WORKSHOP REPORT

Catalyzing Private Sector-Led Solar Irrigation Scaling in Ethiopia
Stakeholders Dialogue for Pathways

March 27, 2026 | Addis Ababa, Ethiopia

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Front cover photo: Group Photo Stakeholder Consultation Inception Workshop March 27,2026 (*Photo:* Rahel Mesganaw/IWMI)
Back cover photo: Breakout group discussion (*Photo:* Rahel Mesganaw/ IWMI)

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Acronyms

AWMTF – Agricultural Water Management Task Force

ATI – Agricultural Transformation Institute

EFSRP – Ethiopia Food Systems Resilience Program

ESEDA – Ethiopian Solar Energy Development Association

EWTI – Ethiopian Water Technology Institute

FAO – Food and Agriculture Organization (United Nations)

IaaS – Irrigation-As-A-Service (irrigation provided as a service)

IWMI – International Water Management Institute

MEL – Monitoring, Evaluation, and Learning

MSI – Micro-Scale Irrigation

MoA – Ministry of Agriculture

MoILLs – Ministry of Irrigation and Lowlands

MoWE – Ministry of Water and Energy

NBE – National Bank of Ethiopia

NEP 2.0 – National Electrification Program 2.0 (Ethiopia)

PAYGO – Pay-As-You-Go (financing model)

SMEs – Small and Medium Enterprises

SNV – Netherlands Development Organization (NGO)

SPIS – Solar-Powered Irrigation System

Executive Summary

Ethiopia's solar-powered irrigation scaling agenda is moving from fragmented, subsidy-driven deployment toward a coordinated, market-responsive, and evidence-based scaling pathway. The stakeholder dialogue confirmed that SPIS can only scale responsibly when solar pumps are bundled with finance, advisory services, standards, after-sales support, sustainable water uses, and a national coordination mechanism.

The confirmed near-term pipeline includes public institutions and Development Partners commitments such as more than 2,000 pumps already deployed, approximately 10,000 hectares irrigated, and a 2026 target of 1,750 additional solar pumps. Building on the Scaling Ambition Framework, the broader ambition is to help reach about 284,000 smallholder farmers in Ethiopia between 2026 and 2028 through integrated SPIS/FLID bundles, digital decision-support tools, demand creation, and smart blended-finance models.

The workshop agreed that the Solar Pump Scaling Platform should serve as the coordination backbone for the 2026–2028 agenda, with MoA and MoILLs providing public leadership and IWMI/S4I supporting evidence, readiness assessment, learning, platform facilitation, investment matchmaking, and capacity building through subsequent yearly ToT training for all key actors. The next phase should therefore focus on platform setup and pilots in 2026, expansion through finance and service networks in 2027, and institutionalization and broader scale-up in 2028.

Scaling ambition: reach about 284,000 smallholder farmers by 2028 through bundled SPIS/FLID innovation, smart finance, platform coordination, evidence tools, and yearly capacity building.

1. Background and Scaling Challenge

1.1. Agriculture's Strategic Role and Irrigation Imperative

Agriculture remains central to Ethiopia's economy, contributing approximately 34% of GDP and employing an estimated 60–80% of the national workforce. The sector is dominated by smallholder subsistence farming, with over 95% of crop production generated by smallholders, and remains predominantly rainfed (Adamseged et al.,2025). This dependency leaves agricultural production highly vulnerable to climate variability, recurrent droughts, and seasonal rainfall uncertainty (Assefa et al., 2020). Consequently, irrigation expansion has become a central pillar in the government's Ten-Year Development Plan (2021–2030), the Food System Resilience Program, and the National Smallholder Irrigation and Drainage Strategy.

Ethiopia possesses untapped water resources, with irrigation potential estimated at 3.5–5.3 million hectares by FAO and IWMI, and up to 11.1 million hectares according to MoA strategic documents; yet only about 10% of this capacity is currently utilized. Transitioning to modern irrigation is essential to lift smallholders out of poverty and reduce reliance on erratic rainfall, especially as diesel pumping costs become increasingly prohibitive for most farming households.

1.2. Opportunity of Solar-powered Irrigation

Solar-powered irrigation systems (SPIS) offer a low-emission, cost-effective alternative to diesel, with payback periods of one to three years under appropriate conditions (Schmitter et al., 2018, IWMI, 2023 and IWMI,2026). They align with the National Electrification Program 2.0 (NEP2) as a high-value productive use of energy. SPIS can improve water management efficiency, reduce operating costs by 70–90% compared to diesel, and enhance climate resilience at the farm level. The broader significance of SPIS lies in its ability to connect multiple priorities that are often treated separately. It addresses energy access by replacing diesel dependence, supports agricultural productivity through more reliable water access, and contributes to national climate goals by reducing greenhouse gas emissions. Within the S4I framework, this makes solar irrigation a suitable candidate for systemic scaling, because its benefits extend across sectors and depend on the interaction of technology, institutions, financing, and service delivery.

1.3. Challenge of Access to Fuel for Pump-Based Irrigation

As emphasized by Mr. Solomon Mesele from MoA during the workshop opening, farmers across Ethiopia are suffering greatly from the challenge of accessing fuel for irrigation pumps. Diesel fuel has become—is increasingly expensive, subject to supply disruptions, and contributes to emissions. Many smallholders cannot afford to run their pumps for adequate irrigation, leading to reduced yields, lost income, and persistent poverty. This fuel access crisis represents a binding constraint on agricultural productivity and rural livelihoods. By positioning fuel insecurity as a central problem, the case for solar irrigation scaling is grounded in practical farmer needs rather than abstract technology promotion. Solar pumping is not introduced as a standalone innovation but as a strategic response to an urgent production challenge that affects millions of farming households across the country.

2. Workshop Objectives and Methodology

The workshop brought together 24 senior decision-makers from government, financial institutions, the private sector, and development partners. Its primary objective was to align these actors around a coordinated, Private Sector-led solar pump scaling framework and translate Ethiopia's existing national scaling pathway into actionable commitments for the 2026–2028 period. This objective is consistent with the S4I logic of convening multiple actors to unlock scaling bottlenecks that cannot be solved by any single institution.

2.1. Specific Objectives

The workshop pursued four specific objectives:

⇒ Validate a National Scaling Pipeline: Identifying priority regions, target farmer segments, and delivery partners for solar pump deployment.

⇒ Co-Design Finance & Risk-Sharing Mechanisms: Developing feasible financial and risk-sharing options suited to Ethiopia's economic and institutional context, with the understanding that different farmer segments require distinct financial pathways.

⇒ Clarify Ecosystem Gaps & Roles: Clarifying institutional roles, technical support needs, and capacity gaps across public, private, and financial actors involved in the scaling ecosystem.

⇒ Establish a Coordination Mechanism: Agreeing on the creation of a standing Solar Pump Scaling Platform to ensure sustained coordination, aligned investment, and evidence-based implementation beyond the workshop.

2.2. Workshop Design and Methodology

The workshop used a mixed methodology that combined strategic framing presentations with structured breakout groups, institutional mapping exercises, reflection sessions, and plenary consolidation. Nine key institutions presented their achievements, ongoing plans, and constraints. These presentations were followed by facilitated working sessions to validate the national scaling pipeline, design financing mechanisms, map institutional roles, and draft the 2026 implementation roadmap. This design allowed participants to move from a shared understanding of the current landscape into progressively more structured problem-solving and commitment-setting.

2.3. Stakeholder Participation and Representation

Participants included representatives from government institutions such as MoA (including SHID, PACT, and FSRP–FLID linked departments, program and Projects respectively), MoWE, MoILLs, and ATI. Development partners were represented by FAO and SNV. Financial institutions included Tseday Bank and Sinqee Bank. The private sector was represented by five solar pump suppliers (Green Scene, Solar Village Ethiopia, Hagere Import and Export, Meseret Mare Solar Import, and Jebdu Motors PLC) and their association, ESEDA. IWMI/CGIAR represented the research community. Among the 24 senior decision-makers, women accounted for approximately 20% of participants, reflecting encouraging progress in gender inclusion within the solar irrigation sector.

3. Summary of Sessions

The workshop was designed as a highly participatory, solution-oriented engagement, combining strategic framing presentations with structured breakout groups and plenary discussions. Over the course of the day, nine key institutions including the Ministry of Agriculture, Ministry of Water and Energy, Ministry of Irrigation and Lowlands, Agricultural Transformation Institute, FAO, SNV, and the Ethiopian Solar Energy Development Association presented their previous achievements, their 2026 plans, and their constraints where they need technical assistance. These presentations were followed by facilitated working sessions to validate the national scaling pipeline, design financing mechanisms, map institutional roles, and draft the 2026 implementation roadmap. The following section synthesizes the key points, methodologies, and outcomes from each session.

3.1. Session 1: Opening and Strategic Framing

The opening session established the rationale for the workshop and framed solar irrigation scaling as a national systems issue rather than a standalone technology program. Mr. Solomon Mesele from the Ministry of Agriculture highlighted the urgent need to replace expensive and unreliable diesel pumps with solar energy, emphasizing the suffering of farmers due to fuel access constraints. Seifu Tilahun (S4I/CGIAR) formally opened the workshop, and Amare Haileslassie presented and led the sessions on how the Scaling for Impact program framed scaling as systemic transformation not just hardware distribution and noted that IWMI would serve as a neutral facilitator, providing a solar pump sizing tool, suitability map, and service manual to guide responsible scaling decisions.

3.2. Session 2: Mapping Solar Pump Scaling Pipeline

This session brought together nine institutions to present a structured overview of Ethiopia's solar pump ecosystem, highlighting existing investments, persistent constraints, and coordination gaps. The Ministry of Agriculture confirmed over 2,000 pumps were deployed and 10,000 hectares irrigated, with a 2026 target plan of 1,750 pumps, while noting fragmentation across programs, weak after-sales service, and limited monitoring and evaluation data. MoWE presented progress on electrification, reporting 63% national electricity access and committing to integrate irrigation as a productive use of energy under NEP 2.0. MoILLs quantified its 2026 commitment at 1,340 hectares and 2,300 households but cited high upfront costs and technician shortages as binding constraints.

SNV shared evidence from PAYGO and cooperative lending pilots, demonstrating that innovative financing arrangements can work when paired with quality technology and local service delivery. The private sector, represented through ESEDA, flagged customs delays, foreign exchange shortages, and the absence of enforced national standards as major market barriers. Collectively, the session confirmed that while public investment has built a foundation, a lack of coordination, finance hesitancy, and weak service ecosystems remain binding constraints to private-led scaling. Table-1 summarizes the key presentations from each institution.

Table 1 shows that stakeholders have made progress in deployment and planning, but finance, after-sales service, standards and coordination remain binding constraints.

Table 1. Consolidated achievements, plans, and challenges

Institution	Achievements to date	Plans / Targets (2026–2030)	Constraints highlighted
MoA	Above 2,000 pumps deployed; 10,000 ha irrigated.	1,750 pumps planned (2026); finalize standards and strengthen QA/testing.	Fragmentation, data gaps, finance hesitancy, after-sales weaknesses, standards gaps and capacity building at all level
FLID/FSRP (MoA)	FLID in 8 regions and 30 woredas; 30% solar MSI cost-sharing.	Scale FLID through partnerships and training; MSI targets/budgets shown.	Awareness and training, after-sales, quality, groundwater risk, finance, import/standards.
MoWE	63% electricity access; 145 kW mini-grid for 100 ha + 200 HHs; 5.46M grid connections.	100% access by 2030; PUE from <2% (2025) to ≥50%; PAYGO/digital monitoring scale-up.	Training, Licensing/standards/subsidy mechanisms still developing.
MoILLs	Revolving credit schemes; system range 0.5–100 ha.	1,340 ha, 2,300 HHs, 130 trained (2026 commitment); case studies.	Capacity gap, high Cost, absence technicians/spares, WUAs, supplier performance, collateral, QA gaps.
ATI	250 systems installed across five regions.	Capacity to irrigate 850 ha (coming years); 250 ha in 2026.	High CAPEX, finance access, sizing/design, spares/skills, monitoring, groundwater risk.
FAO	130 ha under construction; 40 ha upgrade design; 13 pumps distributed.	O&M training expansion; explore solar beyond irrigation (cold storage, agro-processing).	High cost, limited expertise, spare parts constraints.
SNV	PAYGO + group/cooperative models; supplier finance linkages described.	Continue finance innovation; co-design credit; strengthen after-sales; align via platforms.	Inflation/forex/import constraints; standardization gaps; high upfront cost; limited finance/tech support.
ESEDA	100+ members, 20+ SWP companies; standards/customs/finance and demand creation activities.	Continuing market stimulation, standards, finance mobilization, data systems; platform support.	Credit barriers, supplier cash flow, project-driven market, data scarcity, customs lead time.
Scaling Platform (ToR)	Governance and functions defined; MoA lead, IWMI secretariat; 15–20 core members.	Quarterly meetings; annual synthesis; duration 2026–2028.	Keep lean, decision-oriented, non-bureaucratic.

Source: Workshop presentations and stakeholder discussions, 27 March 2026, Addis Ababa.

3.3. Session 3: Validating The National Scaling Pipeline

The validated pipeline refers primarily to the 2026 national solar pump deployment target presented by MoA, while also incorporating complementary commitments and implementation inputs from other public institutions, development partners, financial institutions, and private sector actors. Beyond the headline target of 1,750 solar pumps in 2026, the pipeline was validated across five practical dimensions: priority geographies, target farmer segments, technology configurations, financing pathways, and coordination arrangements. Participants identified Harari, Dire Dawa, Central Ethiopia, East Shewa in Oromia, and the Fogera Plain in Amhara as priority areas for initial scaling. Target groups included smallholders with shallow groundwater access, farmer cooperatives, diesel pump owners, commercial horticulture farmers, and youth and women entrepreneurs. As indicated in Table 2, the agreed technology configurations ranged from standalone pumps for individual smallholders cultivating 0.5–2 ha, to shared systems for groups and cooperatives managing 2–10 ha, and larger mini-grid or centralized pumping systems for clusters above 10 ha. This means the validated pipeline was not only a numerical target; it was a structured implementation pathway linking where deployment will happen, who will be targeted, what technology will be used, which financing models will be tested, and how coordination will be managed through the Solar Pump Scaling Platform.

Table 2. Segmented pump sizes

Segment	Land size	Pump power (kW)	System type
Individual smallholder	0.5–2 ha	1–2.2 kW	Standalone pump + surface/sprinkler
Group/cooperative	2–10 ha	2.2–7.5 kW	Shared pump + distribution network
Integrated service/mini-grid	>10 ha	>100 kW (cluster)	Mini-grid or centralized pumping

3.4. Session 4: Designing Financing Mechanisms

Using facilitated working groups and scenario testing, participants evaluated a range of financial instruments and rejected a one-size-fits-all approach. The consensus endorsed a portfolio of four priority models: blended finance combining partial subsidy with bank credit, PAYGO and PAYGO-loan hybrids in which the supplier takes on repayment risk, Irrigation-as-a-Service (IaaS) for clustered farms exceeding 10 hectares, and cooperative or group lending mechanisms that reduce transaction costs and enable group guarantees. These models build on the evidence base provided by Otoo et al. (2018) and reflect the diverse needs of different farmer segments.

The session also refined subsidy logic, with participants agreeing that subsidies should target CAPEX-constrained farmers and decline over time as markets mature. Farmers already using diesel profitably were identified as candidates for direct transition to credit-based financing rather than subsidized models. This differentiation ensures that public resources are directed where they are most needed while encouraging commercial sustainability across the broader market.

3.5. Session 5: Institutional Support Mapping

This session clarified the institutional roles, capacity gaps, and support needs required to enable private-led scaling. Using a role matrix exercise, participants systematically mapped responsibilities across four actor groups. Public institutions were assigned roles in policy formulation, public de-risking through instruments such as first-loss guarantees, and technical training. Financial institutions were expected to develop tailored loan products and asset-based lending mechanisms in coordination with woreda offices. Private suppliers, represented through ESEDA, were recognized for their role in delivering quality products, ensuring after-sales service, and engaging in PAYGO arrangements. Research and development partners, including IWMI, SNV, and FAO, were identified as responsible for evidence generation, convening functions, and advisory support.

The exercise also identified key bottlenecks that constrain the scaling ecosystem. These include limited access to finance for farmers and suppliers, weak after-sales service systems, customs and foreign exchange delays that affect supply chains, and low farmer awareness of solar irrigation technologies and associated financing options. These bottlenecks informed the technical support matrix output and provided a basis for the recommendations and follow-up actions outlined later in this report.

3.6. Session 6: 2026 Implementation Roadmap and Platform Establishment

Using facilitated roadmap drafting and a formal agreement session, participants defined institutional responsibilities and coordination mechanisms for the 2026 implementation period. The key outcome was the formal decision to establish the Solar Pump Scaling Platform, with a governance structure designating MoA as Chair, MoILLs as Co-Chair, and IWMI as Technical Secretariat. Core membership was set at 15–20 institutions, and the platform's functions include quarterly meetings, pipeline oversight, finance transition monitoring, standards harmonization, policy advisory, knowledge exchange, and safeguard compliance.

The facilitated roadmap also clarified the distinct yet complementary roles of two coordination mechanisms. The National Solar Water Pumping Multi-Stakeholder Platform, led by ESEDA, serves as an open dialogue, learning, and advocacy mechanism without formal decision-making authority. The Solar Pump Scaling Platform, led by MoA and facilitated by IWMI, is a time-bound government coordination body (2026–2028) overseeing pipeline delivery, finance performance, and deployment data. Rather than merging the two platforms, stakeholders agreed that the ESEDA-led platform would feed bottlenecks and policy insights into the Scaling Platform, which would translate them into coordinated government action. Separately, ESEDA was tasked with leading field-level demand creation and market brokerage, targeting over 350 solar pumps in 2026.

4. Key Outputs and Deliverables

The workshop produced four central outputs that collectively move the solar irrigation scaling agenda from dialogue to institutional commitment. The first was the validation of a national solar pump scaling pipeline for 2026–2028, establishing a 2026 target of 1,750 pumps with identified priority regions, farmer segments, and technology configurations. The second was an institutional and technical support matrix that clarified capacity gaps, risk-sharing needs, after-sales responsibilities, and policy adjustments required to support private-led scaling.

The third output was the endorsement of a portfolio of priority financing models, including blended finance, PAYGO and hybrid arrangements, irrigation-as-a-service, and cooperative lending. This portfolio approach replaces a one-size-fits-all financing strategy and allows the system to accommodate different levels of farmer capacity and risk tolerance. The fourth and arguably most significant output was the formal decision to establish the Solar Pump Scaling Platform with defined governance, membership, and coordination functions. Together, these outputs demonstrate that the workshop generated both strategic direction and the institutional architecture needed for coordinated scaling.

5. Lessons Learned

The stakeholder dialogue revealed several important lessons for solar irrigation scaling in Ethiopia. First, the workshop confirmed that bundled solutions are essential technology alone is insufficient, and solar pumps cannot scale sustainably if provided without finance, advisory services, after-sales support, and groundwater safeguards. Second, the absence of enforced national standards for solar pumps erodes trust from both farmers and financiers, confirming that standards and quality assurance are foundational for market confidence. Third, the discussions demonstrated that no single financial model fits all farmer segments; a portfolio approach that combines blended finance, PAYGO, cooperative lending, and service-based models enables a gradual and context-sensitive transition from subsidies to credit.

Fourth, the workshop reinforced that coordination is a prerequisite for scaling, not an optional extra. A standing, light-touch coordination mechanism such as the newly established Scaling Platform is critical to reducing fragmentation and aligning public and private pipelines. Fifth, participants emphasized that decision-support tools such as the solar suitability map and pump sizing tool reduce investment risk by guiding spatially responsible scaling and preventing groundwater overuse. These lessons are not unique to Ethiopia but speak to broader principles of systemic scaling that are relevant across the S4I portfolio.

6. Scaling Opportunity, Partnership Pipeline and Pathway

This report consolidates the scaling opportunity, partnership pipeline, and scaling pathway from innovation to outcomes. The figure indicates that the total projected outreach is approximately 284,000 beneficiaries, calculated by applying the average household size to the targeted smallholder farming households reached through the scaling intervention, shown in Figure 1, Figure 2, and Table 3.



Figure 1. Consolidated scaling opportunity for solar irrigation in Ethiopia
Source: compiled workshop reports

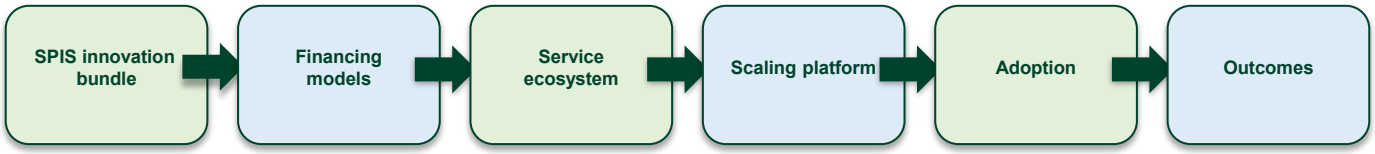


Figure 2. Solar irrigation scaling pathway in Ethiopia

Table 3. Scaling opportunity and partnership pipeline

Dimension	Partnership pipeline
Who scales	MoA/MoILLs ATI, MoWE and others regional public leadership; ESEDA demand creation; banks and suppliers delivery; IWMI/S4I evidence and facilitation.
What scales	Bundled SPIS/FLID package: pumps, finance, advisory services, sizing, suitability mapping, after-sales support and safeguards.
Where	Priority Ethiopian regions sequenced by public pipeline, service capacity and demand.
How	Solar Pump Scaling Platform, smart blended finance, PAYGO/cooperative/IaaS models, standards and MEL.
Expected reach	About 284,000 smallholder farmers between 2026 and 2028.

7. Demand Evidence and Scaling Readiness

Early adoption is most likely where SPIS solves a practical production or business constraint. This combines demand-side evidence with a readiness snapshot, including yearly ToT-based capacity building for all actors as indicated in Table 4.

Table 4. Demand-side adoption segments and constraints

Segment	Why adopt first	Remaining barriers
Diesel pump users	Fuel-cost and supply constraints create clear incentives.	Upfront cost, credit risk and quality assurance
Smallholders with shallow water	Suitable for smaller standalone systems.	Awareness, targeting, after-sales and safeguards
Cooperatives/groups	Shared systems reduce transaction costs.	Governance, guarantees, technicians and water rules
Women/youth entrepreneurs	Inclusive service delivery and agribusiness potential.	Collateral, training access and tailored loan products

Source: Stakeholder discussions and market-system analysis.

Readiness is the strongest in coordination potential, while finance, standards, services, MEL and yearly capacity building require targeted investment as indicated in Table 5.

Table 5. Scaling readiness assessment snapshot

Enabler	Readiness	Priority gap / investment need
Technology bundle	Low to Moderate	Finalize sizing tool, suitability map, service manuals and safeguards.
Demand creation	Low to Moderate	Segment farmers and strengthen awareness through ESEDA and extension.
Finance	Emerging	Pilot blended finance, PAYGO, cooperative lending and de-risking.
Standards and QA	Emerging	Finalize national standards, testing, certification and supplier accountability.
Service ecosystem	Emerging	Build technicians, spare parts channels and after-sales obligations.
Capacity building / ToT	Emerging	Establish subsequent yearly ToT training for all actors: public institutions, suppliers, financiers, extension agents, technicians and farmer organizations.
Coordination and MEL	Emerging	Operationalize platform and track adoption, inclusion, repayment, service quality and sustainable water use risk.
Capacity building	Emerging	Cross cutting capacity building along all the SPIS value chain actors actor is mandatory

8. 2026–2028 Roadmap and AoW-linked Recommendations

The roadmap translates the scaling ambition into sequenced actions, while the Table 6 links recommendations to CGIAR Scaling for Impact priorities which clearly shown in Figure 3.



Figure 3. 2026–2028 solar irrigation scaling roadmap

Table 6. Alignment of recommendations with CGIAR Scaling for Impact Areas of Work

S4I Area of Work	Recommended action
AoW1: Demand creation	Use ESEDA, extension services and pilots to identify adoption segments and bankable demand.
AoW2: Innovation bundles	Package pumps with sizing tools, mapping, finance, advisory, after-sales, standards and safeguards.
AoW3: Finance and enabling environment	Pilot blended finance, PAYGO, cooperative lending, asset-based finance and standards/QA reforms.
AoW4: Scaling platform	Coordinate targets, roles, policy bottlenecks, investment matchmaking and quarterly learning.
AoW5: Tools, MEL and learning	Track adoption, gender/youth inclusion, repayment, service quality, groundwater risk and lessons.
Cross-cutting capacity building	Institutionalize yearly ToT training to build shared technical, finance, service and safeguard capacity across all actors.

Note: This section is a synthesis linking the CGIAR scaling impact area framework with the discussion and recommendations from the workshop

9. Conclusion

Ethiopia's solar irrigation scaling drive, as coalesced in the March 2026 workshop, represents a paradigm shift from fragmented, subsidy-driven programs toward a coordinated, systemic approach. The workshop confirmed that effective scaling is not about deploying "more pumps" in isolation, but about transforming the enabling environment. By embracing innovation bundles (combining technology, finance, service, and policy), validating a concrete national pipeline of 1,750 new solar pumps in 2026, and launching a multi-stakeholder Solar Pump Scaling Platform to steer implementation, stakeholders have laid the groundwork for sustainable, private-led expansion of solar irrigation. Diversified financing models (blended credit, PAYGO, IaaS, cooperative loans) promise to gradually shift farmers from dependence on one-off subsidies to market-based adoption, while evidence-based planning tools and inclusive design ensure scaling benefits are broad, data-driven, and environmentally sound. In sum, the alliance forged between government, private sector, financiers, and partners under the CGIAR S4I ethos – provides a clear, actionable roadmap for systemic scaling. If fully implemented, this approach can greatly accelerate access to climate-smart irrigation, boost smallholder productivity and resilience, and model a transition to market-led agricultural innovation scale-up in Ethiopia.

10. Recommendations and Next Steps

To translate the workshop's outcomes into action, the following priority measures are recommended, together with an indicative timeline for implementation:

- **Operationalize The Solar Pump Scaling Platform**: The Ministry of Agriculture will formally establish the Solar Pump Scaling Platform in Q2 2026 as the central coordination body for solar irrigation scaling. IWMI, as technical secretariat, will convene the inaugural platform meeting and facilitate creation of thematic working groups (e.g., Finance, MEL). Regular quarterly meetings and an annual progress review will institutionalize partnership and ensure accountability toward achieving pipeline targets.
- **Launch Inclusive Blended Finance Pilots:** IWMI, SNV, and ESEDA will co-design and launch 2–3 blended finance pilot projects by Q3–Q4 2026, in collaboration with participating banks (e.g., Tseday and Sinqee). These pilots should combine public funds with commercial lending to de-risk loans for solar pumps, offering affordable credit to smallholders. Each pilot will include specific strategies to reach women and young farmers, building on the pipeline's focus on inclusive access to finance. Results and lessons from these pilots will inform a larger nationwide financing mechanism for solar irrigation.
- **Strengthen Decision Support & Capacity Building**: IWMI will accelerate development and national rollout of key decision-support tools and modules to underpin scaling efforts. By the end of 2026, the Solar Pump Sizing Tool and Solar Suitability Map will be made available to practitioners and policymakers, with training provided on their use. Concurrently, MoA and MoILLs will implement a training program to equip field extension agents and technicians with skills in solar pump deployment and groundwater monitoring. ESEDA will train local solar technicians on installation and maintenance best practices, ensuring strong after-sales support. These steps will ensure that as scaling accelerates, all actors have the knowledge and tools needed to implement projects effectively while safeguarding natural resources.

11. Impact Areas

This scaling initiative contributes to multiple CGIAR Impact Areas:



Nutrition, health & food security – Enhanced irrigation will boost crop yields, leading to improved food availability and nutrition in rural communities.



Poverty reduction, livelihoods & jobs – Productive water access helps raise farm incomes and creates jobs (e.g., in pump services), supporting economic development.



Gender equality, youth & social inclusion – The scaling strategy prioritizes women and young entrepreneurs, improving their access to resources and opportunities in the irrigation sector.



Climate adaptation & mitigation – Solar irrigation reduces reliance on fossil fuels (lowering emissions) and improves climate resilience by stabilizing water supply for agriculture.



Environmental health & biodiversity – Responsible scaling with safeguards protects groundwater resources and promotes sustainable water use, preserving ecosystems.

References

Adamseged, M. E., Abegaz, D. M., & Minh, T. T. (2025). Unveiling the potential: Is the private sector poised to revolutionize the solar irrigation market in Ethiopia? Sustainable Futures, 9, 100743. https://doi.org/10.1016/j.sftr.2025.100743

Assefa, T. T., Adametie, T. F., Yimam, A. Y., Belay, S. A., Degu, Y. M., Hailemeskel, S. T., Tilahun, S. A., Reyes, M. R., & Prasad, P. V. V. (2020). Evaluating irrigation and farming systems with Solar MajiPump in Ethiopia. Agronomy, 11(1), 17. https://doi.org/10.3390/agronomy11010017

International Water Management Institute (IWMI). (2023). Scaling solar-based irrigation bundles in Ethiopia: A market linkage pathway. International Water Management Institute (IWMI). https://doi.org/10.5337/2022.227

Otoo, M., et al. (2018). Business model scenarios and suitability: Smallholder solar pump-based irrigation in Ethiopia. Agricultural Water Management – Making a Business Case for Smallholders. International Water Management Institute (IWMI). https://doi.org/10.5337/2018.207

Schmitter, P., Kibret, K. S., Lefore, N., & Barron, J. (2018). Suitability mapping framework for solar photovoltaic pumps for smallholder farmers in sub-Saharan Africa. Applied Geography, 94, 41–57. https://doi.org/10.1016/j.apgeog.2018.02.008

IWMI. (2026). Ethiopia plans to scale solar irrigation with public and private sector momentum. IWMI Blog. https://www.iwmi.org/blogs/ethiopia-plans-to-scale-solar-irrigation-with-public-and-private-sector-momentum/



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