Scaling Agricultural Innovation in Ethiopia: Lessons from Pressurized Irrigation and Mechanization Promotion in Four Ethiopian Regions

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Background & Context

•Ethiopia faces significant challenges in food, energy, and water security, especially among smallholder farmers.

•The LIFT program (funded by DFID) sought to improve land productivity and livelihoods through second-level land certification and complementary interventions.

•Bislet Agritech implemented a demonstration project in 4 regions: Amhara, Tigray, Oromia, and SNNPR.

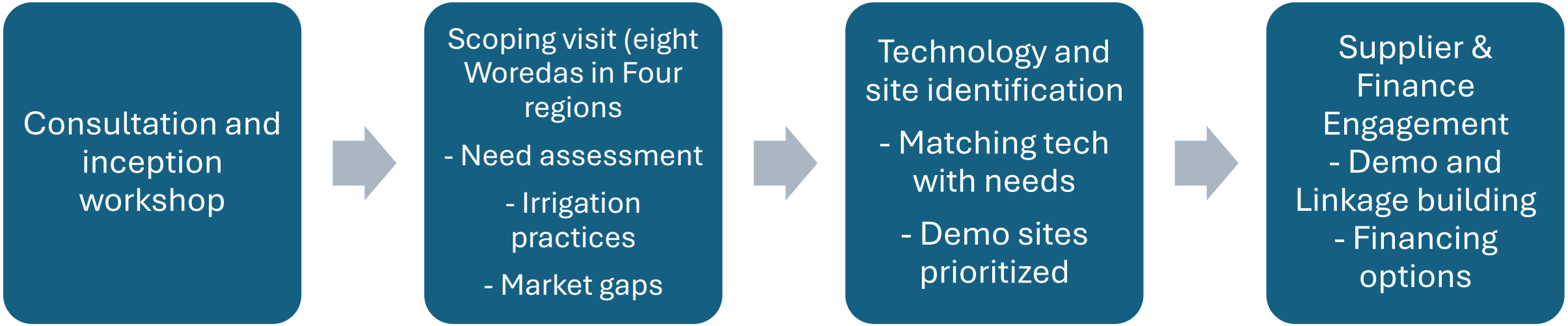
Objectives of the Intervention

- Promote small-scale irrigation (SSI) and agricultural mechanization technologies.
- Create demand for efficient water and farming technologies.
- Facilitate linkages among farmers, suppliers, financial institutions, and cooperatives.
- Catalyze scale-up and policy attention for SSI technologies.

The Challenge

- The assessment we did showed that there is low level utilization of pressurized irrigation and agricultural machinery in Ethiopia
- Let us promote and scale up drip irrigation and two-wheel tractor in the four big regions of Ethiopia

Methodology



Consultation and inception workshop

- Inception workshop held to guide the design of small-scale irrigation and agricultural machinery promotion.

- Stakeholders consulted on:
  - Status and challenges of irrigation and mechanization in Ethiopia
  - Market and business opportunities
  - Access to microfinance

- Key recommendation: Engage local communities in selecting technologies suited to local conditions.

- Emphasis on context-specific technology packages—not one-size-fits-all—for different regions and woredas.

- The workshop shaped the strategic framework and focus areas of the LIFT/Bislet intervention.

Results of Scoping Visits

• **Identified critical regional variation** in irrigation, water availability, climate, introduced technologies, financial capacity across the four target regions (Amhara, Tigray, Oromia, SNNPR).

• **Diverse technology needs**:

- Demand for **motor pumps, treadle pumps, and deep-well centrifugal pumps**.
- Farmers expressed interest in **sprinkler and drip irrigation**, but many drip systems previously introduced had failed due to poor maintenance (pipes eaten by rodents) or lack of spare parts.
- Strong demand for **lightweight threshers, seed drills, and planters**, particularly for teff, wheat, and maize.

Sprinkler irrigation system introduced in Selam Bekalsi scheme in Alamata

Introduced thresher in Motta area

Results of Scoping Visits

- **Found gaps in access to agricultural machinery**:
  - **Oxen-based cultivation still dominant**; tractors and threshers largely unavailable or unaffordable.
  - Two-wheel tractors introduced in some areas had limited success due to poor adaptability

Two-wheel tractors were introduced in Alaje but they are not in use in the wereda

Tractors and trucks owned by Hitosa Union which serves the farms on lease basis

Results of Scoping Visits

- **Revealed maintenance and service delivery challenges**:
  - Lack of local repair services for irrigation systems and machinery.
  - Limited availability of spare parts and accessories, especially for drip and sprinkler systems.
- **Uncovered financing constraints**:
  - Farmers lacked access to affordable credit to purchase irrigation equipment or machinery.
  - Microfinance institutions present but often unable to provide adequate loan amounts for individual farmers
- **Exposed market linkage gaps**:
  - Farmers had limited contact with technology suppliers.
  - Suppliers not engaged in rural promotion; focused mainly on institutional tenders.

Introduced planter in Yilmna Densa which is not in use

Results of Scoping Visits

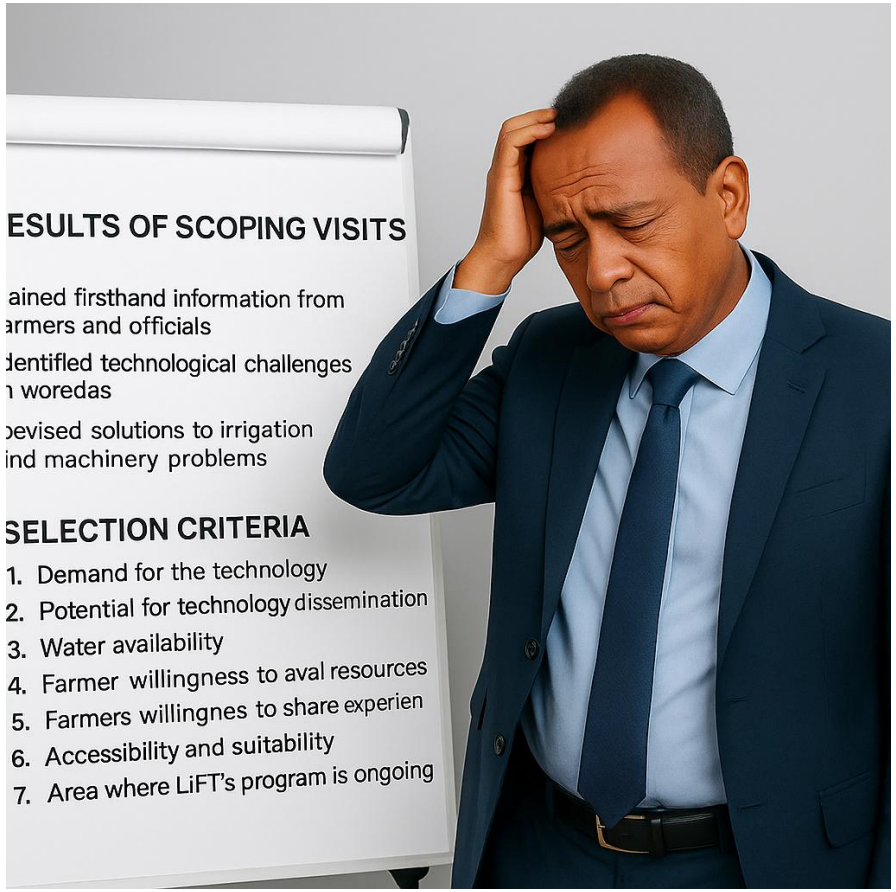
- **Validated the need for localized technology solutions**:
  - Different woredas required tailored combinations of irrigation methods and mechanization tools.
  - Success depended on matching technologies to local conditions and capacities.
- **Provided criteria for demonstration site selection**, including:
  - Farmer demand and willingness to participate.
  - Water availability and irrigation potential.
  - Accessibility and potential for scaling.

Cultivation Papya trees in Tiru Selam irrigation scheme in Amhara region

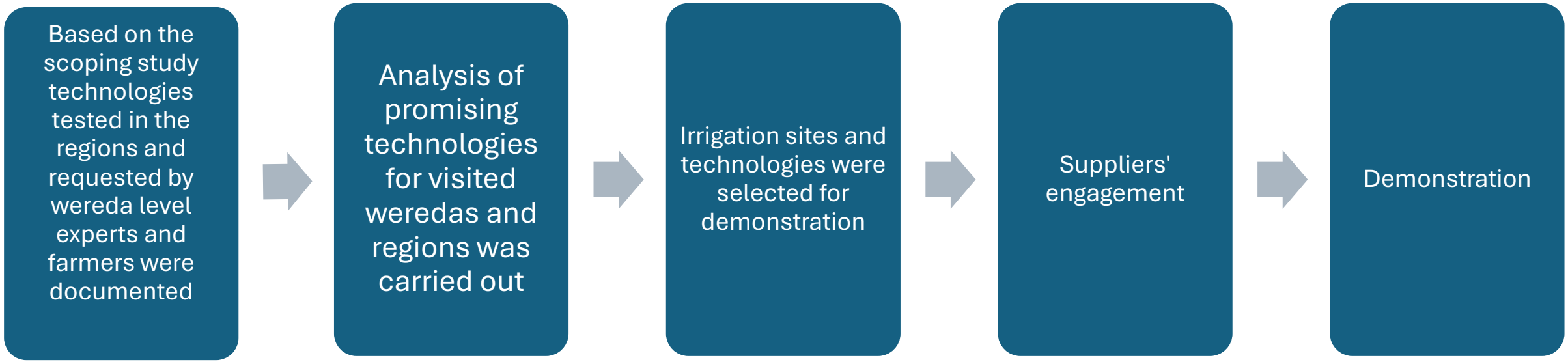
A lined main canal servers the irrigation farms of Chelena irrigation scheme

Scoping Visit Summary – Key Insights and Criteria

- Scoping visits provided firsthand input from farmers and woreda officials on irrigation and machinery needs.
- Field visits clarified key technological barriers and helped adapt suitable solutions for demonstration.
- Demonstration sites were selected based on seven key criteria:
  1. Demand for the technology
  2. Potential for dissemination (market access, land availability, farmer efforts)
  3. Water availability
  4. Willingness to contribute (land, pumps, seedlings, security)
  5. Openness to knowledge sharing
  6. Accessibility and suitability for multiple technologies
  7. Alignment with ongoing LIFT activities (land and finance)



Technology Demonstration

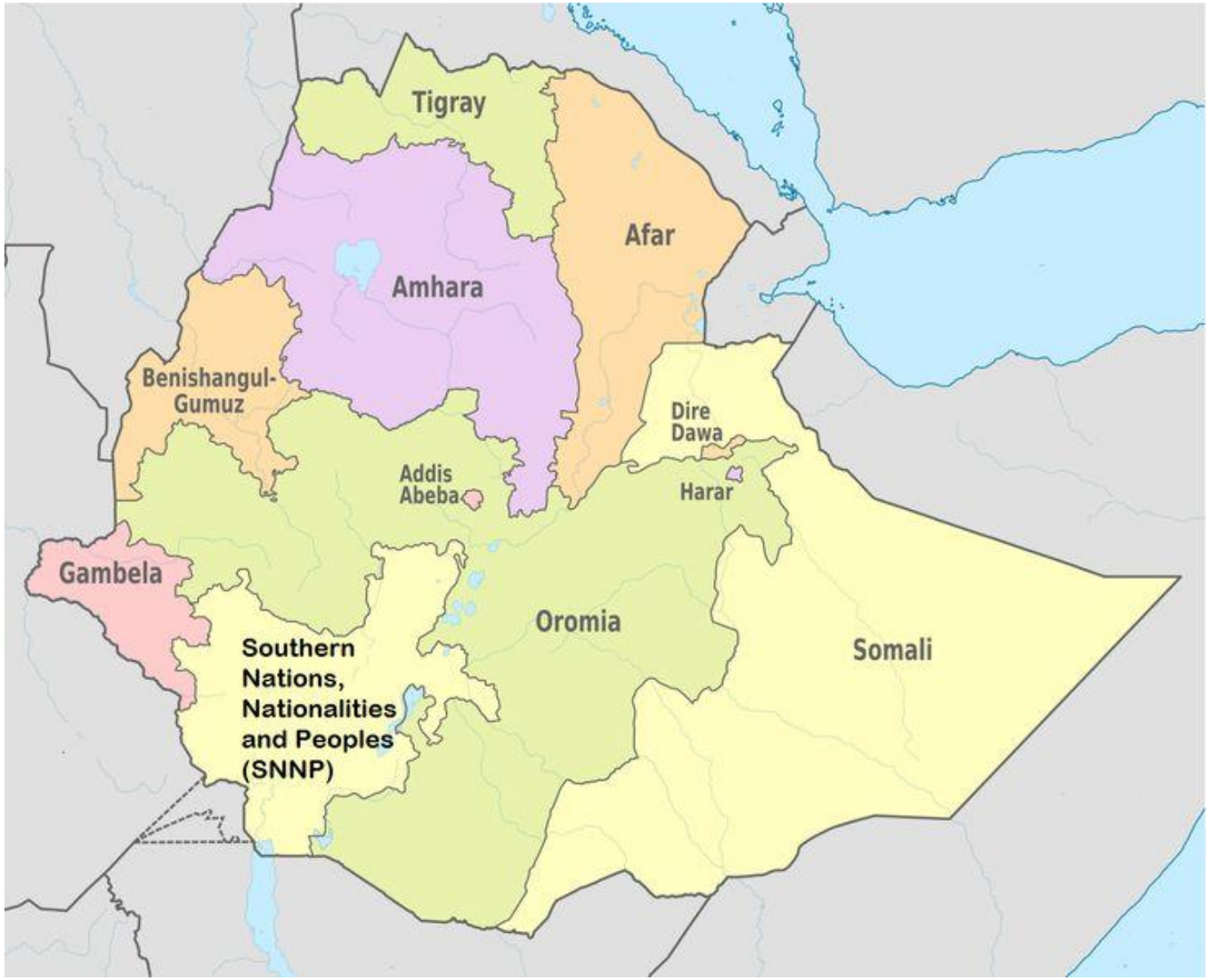


Promising technologies at scheme level

- Supplementary irrigation for wheat production using Reels (traveling gun sprinkler)
- Low pressure drip irrigation system with pump
- Low pressure sprinkler irrigation system with pump
- Deep well centrifugal pump
- Motor pump
- Potato planter
- Teff planter
- Improved thresher
- Water conveyance using polyethylene pipe

Technology Demonstration

- Amhara: Hulet Ej Ensae, Yilmana Densa
- Tigray: Alaje, Alamata
- Oromia: Hitosa, Dodota
- SNNPR: Sodo, Meskan



Technologies Demonstrated

- Irrigation:
  - Drum and bucket drip irrigation kits
  - Sprinkler systems
  - Treadle and Centrifugal pumps
- Agricultural Machinery:
  - Four-wheel tractors
  - Threshers (teff, wheat, maize)

Key Achievements

- Demonstrated technologies in 8 woredas across 4 regions.
- Raised awareness and demand for irrigation and mechanization.
- Strengthened links between farmers, cooperatives, suppliers, and microfinance.
- Identified context-specific challenges and opportunities

Lessons Learned

- One-size-fits-all approach does not work; technology must be tailored.
- Farmers value demonstration as trusted pathways to adoption.
- Linkage with local cooperatives and financial systems is essential for adoption and sustainability.
- Local capacity in operation and maintenance must be built alongside technology transfer.

Recommendations

- Promote affordable, modular technologies suitable for smallholders.
- **Incentivize Supplier Engagement in Local Markets**

  Development programs should create co-financing or performance-based incentives for private suppliers to invest in rural market promotion, training, and after-sales services.

Recommendations

- **Promote Cooperative and Group Purchasing Models**

  Strengthen the role of cooperatives and unions as aggregators of smallholder demand. This can improve their bargaining power, enable bulk procurement, and make them more attractive clients for technology suppliers.

- **Establish Regional Agro-Tech Hubs**

  Facilitate the emergence of decentralized market hubs that bring together suppliers, service providers, finance institutions, and extension services to serve as demonstration and transaction centers for agricultural technologies.

Recommendations

Integrate Finance into Technology Promotion

Link demonstrations to pre-approved microfinance or leasing schemes to ensure that interested farmers can transition from observation to adoption. Financial institutions must be engaged early in the process.

Rethink Public Procurement to Drive Innovation

Government and donor-funded procurement systems should be redesigned to reward suppliers who invest in farmer outreach, training, and local supply chains—not just low-cost bids.

Document and Scale Successful Linkage Models

Capture case studies where farmer-supplier-finance linkages have worked effectively and use them to inform national strategies for small-scale irrigation and mechanization.

Conclusion

- The project demonstrated the importance of farmer-centered, location-specific solutions.
- Scalable opportunities exist but require coordinated support across sectors.
- Continued investment in small-scale irrigation and mechanization is key to resilient food and water systems in Ethiopia.