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Advancing multifunctional agroforestry in Ethiopia

Evidence, innovation and policy pathways

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Key messages

- The MAF4E project is pioneering Living Labs that generate real-world evidence while fostering community innovation and enterprise development.
- RRCs produce quality planting material and create green jobs for women and youth.
- Homestead agroforestry enhances inclusion, nutrition, biodiversity, and resilience.
- Scaling impact requires a National Agroforestry Strategy, long-term financing, PES mechanisms, and expansion into urban areas.

Background

Ethiopia has a rich legacy of agroforestry – ranging from UNESCO-recognized traditional systems to modern practices. Agroforestry is central to Ethiopia's climate, biodiversity and restoration goals, supporting commitments under the CRGE Strategy, NDCs, Ten-Year Development Plan and AFR100.

The DEFRA-GCBC funded project Multifunctional Agroforestry for Ethiopia (MAF4E) is led by CIFOR-ICRAF in partnership with Tree Aid, government institutions and universities. It strengthens science, institutional systems and inclusive community innovation to accelerate climate-resilient agroforestry scaling for biodiversity. MAF4E applies a 'Living Lab' approach. A living lab is not a research facility, it is a community-driven, open-innovation platform where farmers, scientists, policymakers and local institutions co-design and test sustainable land-use solutions. These spaces serve as hubs for real-world experimentation, knowledge generation and scaling of climate-smart practices.

Key achievements

Living labs in Ethiopia: By combining sensor-based datasets, women and youth-led Rural Resource Centers (RRCs) and household production systems, MAF4E's Living Labs bridge science, extension services and green enterprise development – creating a scalable model for climate-smart agroforestry policy and rural youth-led entrepreneurship.

High-resolution science for policy

Living Labs in Tigray and Southern Ethiopia generate one of Ethiopia's first long-term, high-frequency agroforestry datasets through:

- 30+ dendrometers installed on indigenous and economic tree species
- soil moisture and temperature sensors
- 30-minute interval data collection over five years
- direct farmer-scientist – policy collaboration.

Evidence produced

- Tree growth dynamics under drought stress
- Soil-water interactions across landscapes
- Carbon accumulation trends
- Species performance for climate-resilient planning

Living labs: Rural Resource Centres (RRCs) – hubs and business model

RRCs strengthen community agroforestry enterprises by combining:

- indigenous seedling production and improved nursery management
- improved high value seedlings (grafting and vegetative propagation)
- youth and women employment opportunities
- beekeeping and integrated product development
- farmer demonstrations and extension support.

Outputs

- 11,000+ seedlings produced in a year
- 24 rural youth and women trained and got green job opportunities
- Increased income from nursery and honey production
- Strong local ownership and availability of locally demanded quality seedlings
- Improved nutrition, biodiversity and household income

Living labs: Homestead agroforestry pilots

More than 200 households across four regions established diversified home-garden agroforestry systems.

Outputs

- 3,010+ kg of vegetables harvested in a year
- Improved nutrition and household income
- Better microclimate regulation and soil health
- Homestead agroforestry acting as 'real-world living labs'

Participatory scenario planning and innovation platforms

- 64 stakeholders from 20 institutions co-developed 2030 and 2063 land-use futures using a participatory scenario modelling tool (KESHO)
- Innovation platforms in Amhara and Southern Ethiopia improve coordination among agencies

Gender equality, youth empowerment and inclusion

- Female-headed households prioritized.
- Women-only training increased participation and leadership.
- Women and youth engaged in green jobs – seedling production and beekeeping enterprises.
- RRCs empower rural women and youth and function as Knowledge and services hubs for the community .

Knowledge sharing, publishing and communication for scaling

MAF4E is strengthening national awareness and evidence uptake through:

- policy briefs, technical reports and journal publications
- farmer-to-farmer learning
- co-created knowledge products and media outreach with regional and national partners
- engagement in national and international forums to inform policy and practice.

Impact

MAF4E is improving national planning, creating green jobs, enhancing farm resilience, and advancing biodiversity integration in agriculture and forestry.

Key insights

- Blending Indigenous knowledge with scientific evidence increases adoption.
- RRCs are scalable business models for extension, enterprise and seedling supply.
- Homestead agroforestry pilots demonstrate fast, low-cost resilience pathways.
- Regional innovation platforms strengthen cross-sector coordination.
- Gender-responsive and youth-centred approaches improve long-term sustainability.

Living Labs promote inclusion, empower local communities, and elevate traditional knowledge. Strengthening agroforestry capacity within agricultural extension services is critical to scale evidence-based practices nationwide.

Policy and governance gaps

- Absence of a comprehensive national agroforestry strategy and policy framework to guide investment, innovations, species choices, seed systems and extension.
- Fragmented agroforestry governance across ministries and agencies, resulting in weak coordination.

Operational challenges

- Limited agroforestry oriented extension systems within agricultural and natural resources sectors, restricting farmer support and evidence-based scaling.
- Climate risks (hail, drought, flooding) threaten nurseries, early-stage plantations and RRC operations, requiring climate-proof infrastructure.
- Weak markets and value chains for indigenous tree seedlings and agroforestry products, limiting enterprise growth.
- Short-term funding cycles undermine long-term monitoring, species development, and business models, affecting sustainability and scale.

Policy recommendations

National policy and hubs

- Establish National Agroforestry Strategy and Policy framework.
- Scale regional living labs for long-term monitoring.
- Establish a national digital agroforestry evidence platform.

- Leverage real-time Living Lab datasets to develop payment for ecosystem services (PES) that enables transparent carbon accounting and rewards communities and RRC enterprises for measurable ecosystem benefits, aligned with Ethiopia's NDC, NAP, CRGE and Green Legacy reporting.
- Establish agroforestry into urban and peri-urban landscapes through integration into city greening programs, school compounds, road corridors, riparian buffers, and residential areas, enhancing climate resilience, cooling, health, food production, and biodiversity.

Scale RRCs and living labs nationally

- Integrate RRCs into national extension and as a business model for green jobs creation.
- Establish nursery accreditation standards.
- Support youth enterprises in seedling production, nursery management, fruit processing, beekeeping and packaging.

Mainstream agroforestry and biodiversity education and training

- Embed agroforestry into university and TVET curricula.
- Develop practice oriented farmer guides informed by science and traditional knowledge.

Empower women and youth

- Provide targeted training, start-up support and market linkages.
- Promote women- and youth-led nursery and honey enterprises.

Strengthen biodiversity policy

- Integrate biodiversity into agricultural and forestry landscapes through the scaling of agroforestry .
- Strengthen ecosystem services—including soil fertility, pollination, carbon storage, and watershed protection.
- Promote climate-resilient, productive multifunctional landscapes that enhance both biodiversity and rural livelihoods.

The African Agroforestry Union (AFRU)

The African Agroforestry Union (AFRU) is a new continental platform that accelerates agroforestry policy coordination, biodiversity integration, evidence sharing, technical capacity, and investment across Africa.

Through AFRU, Ethiopia can:

- share long-term datasets and Living Lab methodologies
- demonstrate scalable RRC-based enterprise models
- lead regional training and south-south learning exchanges
- shape harmonized African agroforestry and biodiversity policies.

Conclusion

The GCBC–DEFRA–CIFOR–ICRAF project is building strong scientific foundations, institutional platforms, and community innovations. However, long-term investment is essential to sustain these achievements and fully scale agroforestry across Ethiopia. This foundation also positions Ethiopia to meaningfully contribute to AFRU's continental agenda, strengthening climate resilience, restoring biodiversity, and sustainable livelihoods across Africa.

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