



# SCALING UP AGROFORESTRY IN SOMALIA: A PATHWAY TO LOW EMISSIONS AND CLIMATE RESILIENCE

## TECHNOLOGY DESCRIPTION

### TECHNICAL DESCRIPTION

Agroforestry is a sustainable land management practice that integrates trees and shrubs into agricultural landscapes, combining the cultivation of crops and livestock with forestry. By incorporating trees into farming systems, agroforestry creates a more diverse and resilient agricultural environment, which improves soil health, enhances biodiversity, and offers better water retention and nutrient cycling. This practice helps reduce land degradation and desertification, key issues in Somalia's arid climate. Agroforestry contributes significantly to carbon sequestration by capturing atmospheric CO<sub>2</sub> through tree growth, making it an essential climate mitigation tool. Additionally, this approach provides multiple income streams for farmers, including timber, fruits, nuts, and other tree-based products, diversifying their livelihoods. This not only improves food security, but also increases resilience to climate shocks like droughts and floods. In Somalia, agroforestry is vital for combating desertification and enhancing both climate adaptation and mitigation efforts.

### CURRENT TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

Agroforestry in Somalia is currently at a Technology Readiness Level (TRL) of 5, indicating that the technology has been validated in experimental settings and small-scale trials, particularly in regions affected by land degradation and water scarcity. While these pilot initiatives have demonstrated the potential of agroforestry to restore soil fertility, enhance biodiversity, and improve climate resilience, large-scale deployment has not yet been achieved. The key barriers include a lack of financial support, limited technical capacity, and insufficient policy coordination. Although the benefits of agroforestry are recognized, the lack of a comprehensive financial framework and market incentives hampers broader adoption.

### CLIMATE RATIONALE OF THE TECHNOLOGY

Agroforestry serves a dual objective of addressing climate change by supporting both mitigation and adaptation. By integrating trees into agricultural systems, it significantly enhances carbon sequestration, reducing atmospheric CO<sub>2</sub> levels and thus contributing to climate mitigation. At the same time, the practice improves soil fertility and water retention, which are crucial for sustainable agriculture, particularly in Somalia's arid and semi-arid regions. This helps to combat desertification and soil erosion, increasing land productivity. Agroforestry also boosts the resilience of farming communities to climate shocks, such as prolonged droughts, by providing diversified income streams through products like timber, fruits, and nuts. This reduces reliance on monocropping and creates a buffer against crop failure. The technology aligns with Somalia's Nationally Determined Contributions (NDC) by promoting sustainable land management practices, reducing emissions from agriculture, and enhancing carbon sinks in the agricultural sector.



## AMBITION OF THE TECHNOLOGY

### SCALE FOR IMPLEMENTATION AND TIME-LINE

By 2030, the TAP aims to establish 400,000 hectares of agroforestry systems across Somalia's arid and semi-arid regions. This will represent approximately 5% of Somalia's total arable land, sequestering an estimated 3.8 MtCO<sub>2</sub>eq annually by 2030.<sup>1</sup> Agroforestry will be promoted as a key climate adaptation measure, improving food security, soil health, and water management in regions most vulnerable to climate change.<sup>2</sup>

### AMBITION FOR TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

By 2030, agroforestry practices in Somalia are expected to reach Technology Readiness Level (TRL) 7, signifying their demonstration in operational environments. At this stage, agroforestry systems will be widely adopted by farming communities across the country, particularly in regions affected by desertification and land degradation. This level of readiness will be supported by government policies that promote sustainable agriculture, along with financial incentives such as subsidies and grants to encourage farmers to adopt agroforestry practices. Additionally, there will be robust technical assistance provided through agricultural extension services and community-based training programs, ensuring that farmers have the necessary knowledge and skills to integrate trees into their farming systems. Reaching TRL 7 will signify that agroforestry is no longer experimental but a well-established practice, contributing to increased food security, enhanced resilience to climate change, and greater carbon sequestration as part of Somalia's Nationally Determined Contributions (NDC).

## EXPECTED IMPACTS OF THE TECHNOLOGY

- **Environmental Impact:** Agroforestry will enhance carbon sequestration, expected to sequester 3.8 MtCO<sub>2</sub>eq annually by 2030, contributing significantly to Somalia's climate mitigation goals.<sup>3</sup> Integrating trees into 400,000 hectares of agricultural land will improve biodiversity by providing habitats for wildlife, while also reducing soil erosion by up to 60%. Tree-based systems enhance water retention, increasing soil moisture by 20-30%, which makes farms more resilient to droughts. This reduces the need for chemical fertilizers by up to 50%, as tree roots fix nitrogen in the soil, improving fertility and reducing environmental pollution.<sup>4</sup>
- **Economic Impact:** Agroforestry provides farmers with additional income of 30-40% expected from timber, fruits, nuts, and other tree-based products. It also reduces the need for costly inputs like fertilizers and pesticides, making farming more cost-effective and sustainable, as the need for fertilizers and pesticides drops by 30-50%, making farming more sustainable and reducing input costs. By 2030, it is estimated that 100,000 farmers will adopt agroforestry practices, creating new income streams and boosting local economies.
- **Social Impact:** Agroforestry will improve food security by increasing agricultural productivity and diversifying food sources by up to 50%, particularly in regions vulnerable to climate change.<sup>5</sup> It will

<sup>1</sup> Federal Government of Somalia(2021) Somalia Nationally Determined Contributions (NDC), 2021

<sup>2</sup> <https://www.fao.org/agroforestry/en/>

<sup>3</sup> Federal Government of Somalia (2021) Somalia Nationally Determined Contributions (NDC), 2021

<sup>4</sup> <https://www.cifor-icraf.org>

<sup>5</sup> [https://www.siwi.org/wp-content/uploads/2020/02/Agroforestry-for-adapation-and-mitigation-to-climate-change\\_web.pdf](https://www.siwi.org/wp-content/uploads/2020/02/Agroforestry-for-adapation-and-mitigation-to-climate-change_web.pdf)



also promote gender equity by creating opportunities for women to participate in tree planting, crop production, and agroforestry-based market activities. Women, who traditionally play key roles in agricultural labor, will benefit from both the additional food sources and income-generating opportunities that agroforestry systems provide.

## POLICY ACTIONS FOR TECHNOLOGY IMPLEMENTATION

### EXISTING POLICIES IN RELATION TO THE TECHNOLOGY

- **National Development Plan (NDP) 2020-2024:** The NDP promotes agroforestry as a strategy for sustainable land management, improving food security, and enhancing climate resilience in Somalia's agricultural sector.
- **Somalia National Environment Policy (2020):** This policy advocates for the integration of agroforestry into national agricultural policies to promote sustainable land use, enhance biodiversity, and mitigate climate change.
- **Updated Nationally Determined Contributions (NDC) (2021):** Agroforestry is identified as a key technology for reducing emissions and enhancing carbon sinks in the agriculture and forestry sectors.
- **Somalia's Adaptation Communication (2022):** Somalia's Adaptation Communication to the UNFCCC emphasizes the critical role of sustainable land management practices, including agroforestry, in enhancing climate resilience. The Adaptation Communication underscores the importance of integrating agroforestry into national adaptation strategies to improve food security, water conservation, and biodiversity while supporting rural livelihoods.

### PROPOSED POLICIES TO ENHANCE TECHNOLOGY IMPLEMENTATION

#### 1. Financial Incentives and Support:

- Introduce subsidies and grants for farmers adopting agroforestry practices, helping cover the cost of seedlings, fencing, and training. Financial support will be critical for scaling agroforestry in rural areas.
- Develop microfinance programs and low-interest loans tailored to agroforestry investments, enabling farmers to purchase the necessary inputs for establishing agroforestry systems.

#### 2. Strengthen Policy and Institutional Frameworks:

- Create a national agroforestry policy that integrates agroforestry into Somalia's agricultural and climate policies. This policy should include clear targets for agroforestry adoption and provide incentives for farmers to transition to agroforestry systems.
- Strengthen agricultural extension services to support farmers in implementing agroforestry techniques. Extension agents should provide technical advice, training, and support to ensure the successful integration of trees into farming systems.

#### 3. Capacity Building and training:

- Train farmers, particularly women and youth, in agroforestry techniques such as tree planting, crop diversification, and sustainable harvesting practices. Community-based training programs will be essential for building local capacity and ensuring long-term success.



- Establish demonstration farms and research centers to showcase best practices in agroforestry and promote innovation in sustainable land management. These centers can serve as hubs for learning, experimentation, and knowledge sharing among farmers.

#### 4. Public Awareness and Education:

- Launch a national awareness campaign to promote the benefits of agroforestry, focusing on its role in improving food security, enhancing soil health, and sequestering carbon. The campaign should involve local leaders, farmers' associations, and agricultural cooperatives to drive demand for agroforestry systems.

#### COSTS RELATED TO THE IMPLEMENTATION OF POLICIES

- Subsidies and microfinance schemes for farmers (USD 10 million)
- Capacity building and training (USD 15 million)
- Public awareness campaigns (USD 3 million)
- Policy development and extension services (USD 2 million)

## USEFUL INFORMATION

#### CONTACT DETAILS

- **TNA Coordinator:**

Hafsa Omar Abdilahi, Ministry of Environment and Climate Change - Tel: +252634536811.  
Email: [climate@moecc.gov.so](mailto:climate@moecc.gov.so)

- **Champion:**

Mohamed Ali Awale, Head of Forestry Section; Tel: +25206151023 Email: [mooh.awale@gmail.com](mailto:mooh.awale@gmail.com)

#### LINKS TO TNA REPORTS

<https://tech-action.unepccc.org/country/somalia/>