middle and lower sub-basins; three representative sites were presented at the workshop (Table 7). Because no calibrated hydraulic or ecological parameters exist for Ethiopian rivers, parameters were transferred from South African reference rivers of similar geomorphic type: Thina-2 for the upper, Asseg-2 for the middle and Augr-3 for the lower sub-basin. With simulated rather than observed natural flows, transferred parameters and no field hydraulic or ecological data, the results should be regarded as low-confidence estimates.

Table 7. Preliminary environmental-flow requirements (RDRM) at three representative sites using simulated naturalized streamflow (Mm³/y)

Station (lat, long)	Location	Natural MAR (Mm ³ /y)	Cat A dry season (Mm ³ /y)	Cat B dry season (Mm ³ /y)	Cat C dry season (Mm ³ /y)	Cat D dry season (Mm ³ /y)
U_1 (8.333964, 37.302986)	Upstream	1012.77	221.627	186.429	155.501	90.524
M_1 (7.215569, 37.445344)	Middle	3965.24	898.621	646.130	493.837	344.527
D_1 (6.532406, 36.485331)	Downstream	5443.35	1071.669	787.654	511.527	278.564

Source: Unpublished workshop presentation by L. Lorance, "Naturalized Streamflow Modelling for the Omo-Gibe Basin," September 25, 2026.
MAR = mean annual runoff; Categories A–D = ecological management classes (RDRM).

3.6 Pre-workshop questionnaire

The questionnaire was sent to 25 recipients from the May workshop and received 14 responses. Respondents represented universities or research institutions, government or public authorities, consultancies or technical advisory firms, and an independent expert. The results provide a targeted, non-representative snapshot of data access, perceived monitoring coverage, implementation barriers, priority reaches and training needs.

Table 8. Summary of findings from the pre-workshop questionnaire

Finding	Questionnaire signal
Monitoring coverage	Most respondents rated streamflow and water-quality coverage as poor.
Data access	Gauge data were often available through formal request, but some existing data were difficult to obtain or institutionally siloed.
Decision uses	Downstream livelihoods, dam operations, irrigation permitting and ecosystem conservation were prominent entry points.
Implementation barriers	Weak coordination and insufficient continuous monitoring were selected most often, followed by weak regulation or enforcement and limited modelling capacity.
Priority geography	The lower Omo dominated nominations, while other respondents proposed different areas (upper and mid Omo) or questioned the scarcity framing.
Capacity needs	Hydrological and hydraulic modelling, environmental-flow assessment, monitoring systems, operational decisions and hands-on basin-specific training.

Table 9. Barriers to implementing environmental flows (respondents could choose up to three; n = 14)

Barrier	Respondents mentioning
Institutions not coordinating	9
Not enough continuous gauge monitoring	9
Weak regulation or enforcement	8
Limited hydro-ecological modelling capacity	7
Competing demands (energy / agriculture / ecology)	5
Not enough funding	5

Source: Unpublished workshop presentation by J.P. Simaika, "Results of the Pre-workshop Questionnaire," September 25, 2026. One respondent selected four barriers.

4. Cross-cutting findings

Although the six sessions addressed different topics, six findings recurred across them. Each is summarized below, together with the evidence from Section 3 that supports it.

4.1 Seasonal variability and flood pulses matter

A key message from the presentations was that environmental-flow requirements in the Omo-Gibe cannot be expressed as a single minimum release. The literature review framed the seasonal flood pulse as the connector among floodplain fertility, groundwater recharge, wetlands, fisheries, riparian vegetation and livelihood practices, and the ecosystem-services synthesis showed that seasonal floods also shape farming, grazing, movement, settlement and cultural calendars (Table 5). Hydro-climatic analysis confirmed strong spatial and seasonal variation: at the Kuraz headwork, the monthly coefficient of variation ranged from 32.2% in September to 78.4% in March over 1981–2023 (Table 4). Regulation by the hydropower cascade brings benefits, including steadier dry-season flows, attenuated flood peaks and stored water for irrigation, but these same changes alter the flows on which floodplain inundation, recession agriculture, sediment and nutrient transport, fish recruitment, groundwater recharge and seasonal habitat connectivity depend. The RDRM produces low-flow and high-flow requirements for each month, but only the dry-season requirements were presented at the workshop

4.2 Quantity, timing and quality should be assessed together

Water quality was one of the six priority themes identified in May, with catchment degradation, sedimentation and untreated waste highlighted as the main problems. The September sessions showed that flow quantity and water quality are closely linked. Sediment and nutrient change is one of the six causal pathways in the literature review and one of the better-evidenced ones, and floods transport the sediment and nutrients that sustain floodplain fertility downstream. Yet most questionnaire respondents rated water-quality monitoring coverage as poor, and the modelling presented to date addresses flow only. Flow recommendations should therefore be linked to explicit water-quality objectives and to the catchment pressures that affect them, with priority parameters, pollution and sediment sources, ecological thresholds and feasible monitoring frequencies identified alongside flow requirements. Because the Basin Monitoring Strategy for 2026–2035 covers water quality as well as surface water and groundwater, it provides an institutional entry point for this integration.

4.3 Monitoring is a precondition for adaptive management

A key message from the presentations was that monitoring is a precondition for adaptive management. The Ministry of Water and Energy reported that 22 of 42 assessed stations had completed maintenance or rehabilitation, but 16 existing stations remained pending, four new stations were awaiting establishment, only four telemetry stations were operating and 12 stations in the wider network were non-functional or closed. Priority gaps included inflow–outflow monitoring around the hydropower cascade, routine discharge measurement, rating-curve updating, operational capacity and vandal-resistant infrastructure. Stakeholders echoed these gaps: together with weak institutional coordination, insufficient continuous gauge monitoring was the barrier selected most often (9 of 14 respondents; Table 9), and respondents reported that some existing data were difficult to obtain or institutionally siloed. The Basin Monitoring Strategy proposes 32 new stations for the Omo-Gibe, bringing the total to 74 (Table 6). Aligning the phasing of these stations with the priority reaches and indicators of the environmental-flow assessment would allow the same investment to support model calibration, compliance assessment and adaptive management.

4.4 Models support decisions but do not replace validation

A key message from the modelling presentation was that models can support decisions but do not replace validation. The naturalized-streamflow work demonstrated that open-access precipitation, reanalysis and catchment data can be combined in an XGBoost regression to estimate daily and monthly naturalized flows, including in ungauged catchments, and to provide inputs to SPATSIM and the Revised Desktop Reserve Model. The reliability of these estimates, however, depends on the observed records used for training, drawn from four stations for 1982–2005, and the presenters noted limitations related to small streams, coarse satellite resolution and inconsistent gauge records. The hydro-climate session likewise stressed the need to validate satellite products against ground observations. The scenarios from that session and the preliminary class-based allocations (Table 7) should therefore be treated as analytical inputs rather than final prescriptions. Before they inform decisions, naturalized-flow outputs must be tested against field observations, ecological response, local knowledge, downstream livelihood needs and operational feasibility, with model performance and sensitivity reported transparently.

4.5 Evidence is uneven across causal pathways

A key message from the literature-review presentation, which drew on Simaika et al. (2026), was that evidence is uneven across causal pathways. The review organized the evidence along six causal pathways: river-flow regulation, irrigation abstraction, sediment and nutrient change, groundwater recharge, evaporation and wind, and land and climate change. Dam regulation and sediment–nutrient pathways were comparatively well covered, whereas groundwater recharge, atmospheric controls, ecological responses and governance interactions remain under-evidenced. Because the major causal claims contained both supporting and contradicting evidence, model-based values and contested propositions should not be treated as settled facts. Key quantitative inputs also differ between sources; for example, basin surface-water potential was reported as 17.02 BCM (MoWE 2024, as cited in the hydro-climate presentation) and as approximately 19–20 BCM/y in an unpublished estimate presented at the workshop (Table 4). A traceable evidence register that distinguishes observations, model projections, expert judgement and contested claims would make the basis for flow recommendations transparent and direct field studies to the weakest links.

4.6 Governance links technical evidence to implementation

A key message across the presentations and questionnaire was that governance links technical evidence to implementation. The May workshop found that the basin has no operational environmental-flow framework and called for legal, institutional and technical mechanisms. In the questionnaire, weak institutional coordination (9 of 14 respondents) and weak regulation or enforcement (8 of 14) were among the barriers cited most often, while competing demands among energy, agriculture and ecology, and insufficient funding, were each cited by five respondents (Table 9). Respondents identified downstream livelihoods, dam operations, irrigation permitting and ecosystem conservation as the main decision entry points. Field observations at Kuraz, where about 10,000 ha (6%) of the planned 175,000 ha had been developed (Table 4), further showed that planned and actual water use can diverge, which matters for realistic allocation scenarios. Clarifying who supplies data, who validates evidence and who uses the outputs, supported by data-sharing arrangements and a decision calendar linked to reservoir operation and water allocation, is therefore as important as the technical assessment itself.

5. Lessons learned and emerging priorities

Table 10. Lessons learned, emerging priorities and immediate outputs

Emerging priority	Why it matters	Immediate output
Evidence synthesis	Separates supported mechanisms from unresolved claims	Evidence map and uncertainty register
Monitoring gap assessment	Targets investments for calibration and compliance	Prioritized station, parameter and data-access plan
Pilot reach selection	Concentrates field work where decisions are consequential	Transparent criteria and shortlist
Indicator framework	Connects flows to ecological, water-quality and livelihood outcomes	Draft hydrological, ecological, water-quality and social indicators
Model validation	Tests naturalized flows and scenarios	Calibration, sensitivity and field-validation protocol
Institutional pathway	Clarifies who supplies data, validates evidence and uses outputs	Roles, data-sharing arrangements and decision calendar
Capacity strengthening	Enables sustained use of tools and monitoring systems	Hands-on training using Omo-Gibe datasets

6. Recommendations and proposed next steps

1. Consolidate the evidence base: Complete the structured literature review and maintain a traceable evidence table distinguishing observations, model projections, expert judgement and contested claims.
2. Develop an integrated monitoring gap assessment: Combine hydrometric, meteorological, water-quality, ecological and livelihood monitoring needs.
3. Agree pilot-reach selection criteria: Use decision relevance, ecological and livelihood dependence, degree of flow alteration, data feasibility, institutional demand and transboundary significance.
4. Validate modelling in stages: Assess gauge quality and rating curves, validate naturalized-flow estimates, test sensitivity and compare scenarios against ecological and social objectives.
5. Integrate water quality: Identify priority parameters, pollution and sediment sources, ecological thresholds and feasible monitoring frequencies.
6. Connect recommendations to operations: Translate scenarios into decision-relevant formats for dam releases, irrigation abstraction, drought planning and flood management.
7. Formalize data and institutional arrangements: Define data custodians, access procedures, quality-control responsibilities, model-review roles and updating mechanisms.
8. Deliver basin-specific capacity building: Prioritize practical training on streamflow analysis, flow-duration curves, SPATSIM/RDRM, remote sensing, telemetry, water quality and operational interpretation.
9. Maintain inclusive stakeholder engagement: Include downstream communities, floodplain farmers, pastoralists, fisheries stakeholders, Ethiopian and Kenyan basin actors, agencies, universities and specialists.

The next phase of technical work will respond directly to Recommendations 4 and 5 and to the need, identified in Section 4.2, to assess flow quantity, timing and quality together. A SWAT+ model will be set up, calibrated and validated for the Omo-Gibe Basin to generate spatially explicit flow, sediment and nutrient outputs, and these outputs will be integrated into IWMI's environmental-flow calculator together with a new water-quality module. Results will be presented in an Omo-Gibe environmental-flows and water-quality assessment report and policy brief for the Ministry of Water and Energy, the Ministry of Irrigation and Lowlands and basin institutions.

Proposed next milestone: Apply SWAT+ and develop a water-quality module for IWMI's environmental-flow calculator, within an Omo-Gibe environmental-flow workplan that links evidence review, monitoring, field validation, stakeholder deliberation, capacity development and institutional uptake.

7. Partnerships and inclusion

The workshop connected IWMI, the Ministry of Water and Energy, universities, technical agencies, engineering institutions, research organizations and civil-society partners around a common basin agenda. Public agencies have roles as data custodians and implementing authorities; universities and research organizations support evidence and training; and stakeholders validate priorities, impacts and feasible management responses.

The participant list contains 56 numbered entries, including named participants and several institution-level or stakeholder-category entries for which no individual was specified. The annex reproduces named participants and separately records organizations or stakeholder groups listed without a named representative. The source list does not provide reliable gender or age-disaggregated information, so gender and youth participation cannot be quantified from it alone.

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Annex A. Workshop agenda

Table 11. Workshop agenda

Time	Session	Responsibility
08:30-09:00	Arrival of participants	
09:00-11:00	Other PoDs	Other PoDs
10:45-11:00	Coffee break	
11:00-11:45	Findings and outcomes of the May workshop	John Simaika, IWMI
11:45-12:30	Revisiting hydro-climate, development and environmental flows	Sirak Tekleab, Addis Ababa University
12:30-13:30	Lunch	
13:30-14:15	Ecosystem services of the Omo-Gibe	Alemseged Haile, IWMI
14:15-15:00	Hydrological monitoring network and basin monitoring strategy	Surafel Dawit, Ministry of Water and Energy
15:00-15:30	Tea break and group photo	
15:30-16:00	Modelling of environmental flows	Lishalan Lorance, remote
16:00-16:45	Results of the pre-workshop questionnaire	John Simaika, IWMI
16:45-17:00	Close of workshop	Abdulkarim Seid, IWMI

Annex B. Participant list

Table 12. Named workshop participants and affiliations

No.	Name	Affiliation
1	Dr Andualem Mekonen	Addis Ababa University
2	Dr. Birtukan Abebe	Haramaya University
3	Dr. Samuel Degalo	Arba Minch University
4	Dr. Demelash Wondimagegnehu	Arba Minch University
5	Mr. Bayew Terefe	Ethiopian Engineering Corporation
6	Mr. Esayas Samuel	Water Witness
7	Mr. Esayas W/Mariam	Ethiopian Engineering Corporation
8	Dr Getahun Kebede	Addis Ababa Science and Technology University
9	Mr. Habtamu Mulat	Ethiopian Engineering Corporation
10	Dr Melkamu Kifetew	
11	Ms Meron Tesfaye	Ministry of Water and Energy
12	Dr. Michael Mehari	Ministry of Water and Energy
13	Ms Mintamir Ferede	Arba Minch Water Technology Institute
14	Mr. Samuel Tesfaye	Ministry of Water and Energy
15	Mr. Shemsu Mubarak	Ethiopian Meteorology Institute
16	Mr. Shewangizaw Amare	Addis Ababa University
17	Mr. Surafel Dawit	Ministry of Water and Energy
18	Dr Surafel Mamo	Freelancer
19	Mr. Walleign Jene	Ethiopian Engineering Corporation
20	Mr. Yirgalem Esuneh	Ministry of Water and Energy
21	Dr. Deneke Dana	Wolaita Sodo University
22	Dr. Wuletaw Abera	Alliance of Bioversity International and the International Center for Tropical Agriculture
23	Dr. Gizaw Desta	International Crops Research Institute for the Semi-Arid Tropics
24	Ms. Hewan Tadesse	Ethiopian Institute of Agricultural Research
25	Dr. Sirak Tekleab	Addis Ababa University
26	Dr. Wakjira Takala Dibaba	Jimma University
27	Prof. Tamena Adugna	Jimma University
28	Mr. Natan Molla	Jimma University
29	Dr Kindu Tegegne	International Livestock Research Institute
30	Belay Mengesha	Alliance of Bioversity International and the International Center for Tropical Agriculture
31	Merid Manana Gebre	Ministry of Irrigation and Lowlands
32	Yonas Tesfaye Wold	Ethiopian Electric Power
33	Yalelet Mulat	Ethiopian Electric Power
34	Eden Seifu	Addis Ababa University
36	Matiwos Balcha	Rural Community Based Development Initiative Association
42	Motuma Tolera	Ethiopian Forest Development
43	Abayneh Derero	Ethiopian Forest Development
46	Dr. Mohsin Hafeez	International Water Management Institute
47	Dr John Simaika	International Water Management Institute
48	Dr Matthew McCartney	International Water Management Institute

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50	Dr. Chaturangi Wickramaratne	
51	Dr Alemseged Tamiru	International Water Management Institute
52	Dr Wolde Mekuria Bori	International Water Management Institute
53	Dr Meron Teferi Taye	International Water Management Institute
54	Dr Abdulkarim H. Seid	International Water Management Institute
55	Dr Amare Haileselassie	International Water Management Institute
56	Dr Kirubel Mekonnen	International Water Management Institute

Organizations or stakeholder groups listed without a named representative

Table 13. Organizations or stakeholder groups listed without a named representative

No.	Organization or stakeholder group
35	Jinka University
37	Terepeza Development Association
38	Large scale irrigators
39	National Fishery and Aquatic Life Research Centre
40	Ministry of Planning and Development
41	Ethiopian Biodiversity Institute
44	Ethiopian Wildlife Conservation Authority
45	Ministry of Culture and Tourism

Annex C. Evidence and follow-up matrix

Table 14. Evidence streams, main contributions and follow-up needs

Evidence stream	Main contribution	Follow-up needed
May workshop synthesis	Basin problems, objectives and priority deliverables	Confirm progress and unresolved commitments
Hydro-climate and field perspectives	Climate, hydrology, development and operational observations	Verify datasets, assumptions and field evidence
Ecosystem-services review	Causal pathways, trade-offs and evidence gaps	Complete peer review and validate disputed claims
Monitoring-network review	Network status, rehabilitation and strategy	Reconcile station counts and produce prioritized gap map
Naturalized-flow model	Baseline flows and preliminary scenarios	Complete performance reporting, sensitivity and ecological validation
Questionnaire	Stakeholder perceptions and training demand	Interpret as a small purposive sample and follow up institutions
Workshop discussion	Validation, commitments and priorities	Insert verified notes, decisions, owners and deadlines



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