

# AGRO-FORESTRY: COMBINING AGRICULTURE & ECOSYSTEM SERVICES

SUSTAINABLE AGRICULTURE PRACTICES WORKING GROUP WEBINAR REPORT



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## Table of Contents

Executive Summary .....	2
1 Introduction .....	3
1.1 The Imperative for Integrated Land-Use Systems .....	3
1.2 Webinar Objectives and Scope.....	3
1.3 About the Speakers and Host Organizations.....	4
2 Conceptual Foundations of Agroforestry (Prof. Meine van Noordwijk) .....	5
2.1 Beyond the Dichotomy: From Forest vs. Agriculture to a Continuum .....	5
2.2 The Evolving Paradigms of Agroforestry: AF1, AF2, AF3 .....	7
2.3 The Diversity of Agroforestry Systems .....	7
3 The Evidence Base: Agroforestry for Ecosystem Services and Livelihoods (Dr. Catherine Muthuri) .....	8
3.1 Addressing Key Challenges in Africa .....	8
3.2 Meta-Analysis of Ecosystem Service Benefits in Sub-Saharan Africa.....	8
3.3 Carbon Sequestration and Economic Value .....	10
4 Case Studies in Practice: From Evidence to Impact .....	11
4.1 <i>Faidherbia albida</i> Parklands in Ethiopia .....	11
4.2 Shaded Coffee Systems in Uganda .....	11
4.3 Fruit Trees (Avocado) for Income and Restoration in Kenya .....	12
4.4 Integrated Tree Growing, Water, and Woodfuel Management.....	13
5 Critical Barriers and Pathways for Scaling Adoption .....	13
5.1 Key Barriers to Widespread Adoption .....	13
5.2 Effective Strategies for Scaling.....	14
6 Policy Implications and The Way Forward .....	16
6.1 The Challenge of "Collateral Damage" from Well-Intentioned Policies .....	16
6.2 The Need for Harmonized and Supportive Policies.....	16
6.3 A Call to Action.....	17
7 Conclusion .....	18

# Executive Summary

Agroforestry, the intentional integration of trees and shrubs into farming systems, emerges from this report not as a marginal practice, but as a critical and multifunctional land-use system essential for addressing intertwined global crises of climate change, biodiversity loss, and food insecurity. It represents a proven return to a more resilient form of agriculture, one that harmonizes production with ecological function.

The evidence presented by leading scientists Prof. Meine van Noordwijk and Dr. Catherine Muthuri underscores the significant and multifaceted benefits of agroforestry. Key findings confirm that these systems deliver a powerful "win-win" for people and the planet:

- **Productivity:** Agroforestry can nearly double crop yields compared to monocultures, demonstrating superior land-use efficiency.
- **Ecosystem Health:** It enhances water regulation, reducing soil loss and runoff by 5-10 times, while significantly improving soil fertility and carbon sequestration.
- **Livelihoods:** By diversifying income sources through fruit, timber, and other tree products, agroforestry builds climate-resilient economies for smallholder farmers.

Despite its potential, scaling agroforestry faces core challenges, including restrictive policies that disincentivize tree planting, limited market access for tree products, and a lack of tailored technical support. To overcome these barriers, the report advocates for key policy actions: reforming laws to recognize farmers' rights to trees, strengthening value chains, and, critically, moving from sectoral policies (Agriculture vs. Forestry) to integrated land-use governance.

In conclusion, agroforestry is a foundational pillar for building sustainable and resilient food systems. Its successful implementation hinges on a final, overarching imperative: placing the farmer at the center of all efforts. By aligning strategies with farmer priorities and knowledge, we can unlock the full potential of agroforestry to cultivate a future where productive agriculture and a healthy ecosystem thrive together.

# 1 INTRODUCTION

## 1.1 The Imperative for Integrated Land-Use Systems

The global community faces a confluence of interconnected crises: climate change, biodiversity loss, widespread land degradation, and persistent food insecurity. These challenges are exacerbated by agricultural systems that, while productive, often compromise the health of the very ecosystems upon which they depend. The prevailing model of segregating land use into distinct domains of agriculture and forestry has led to a "coarsening of the mosaic," with large blocks of monoculture agriculture, pure forest plantations, and urban areas, disrupting ecological functions and the flow of vital ecosystem services (van Noordwijk, 2025).

In this context, there is an urgent need for a paradigm shift towards integrated approaches that reconcile food production with environmental stewardship. As Prof. Meine van Noordwijk articulated in his presentation, "before the advent of what we call today modern agriculture, almost all agriculture was agroforestry." This historical precedent underscores that the combination of trees, crops, and livestock is not a novel concept but rather a return to a more nuanced and resilient form of land management, updated with modern scientific understanding. Agroforestry, the intentional integration of trees and shrubs into farming systems, emerges as a powerful response to these multifaceted challenges. It offers a pathway to "ecological intensification," making use of positive interactions between trees and agriculture to enhance productivity while simultaneously restoring ecosystem functions (van Noordwijk, 2025). In the face of these crises, agroforestry is not merely an option but a critical source of hope, offering "dignified and resilient livelihoods in our rural spaces" that generate better income through higher-value production.

## 1.2 Webinar Objectives and Scope

This report synthesizes the key insights from the World Agriculture Forum (WAF) webinar titled "Agro-Forestry: Combining Agriculture and Ecosystem Services," held on November 18, 2025. The webinar was designed to illuminate the critical role of agroforestry in creating sustainable and productive landscapes. Its primary objectives were:

- **To explore the conceptual evolution** of agroforestry from a simple plot-level technology to a comprehensive framework for landscape management and policy harmonization.
- **To present a robust evidence base** for the role of agroforestry in delivering essential ecosystem services, drawing on meta-analyses and long-term studies, with a particular focus on sub-Saharan Africa.

- **To share practical case studies and scaling strategies** that demonstrates the real-world impact of agroforestry on farmer livelihoods, food security, and landscape restoration.

The scope of the webinar, and consequently this report, spans from theoretical foundations to on-the-ground implementation, providing a holistic view of agroforestry's potential to address some of the most pressing issues of our time.

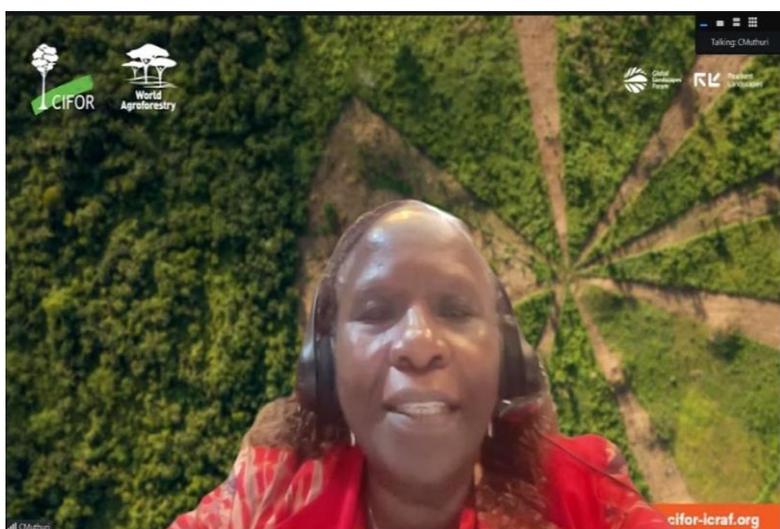
### 1.3 About the Speakers and Host Organizations

The webinar was moderated by **Dr. Ravi Prabhu**, Senior Adviser at CIFOR-ICRAF, who set the stage by highlighting the historical and contemporary significance of agroforestry.

The distinguished panel of speakers included:



**Prof. Meine van Noordwijk**, a foremost expert in agroforestry science affiliated with Wageningen University, Brawijaya University, and CIFOR-ICRAF. His presentation laid the conceptual groundwork, tracing the history and paradigms of agroforestry and its place in the broader discourse on land use.



**Dr. Catherine Muthuri**, Country Director for Kenya and Regional Convener for East Africa at CIFOR-ICRAF. Her presentation provided the empirical evidence and practical perspective, showcasing the measurable benefits of agroforestry through synthesis studies and detailed case studies from across the African continent.

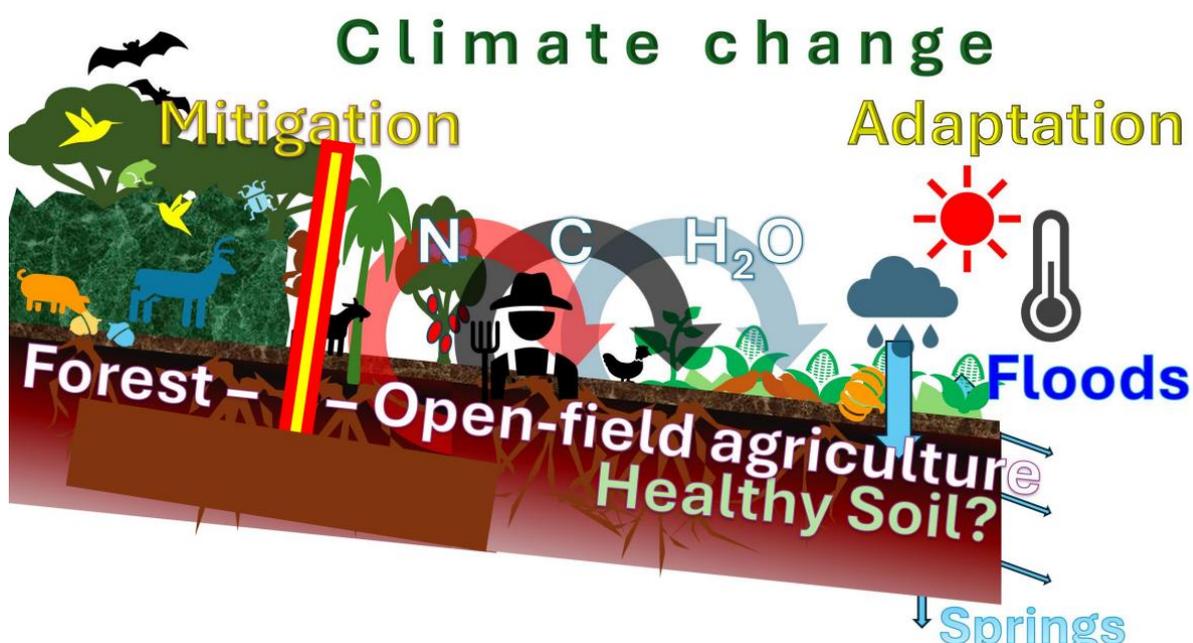
The webinar was hosted by the **World Agriculture Forum (WAF)** and organized by its working group on Sustainable Agricultural Practices. The scientific backbone was provided by **CIFOR-ICRAF (World Agroforestry)**, a global research organization dedicated to harnessing the power of trees to make landscapes more resilient and livelihoods more secure. The collaborative nature of this event underscores the growing consensus on the importance of agroforestry, a field that has been recognized as a key strategy by all three Rio conventions.

This report will elaborate on these themes, beginning with the conceptual foundations of agroforestry, followed by the evidence for its benefits, real-world case studies, an analysis of barriers to scaling, and finally, a set of policy recommendations for a sustainable future.

## 2 Conceptual Foundations of Agroforestry (Prof. Meine van Noordwijk)

To fully appreciate the transformative potential of agroforestry, one must first understand its conceptual evolution. Prof. van Noordwijk's presentation framed agroforestry not merely as a set of techniques, but as a fundamental shift in how we perceive and manage our landscapes, moving from a simplistic dichotomy to a complex, integrated continuum.

### 2.1 Beyond the Dichotomy: From Forest vs. Agriculture to a Continuum



**Source:** Adapted from van Noordwijk (2025)

For decades, land-use policy and scientific research have been dominated by a segregated worldview, which van Noordwijk terms the "AF-0" world, a world without agroforestry. In this model, agriculture and forestry operate as separate realms, each with its own history, ministries,

academic disciplines, and policy frameworks (van Noordwijk, 2025). Agriculture is primarily associated with open fields, annual crops, livestock, and market-driven production, while forestry is focused on timber, conservation, and state-controlled management. This division has created a "coarsened mosaic" on the landscape, with large, homogenous blocks of pure agriculture and pure forest (van Noordwijk, 2025).

This dichotomy is increasingly untenable. As van Noordwijk pointed out, value chains and consumers are now concerned not only with the end product but with the "mode of production," including impacts on water, soil, and deforestation. A crop like rubber blurs the lines, is it agriculture or forestry? The reality is that the ecological functions of a landscape, such as water regulation, carbon cycling, and biodiversity, operate across this artificial boundary. The "AF-0" model fails to account for these critical interactions.

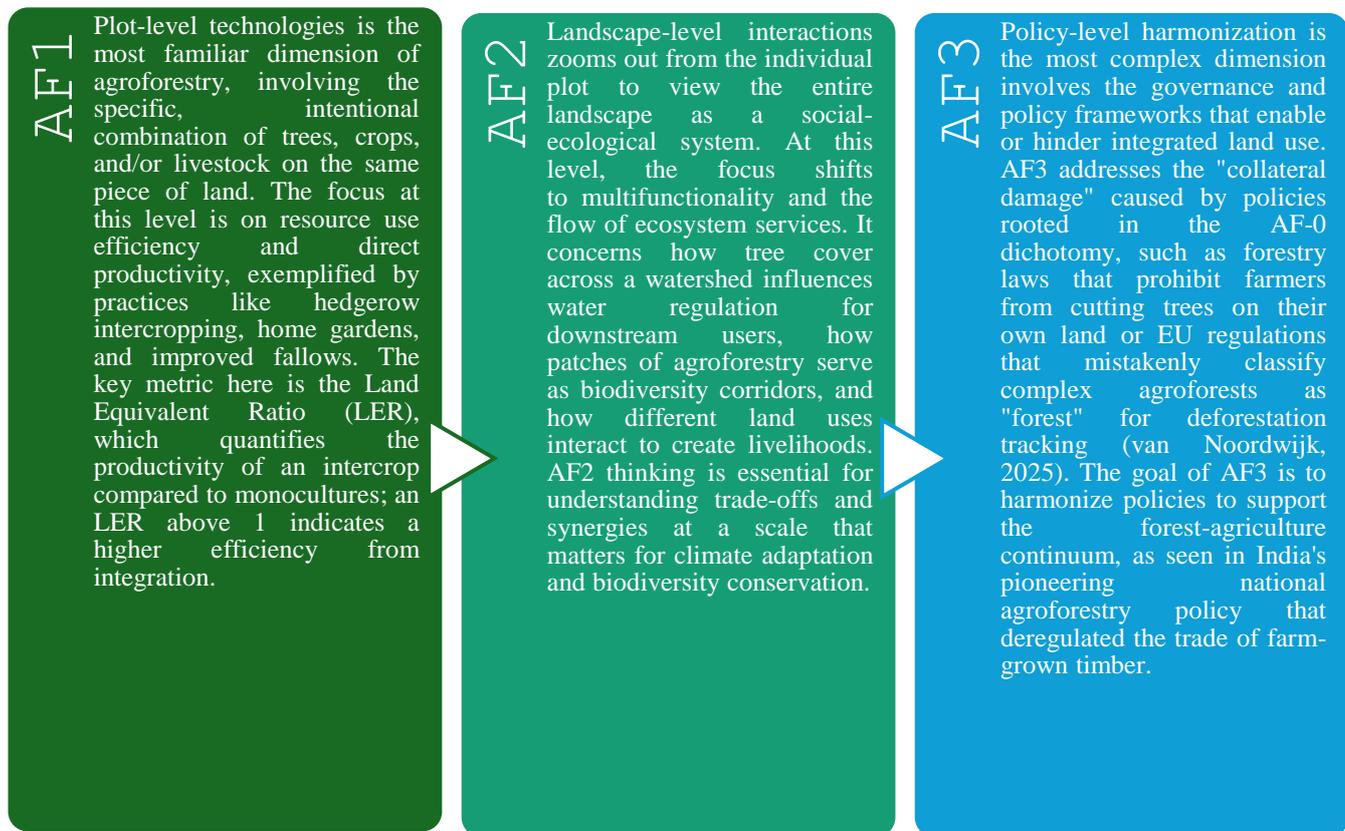
Agroforestry serves as the essential bridge in this divide, creating multifunctional landscapes (van Noordwijk, 2025). Instead of a simple binary, a more accurate representation is a continuum encompassing:

- Urban areas
- Open-field agriculture
- Half-open agroforestry
- Plantation forestry
- Natural forest

In this continuum, ecosystem services form a complex "cascade," where the forest interacts with agroforestry, agroforestry with open fields, and so on, creating a resilient and interconnected social-ecological system.

## 2.2 The Evolving Paradigms of Agroforestry: AF1, AF2, AF3

Prof. van Noordwijk detailed the maturation of agroforestry into its "fifth decade" as a formal science through a three-tiered conceptual framework: AF1, AF2, and AF3 (van Noordwijk et al., 2019).



## 2.3 The Diversity of Agroforestry Systems

Under the umbrella of this conceptual framework exists a stunning diversity of practical applications? Agroforestry is not a one-size-fits-all solution but a suite of context-specific practices. Prof. van Noordwijk

**Provided a non-exhaustive catalogue of systems, including:**

- **Fruitful homegardens:** High-density, multi-layered systems near homesteads for subsistence and sale.
- **Shaded tree-crop systems:** Coffee, cacao, or rubber grown under a canopy of shade trees.
- **Parklands:** Systems like the *Faidherbia albida* parklands of Africa, where trees are scattered in croplands or pastures.
- **Silvopastoral systems:** Integrating trees with livestock grazing for fodder, shade, and soil improvement.
- **Riparian buffers:** Strips of trees along water bodies to filter runoff and provide habitat.
- **Improved fallows:** Using fast-growing leguminous trees to replenish soil fertility during fallow periods.

This diversity leads to a critical concluding message from Prof. van Noordwijk: Agroforestry is an "umbrella term," and its benefits are context-specific (van Noordwijk, 2025). A practice that delivers significant erosion control on a slope may not be relevant for a flat plain; a tree species that improves soil fertility in one region may become an invasive weed in another. Therefore, a "silver bullet" approach is destined to fail. Success depends on understanding the underlying ecological and social principles and applying them through a process of co-creation with farmers, embracing complexity rather than trying to eliminate it.

### 3 The Evidence Base: Agroforestry for Ecosystem Services and Livelihoods (Dr. Catherine Muthuri)

While the conceptual framework establishes the "why" of agroforestry, its widespread adoption depends on robust evidence of its impacts. Dr. Muthuri's presentation provided a compelling synthesis of scientific data and economic analysis that demonstrates the tangible benefits of agroforestry for both ecosystems and human well-being, with a particular focus on sub-Saharan Africa.

#### 3.1 Addressing Key Challenges in Africa

The context for agroforestry in Africa is one of acute challenges. Dr. Muthuri highlighted that smallholder farmers, who are the mainstay of agricultural production, operate in highly heterogeneous and often marginal environments (Muthuri, 2025). They face a nexus of pressures, including:

- **Deforestation and Land Degradation:** Leading to loss of fertile soil and ecosystem resilience.
- **Climate Change:** Manifesting as frequent droughts and floods, disrupting rain-fed agriculture.
- **Food Insecurity and Poverty:** Driven by low crop yields, crop failure, and limited access to markets and finance.
- **Unsustainable Value Chains:** Where farmers often receive minimal benefit from their produce.

Dr. Muthuri emphasized that agroforestry is not a marginal activity but a central feature of these landscapes. "When you look at the general landscape within Africa," she noted, "tree[s are] part of the system," presenting a significant opportunity to enhance productivity and resilience through deliberate integration.

#### 3.2 Meta-Analysis of Ecosystem Service Benefits in Sub-Saharan Africa

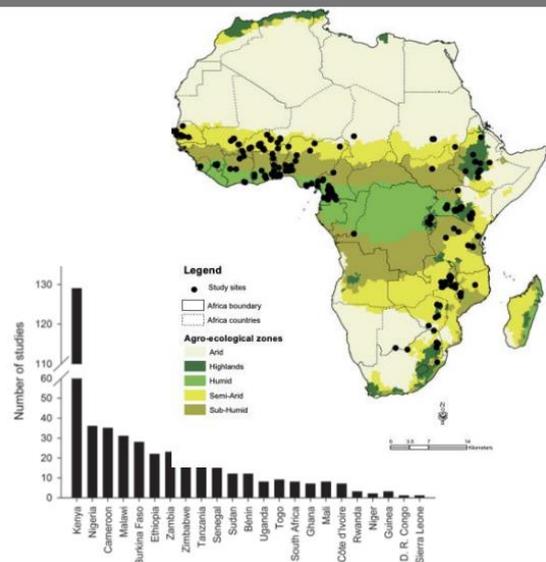
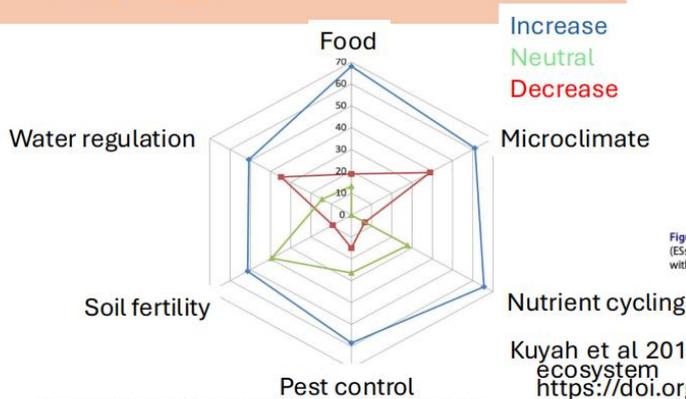
Drawing on a comprehensive meta-analysis of published studies across Sub-Saharan Africa (Kuyah et al., 2016), Dr. Muthuri presented quantitative evidence of agroforestry's impact. The synthesis found that **58%** of reported ecosystem services showed beneficial impacts from trees, while 28% showed no effect and 15% reported a decline (Muthuri, 2025).

The data reveals significant, positive outcomes across key service categories:

- **Productivity:** Agroforestry systems led to a near-doubling of crop yields, with a Response Ratio (RR) of 1.9. This aligns with the Land Equivalent Ratio (LER) concept introduced by Prof. van Noordwijk, confirming that integration is more land-efficient than monocultures.
- **Soil Health:** Agroforestry systems significantly enhanced soil fertility, showing marked increases in soil organic carbon, nitrogen, and available phosphorus compared to control systems without trees.
- **Water Regulation:** The benefits for watershed management were striking. Agroforestry practices reduced runoff and soil loss by 5 to 10 times (RR = 5.0 and 9.7, respectively) and increased water infiltration by nearly threefold (RR = 2.7). This directly translates to reduced erosion, better groundwater recharge, and increased resilience to both droughts and floods.
- **Biodiversity and Pest Control:** The impacts here were more variable, underscoring Dr. Muthuri's point that **management is critical**. While many systems showed benefits, some practices or tree species led to negative effects on pest regulation, highlighting the need for careful species selection and system design.

## Agroforestry impact on Ecosystem services – Africa synthesis

- Beneficial impacts (58%), in particular
- A decline in some ESs was reported in 15% of the studies
- No effect 28%



Kuyah et al 2016. Trees in agricultural landscapes enhance provision of ecosystem services in Sub-Saharan Africa. <https://doi.org/10.1080/21513732.2016.1214178>

Source: Adapted from Kuyah et al. (2016) as presented by Muthuri (2025).

### 3.3 Carbon Sequestration and Economic Value

Beyond immediate production and regulatory benefits, Dr. Muthuri presented data on two powerful motivators for scaling agroforestry: carbon and income.

A 2025 synthesis for East Africa (Muthuri et al., 2025) confirmed that agroforestry systems are significant carbon sinks. Practices like home gardens, woodlots, and scattered trees on farms accumulate substantial carbon in both **biomass and soil**. This positions agroforestry as a key strategy for climate change mitigation that also delivers adaptation and livelihood co-benefits.

Crucially, Dr. Muthuri addressed the core question for farmers: "Is it profitable?" An economic valuation of ecosystem services, adapted from Prof. Cheikh Mbow, demonstrates that agroforestry is economically competitive (Muthuri, 2025). While natural forests excel in regulating services (e.g., climate regulation worth USD 1,838/ha), agroforestry systems, particularly in cropping systems, generate very high **provisioning services** (e.g., food, raw materials, worth USD 738/ha), making them financially attractive to farmers.

**Economic values of agroforestry systems, USD / ha**

Ecosystem services	Forests	Grassland	Wetlands	Cropland	Agroforestry in pastoral systems	Agroforestry in cropping systems	Agroforestry in mixed systems
<b>Provisioning services</b>	<b>284</b>	<b>49</b>	<b>423</b>	<b>589*</b>	<b>192</b>	<b>738*</b>	<b>412*</b>
Food	132	36	25		33		
Water	33		257				
Raw materials	76	12	16		42		
Genetic resources	38		68		25		
Medicinal resources	5	1	46		2		
Ornamental resources			11		90		
<b>Regulating services</b>	<b>1,838</b>	<b>316</b>	<b>2,664</b>	<b>38</b>	<b>216</b>	<b>216</b>	<b>216</b>
Air quality regulation	14	23	67				
Climate regulation	1,343	75	109		49	49	49
Disturbance moderation							
Regulation of water flows	55			19	33	33	33
Waste treatment	153		2,206	4			
Erosion prevention	221	140	179	2	104	104	104
Nutrient cycling	19	78	103		10	10	10
Pollination	19			9	19	19	19
Biological control	14			2	1	1	1
<b>Habitat services</b>	<b>24</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>215</b>	<b>215</b>	<b>215</b>
Nursery service	8		29				
Genetic diversity	16		16		215	215	215
<b>Cultural services</b>	<b>6</b>	<b>5</b>	<b>55</b>	<b>1</b>	<b>6</b>	<b>6</b>	<b>6</b>
Esthetic information							
Recreation	6	5	12	1	6	6	6
Inspiration							
Spiritual experience			41				
Cognitive development			2				
<b>Total</b>	<b>2,152</b>	<b>370</b>	<b>3,187</b>	<b>628</b>	<b>629</b>	<b>1069</b>	<b>849</b>

Sources: ESVD, Mirzabaev et al. (2022) Adopted from Prof Cheikh Mbow (CSE-ZEF study, 2025)

**Source:** Adapted from Muthuri (2025), based on ESVD and Mirzabaev et al. (2022).

This evidence base confirms that agroforestry is not an ecological compromise but a "win-win" strategy. It delivers a suite of proven benefits that address Africa's core challenges of food security, environmental degradation, and rural poverty, making a compelling case for its integration into national and regional agricultural and climate strategies.

## 4 Case Studies in Practice: From Evidence to Impact

The robust evidence for agroforestry's benefits is brought to life through its practical application on the ground. Dr. Muthuri presented a series of detailed case studies from across Africa that illustrate how different agroforestry systems are being implemented to solve specific challenges, demonstrating tangible impacts on productivity, ecosystems, and farmer livelihoods.

### 4.1 *Faidherbia albida* Parklands in Ethiopia

In the semi-arid landscapes of Ethiopia, the native *Faidherbia albida* tree is a cornerstone of traditional agroforestry systems. This species possesses a unique **reverse phenology**, shedding its leaves during the rainy season and remaining in leaf during the dry season (Muthuri, 2025). This ingenious adaptation minimizes competition with crops for light and water when they need it most.

**A long-term study (Sida et al., 2018) demonstrated significant benefits:**

- **Microclimate Regulation:** The tree canopy provided a cooling effect of up to **6°C** compared to open fields, reducing heat stress on crops.
- **Enhanced Yields:** Wheat yields under the *Faidherbia* canopy were substantially higher due to improved microclimate and soil fertility from nutrient-rich leaf litter.

However, the research also revealed a critical management trade-off. While farmers often prune (*pollard*) the trees for fencing material, the study found that this practice **significantly decreases tree water uptake and reduces wheat yields by 27-30%** (Toib et al., 2022). This finding led to targeted interventions, including training on optimal pruning levels and promoting alternative fencing materials, showcasing how scientific evidence can refine traditional practices for greater benefit.

### 4.2 Shaded Coffee Systems in Uganda

Coffee is a vital export crop for Uganda, with 90% produced by smallholder farmers, typically grown under a canopy of shade trees. Research here focused on the critical issue of water competition in a changing climate. Dr. Muthuri's team found that strategic *\*pruning of the canopy trees* reduced their water demand and, through a process of hydraulic redistribution, actually recharged soil moisture in the crop rooting zone (Buyinza et al., 2025).

## The impacts were direct:

- **Higher Coffee Yields:** Coffee grown under pruned *Albizia* trees produced higher yields.
- **Extended Intercropping Period:** Pruning prolonged the availability of soil moisture, allowing farmers to grow food crops like beans for an additional season.

Beyond biophysical improvements, the project linked farmers to **specialty coffee markets**. Through partnerships with private sector roasters, farmers received training on quality control, processing, and marketing. This connection to higher-value markets, such as the "Monastery Coffee" brand in Australia, enabled farmers to more than double their income, moving from subsistence to commercially viable and climate-resilient agroforestry enterprises.

### 4.3 Fruit Trees (Avocado) for Income and Restoration in Kenya

Aligning with Kenya's ambitious goal to restore 10.6 million hectares of land, the government has dedicated a significant portion (26.6%, or 4 billion trees) to agroforestry. A flagship of this effort is the promotion of high-value fruit trees, particularly avocado. Kenya is Africa's leading avocado producer, earning Ksh **29.5 billion (USD ~226 million)** from the crop in 2024 (Muthuri, 2025).

An initiative in Kiambu County addressed key bottlenecks:

- **Capacity Building:** Nearly 2,500 farmers and extension agents were trained on good agronomic practices, varietal selection, and pest management.
- **Cooperative Formation:** Farmers formed the **Avocado and Macadamia Cooperative (AVOMAC)**, which now boasts over 1,500 members. By negotiating collectively, they increased their farm-gate price from **5 to 20-30 Kenyan shillings per fruit**.
- **Carbon Finance:** The project developed allometric equations for mango and avocado (Kuyah et al., 2024) and trained farmers to estimate carbon stocks on their farms, empowering them to potentially access future carbon markets.

This case demonstrates a powerful model where national restoration targets are achieved by focusing on species that provide direct, substantial economic benefits to farmers, ensuring long-term sustainability.

#### 4.4 Integrated Tree Growing, Water, and Woodfuel Management

Perhaps the most holistic examples come from dryland counties in Kenya, where projects addressed the most pressing farmer priorities: water, energy, and food. Under a Nature-Based Solutions for Land Restoration project, an integrated approach was taken:

- **Water Security:** The construction of farm ponds was a transformative intervention. As beneficiary Mary Harrison testified, *“Give farmers water and see them flourish.”* These ponds enabled dry-season irrigation, transforming subsistence plots into productive farms and breaking reliance on food aid.
- **Sustainable Woodfuel:** With 99% of households depending on firewood, the project promoted efficient cookstoves and sustainable woodlot management. Beth Mwanthi reported that the new chimney stove saved firewood, eliminated indoor smoke, and even allowed her to produce briquettes from waste charcoal.
- **Scaling through Schools:** In Laikipia County, a school was equipped with a farm pond and tree nursery. This not only improved the school feeding program by diversifying diets but also equipped students with practical agroforestry skills to take back to their homes.

These testimonials underscore a central theme from Dr. Muthuri: **“Aligning researchers priority to farmers needs [is] critical for sustainable agroforestry”** (Muthuri, 2025). By first addressing the immediate constraints of water and energy, these projects built the foundation for successful and farmer-driven tree growing and landscape restoration.

## 5 Critical Barriers and Pathways for Scaling Adoption

Despite the compelling evidence and successful case studies, agroforestry has not yet been adopted at the scale required to match its potential. The transition from isolated successes to widespread transformation requires a clear-eyed understanding of the barriers that hinder adoption and a strategic commitment to the pathways that can overcome them. The insights from both presenters converge on a central theme: scaling agroforestry is less about technical blueprints and more about creating the right enabling environment.

### 5.1 Key Barriers to Widespread Adoption

The journey towards scaling is fraught with systemic, market-based, and local challenges that must be systematically addressed.

- **Policy and Tenure:** A primary barrier identified by Prof. van Noordwijk is the legacy of the "AF-0" world. In many countries, **forestry policies create negative incentives** by treating all trees as state property, prohibiting farmers from harvesting or selling timber from their own land (van Noordwijk, 2025). This legally disincentivizes farmers from investing in long-term tree growing. Furthermore, well-intentioned policies like the European Union Deforestation Regulation (EUDR) risk causing "**collateral damage**" by potentially classifying complex agroforests as "forest," thereby unfairly penalizing their products in international markets.
- **Market Access and Value Chains:** As highlighted by Dr. Muthuri and the question of rotting mangoes in Senegal, the **lack of processing facilities and stable markets** for perishable tree products is a major disincentive. Farmers face volatile prices and exploitation by middlemen, which undermines the economic rationale for cultivating trees beyond subsistence needs. Without reliable and profitable market linkages, the adoption of fruit and timber trees remains limited.
- **Technical Capacity and Extension:** Agroforestry is knowledge-intensive. There is a critical shortage of **specialized extension services** to advise farmers on species selection, spacing, management (like the precise pruning of *Faidherbia* or coffee shade trees), and pest control. This is compounded by limited access to high-quality, genetically appropriate planting material, which is often not prioritized by agricultural or forestry ministries.
- **Local Context and Social Dynamics:** Scaling is not a simple technical transfer. Dr. Muthuri emphasized that challenges like **free-grazing livestock** can decimate young seedlings, requiring community-level agreements on grazing management. Furthermore, as Prof. van Noordwijk noted, farming decisions are collective; "**you never farm alone**". Social dynamics, gender roles, intergenerational knowledge, and community norms heavily influence adoption, meaning that interventions that ignore local social structures are likely to fail.

## 5.2 Effective Strategies for Scaling

Overcoming these barriers requires a multi-pronged, context-sensitive approach that aligns external support with farmer realities and incentives.

- **Remove Negative Incentives and Reform Policies:** The most powerful first step is often policy reform. Following India's example, governments can **deregulate the trade of farm-grown timber**, recognizing farmers' rights to trees as a profitable crop. Engaging with international bodies to refine regulations like the EUDR to differentiate between agroforestry and deforestation is equally critical. As Prof. van Noordwijk argued, "rather than starting with positive incentives, we first need to look for what are the negative incentives" and abolish them.

- **Align with Farmer Priorities:** Scaling cannot be driven by environmental goals alone. Dr. Muthuri's case studies consistently show that success comes from focusing on **income-generating species** (avocado, macadamia, specialty coffee) and addressing **immediate needs** (water through farm ponds, energy through sustainable woodlots). When farmers see clear economic and livelihood benefits, they become the primary agents of scaling.
- **Strengthen Value Chains:** Building on alignment with farmer priorities, proactive effort is needed to develop robust value chains. This includes promoting **farmer cooperatives** (like AVOMAC in Kenya) for better bargaining power, facilitating access to **processing and storage infrastructure** to reduce post-harvest losses, and creating **market linkages** to premium markets, as demonstrated with Ugandan coffee.
- **Use Context-Specific and Participatory Approaches:** A universal, top-down model is destined to fail. Dr. Muthuri stressed that "**context is everything**," and scaling strategies must be tailored to local ecological zones, market opportunities, and social structures. This requires **participatory engagement**, involving farmers from the very beginning in the design, planning, and implementation of agroforestry interventions. This ensures that technologies are relevant, ownership is local, and solutions are sustainable.

Scaling agroforestry is a complex endeavor that hinges on getting the institutions, markets, and social contracts right. It requires a shift from seeing agroforestry as a project-based intervention to viewing it as an integral part of sustainable rural development, supported by coherent policies and responsive to the people who manage the land.

## 6 Policy Implications and The Way Forward

The journey through the conceptual foundations, empirical evidence, and practical case studies of agroforestry culminates in a clear set of policy imperatives and a collective call to action. Realizing the full potential of agroforestry requires navigating the complexities of modern policy landscapes and fundamentally rethinking governance to support integrated land-use systems.

### 6.1 The Challenge of "Collateral Damage" from Well-Intentioned Policies

A significant contemporary barrier to scaling agroforestry arises from well-intentioned but poorly designed policies. Prof. van Noordwijk provided a stark critique of the **European Union Deforestation-Free Regulation (EUDR)**, highlighting its potential for unintended negative consequences, or "collateral damage," for agroforestry systems (van Noordwijk, 2025).

The core of the problem lies in definition and mapping. The EUDR, in its effort to protect forests, relies on a rigid forest-agriculture dichotomy. An agroforestry system that has a high tree cover—such as a shaded coffee plantation or a complex home garden—may be **remotely sensed and mapped as "forest."** However, by the legal definitions of the FAO or the EU itself, these systems are not forests because they have an agricultural component. This creates a perverse outcome: a multifunctional system that actively combines tree conservation with food production could be flagged as a "deforestation risk," leading traders to avoid its products for fear of non-compliance.

This creates a **strong negative market signal** against the very practices that the sustainability movement aims to promote. Overcoming this requires moving "beyond imperfect maps" to develop evidence-based mechanisms that recognize and reward the conservation and ecosystem service values of agroforestry, rather than penalizing them.

### 6.2 The Need for Harmonized and Supportive Policies

To avoid such pitfalls and actively promote agroforestry, a shift from disjointed, sectoral policies to harmonized and supportive governance is essential.

- **Learning from Pioneers:** India provides a powerful example. As the first country to adopt a **national agroforestry policy**, it broke down the walls between ministries by deregulating the trade of farm-grown timber (van Noordwijk, 2025). This single policy change recognized trees on farms as an agricultural crop, unleashing farmer investment. The result is that farm-grown poplar now supplies 70% of India's wood needs, a testament to the power of enabling policies.

- **Moving to Integrated Governance (AF3):** The Indian example embodies the **AF3 paradigm**—policy-level harmonization across the forest-agriculture continuum. The goal for other nations should be to create overarching land-use policies that embrace this continuum. This means:

- Ensuring agricultural subsidies do not incentivize tree removal.
- Adapting forestry laws to recognize and secure farmers' rights to trees on their land.
- Creating cross-ministerial task forces to develop coherent strategies for landscape restoration, climate adaptation, and food security where agroforestry is a central pillar.

### 6.3 A Call to Action

The successful scaling of agroforestry is a shared responsibility that requires concerted effort from all stakeholders.

- **For Researchers:** The mandate is to deepen engagement with complexity and real-world contexts. Research must move beyond the search for "silver bullet" species and instead focus on understanding the principles that make agroforestry successful in diverse settings. As Dr. Muthuri concluded, researchers must **align their priorities with farmers' needs** to ensure that scientific inquiry translates into tangible benefits and sustainable practices on the ground.
- **For Policymakers:** The charge is to be bold architects of enabling environments. This involves reforming perverse policies, investing in agroforestry-focused extension services, and creating financial incentives for ecosystem service provision. Policymakers must champion the **harmonization of land-use governance**, creating the legal and institutional space for multifunctional landscapes to thrive.
- **For Practitioners and Farmers:** Dr. Muthuri issued a powerful challenge: to be **ambassadors for agroforestry**. "If you preach agroforestry and you don't practice agroforestry... how will you understand what the farmers... go through?". The most convincing advocates are those who experience the benefits firsthand. Farmers and field practitioners are the custodians of this knowledge and must be supported as leaders in the movement.

In conclusion, agroforestry presents a proven, viable, and necessary path forward. It is a solution that grows from the ground up, rooted in ecological wisdom and driven by the imperative for sustainable livelihoods. By embracing its complexity, reforming the policies that hinder it, and placing farmers at the center of the effort, we can harness the power of trees on farms to cultivate a more resilient, productive, and equitable future for all.

## 7 Conclusion

This report has synthesized a compelling body of evidence, demonstrating that agroforestry is far more than a set of agricultural techniques; it is a proven and viable paradigm for the future of land management. By intentionally integrating trees into agricultural landscapes, we can move beyond the false choice between production and conservation. The evidence is clear: agroforestry offers a synergistic path that enhances **agricultural production** while simultaneously restoring and strengthening vital **ecosystem services**. From nearly doubling crop yields through ecological principles like the Land Equivalent Ratio to drastically reducing soil erosion and improving water infiltration, the benefits are measurable and significant.

The case for agroforestry is particularly powerful in the context of our current global challenges. It stands as a cornerstone strategy for **building climate-resilient livelihoods**, buffering crops against extreme temperatures, providing alternative food and income sources during droughts, and sequestering carbon in both biomass and soil. Furthermore, its application across diverse contexts—from the parklands of Ethiopia to the coffee systems of Uganda and the avocado orchards of Kenya—showcases its unparalleled versatility in **restoring degraded landscapes** and reversing biodiversity loss. In doing so, agroforestry directly contributes to achieving a multitude of Sustainable Development Goals, from Zero Hunger and Climate Action to Life on Land.

Ultimately, the success of this paradigm shift hinges on a single, foundational principle: **placing the farmer at the center of all agroforestry efforts**. As Dr. Muthuri powerfully stated, the farmer is the "most important person at the center of that." This means aligning research with their priorities, designing policies that secure their rights to trees, developing markets that provide them fair value, and respecting their knowledge and context. When farmers are recognized as partners and primary beneficiaries—when their needs for water, energy, income, and dignity are met—agroforestry ceases to be an external intervention and becomes a sustained, farmer-driven transformation. By embracing this people-centered approach, we can unlock the full potential of agroforestry to cultivate a future where productive agriculture and a healthy planet are one and the same.

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