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# Agroforestry Network

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## Feeding the Future: Agroforestry for Nutrition and Food Security

By diversifying food production and integrating trees, crops, and livestock, agroforestry can enhance on-farm diversity and strengthen resilience to climate and economic shocks. It can boost food security and nutrition through greater access to nutrient-dense foods, while also empowering women and fostering inclusive local governance.

To realize this potential at scale, governments, producers, researchers, and financiers must work together: embed agroforestry in policy and budgets, co-design locally adapted systems, strengthen knowledge exchange, build the capacity of agroecological extension services, and ensure sustained, aligned financing, as outlined in this Policy Brief.



Food insecurity and malnutrition persist across regions and are intensified by growing geopolitical conflicts, climate change, biodiversity loss, and social inequalities. These interconnected challenges threaten to undermine progress on hunger, health, gender equity, climate resilience, and biodiversity, and are further reinforced by factors such as rising food demand and demographic pressures; Seasonal production gaps; Low dietary diversity; Maternal and child malnutrition; Triple burden of malnutrition: undernutrition, overweight, and micronutrient deficiency; Climate stress and variability; Natural resource degradation; Land concentration and tenure insecurity; Loss of local knowledge and genetic diversity; Limited institutional support for women and youth in food systems; Insufficient technical capacity for agroforestry systems.

## Recommendations

These challenges are best addressed through integrated responses:

### 1 Support integrated governance and coordination

Support multisectoral coordination across agriculture, forestry, environment, and health sectors, with active participation of local communities. Institutionalize dietary guidelines that prioritize nutritionally diverse foods from resilient local food systems over ultra-processed products.

### 2 Promote participatory knowledge management

Revitalize local and Indigenous practices related to food production, preparation, and consumption as a shared public good, ensuring ethical governance and meaningful access for local communities.

### 3 Strengthen agroforestry systems and agroecological transition focused on nutrition

Design participatory agroforestry systems, aligned with territorial strategies, that diversify diets and bridge seasonal food gaps using indigenous and diverse species. Support these systems with agroecological management, nutrition planning, technical assistance, farmer-to-farmer exchange, local bioinputs, post-harvest solutions, and secure smallholders' control over productive resources.

### 4 Integrate gender and equity in governance

Advance women's leadership in initiative design and food system governance, ensuring ethical and transparent governance, expanded access to resources and training, sustained support for rural women's groups and networks, and clear, measurable gender targets across all initiatives.

### 5 Secure sustained financing for food security and nutrition

Ensure progressive and binding increases in public budgets for food security and nutrition, with transparent allocation aligned to national development strategies, prioritizing productive support systems, community seed banks, and their governance structures. Promote institutional procurement of nutritious food to strengthen school feeding programs and support local agriculture.

## Six Dimensions Of Food Security Through Agroforestry

Agroforestry can offer concrete responses to each dimension of food security, making it a cross-cutting solution.

■ **Availability:** Food supply is secured across landscapes and seasons. Agroforestry can expand food availability through multi-strata design, native species integration, and planned pruning, enabling diversified production even in marginal or degraded areas.

■ **Access:** Food is physically and economically accessible. By decentralizing production and diversifying harvests over time, agroforestry can overcome logistical barriers and enhance households' physical and economic access to food, especially during scarcity.

■ **Utilization:** Food safety, preparation, storage, and safe cooking enable diverse, nutritious, safe, and culturally aligned diets. Agroforestry can support these conditions by providing nutrient-rich foods for dietary diversity and on-farm fuelwood for safe cooking

■ **Stability:** Food access remains reliable over time. Through trees and structural diversity across species and cycles, agroforestry can reduce dependence on single crops and seasons, increasing resilience to climatic, ecological, and economic shocks

■ **Agency:** Communities govern their food systems. Embedded in transparent, ethical, and inclusive governance, promoted by those initiatives, agroforestry can enable communities to govern their food systems in line with their values, advancing food sovereignty and self-determination.

■ **Sustainability:** Food systems endure while sustaining their ecological, economic, and social base. By regenerating soils, conserving biodiversity, and closing nutrient loops, agroforestry can meet present food needs while preserving the ecological and social foundations of future food security.

## Accelerating Decline in Food Diversity and Nutrition

Agricultural intensification is reducing crop diversity and driving low-nutrient food production, contributing to food insecurity, low dietary diversity, and rising consumption of nutrient-poor diets linked to non-communicable diseases (NCDs) (12, 1). Today, the global diet relies on roughly 12 plant and 5 animal species, with rice, maize, and wheat supplying 60% of plant-based calories, a pattern tied to biodiversity loss and fragile production systems. Since 1900, 75% of plant genetic diversity has been lost, increasing vulnerability to pests, diseases, and climate change (10).

To ensure food security, diets must provide vitamins (A, B, C, E) from fruits, leaves, legumes, roots, and nuts; minerals (calcium, iron, iodine, magnesium, selenium, zinc) from leafy greens, seeds, mushrooms, legumes, and animal foods; and proteins and fats from legumes, grains, and plant/animal sources. Together with clean water, these nutrients sustain immunity, metabolism, and physiological development (11). Biodiverse agroforestry can integrate these nutrients into local food systems, building on Indigenous and traditional practices to enhance access to healthy diets.

## Agroforestry for Overcoming Food Challenges

As an agroecological approach, agroforestry adapts to diverse contexts, expanding the food base with fruits, vegetables, nuts, legumes, animal-source foods, and starchy crops while delivering ecosystem services like microclimate regulation, pollination, nutrient cycling, and soil regeneration. Trees and shrubs are more resilient to extreme events than annual crops,



Phylis Waraba and Prisca Mayende, agroforestry farmers from Kenya.

making agroforestry a more reliable food source over time.

Highly diversified agroforestry systems can sustain continuous production, filling seasonal gaps (7) and increasing year-round availability of nutrient-dense foods. They can enhance pastures, restore habitats for wild food species, and help stabilize aquatic ecosystems, supporting activities like fishing, central to many food cultures. Trees can also serve as strategic reserves for smallholders; assets mobilized during scarcity to strengthen long-term economic and food security.

Agroforestry works best when grounded in local knowledge. For meaningful and durable results, initiatives must integrate local species selection and community perspectives from the planning stage (3). Many native forest foods, often Neglected and Underutilized Species (NUS) (6), remain central to traditional diets yet are absent from markets and increasingly at risk of disappearing (12). By integrating these species and the knowledge sustaining them, agroforestry preserves biocultural heritage while rebuilding diverse,



Photo: Epic Motions

Photo: Grace & Luwayo Biswick

resilient, and nutrition-sensitive food systems, becoming a bridge between biodiversity, nutrition, and food sovereignty.

Building on local knowledge, agroforestry can be scaled through coherent policy synergies. Aligning with climate goals, forest restoration, and Nationally Determined Contributions (NDCs) links these agendas to socio-bioeconomy strategies, agroecological value chains, and circularity mechanisms like municipal composting, while fostering territorial strategies that improve food access and nutrition for local communities.

## Agroforestry and Animal-Source Foods

Animal-Source Foods (ASF) are culturally significant, with ruminants converting inedible biomass into protein-rich foods with essential amino acids (12). For this reason, livestock is central in arid and semi-arid regions, but water scarcity, soil degradation, and climate stress increasingly undermine productivity, driving food insecurity (13).

### Brazil: Cooperative agroforestry as a living food system

In Brazil's Ribeira Valley, Cooperafloresta transformed degraded land into diversified agroforestry landscapes managed by family farmers. Starting in the 1990s as a small collective experiment, it now spans over 1,000 hectares and involves more than 300 households integrating fruits, roots, vegetables, timber, medicinal plants, and animals within regenerating forest mosaics. The system produces food year-round, reduces external inputs, restores soil and local water cycle, and stabilizes livelihoods. Cooperative serves as a governance structure where farmers jointly design systems, exchange knowledge, coordinate cycles, and link native species to both diets and income (19).



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Photo: Dan Schat

Mitongwe, Malawi, Integrating leguminous trees with indigenous sorghum.



Livestock-integrated agroforestry can offer a resilient alternative. Diversifying animal diets with tree leaves, legumes, and crop residues, and improving microclimate through shade, can reduce heat stress, help stabilize production during droughts, and support animal health. These systems can strengthen soil fertility, nutrient cycling, and biomass availability, potentially lowering costs and contributing to the restoration of degraded areas (13, 14). When combined with rotational grazing and managed fallows, agroforestry can support livestock systems that are both climate-resilient and capable of enhancing productivity.

## Indigenous Foodways Strengthen Food Security and Nutrition

Over 476 million Indigenous people across more than 90 countries have developed diverse, locally adapted food systems rooted in ancestral knowledge. Despite pressures from resource exploitation and climate change, Indigenous communities remain central to food system transformation, offering proven pathways for resilience, biodiversity conservation, and nutrition security (5).

Indigenous food systems encompass hundreds of edible and medicinal species, often richer in nutrients and more tolerant of environmental stress than commercial crops. By combining species with different growth cycles, they mitigate seasonal gaps, resulting in nutritionally dense, climate-resilient diets (5, 6). Traditional processing like fermentation, soaking, germination, long term cooking and species combination further enhances nutrient bioavailability and reinforces the nutritional sophistication of these systems.

### Malawi: From Generic Tree Planting to Nutrition-Sensitive Restoration

Tree planting in Malawi faced structural bottlenecks including species selection, seed access, nursery management, and site preparation, often disconnected from food systems and local knowledge. A needs assessment with 21 organizations confirmed this gap. In response, practitioners co-created My Guide to Tree Planting, Featuring Indigenous Edible Species of Malawi, focused on 24 nutritionally rich indigenous trees with identification, seasonal calendar, and step-by-step guidance on seeds, nurseries and planting sites. The guide shifts tree planting toward nutrition-sensitive agroforestry, embedding biodiversity, nutrition, and local agency into everyday practice (20).



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These systems are multifunctional, generating medicine, energy, materials, and cultural meaning through circular logics that reintegrate biomass. This low-external-input model contrasts with chemically dependent agriculture, demonstrating viable alternatives for food security and ecological regeneration (5, 16).

Indigenous knowledge provides a strategic foundation for agroforestry-based food systems that are resilient, nutri-



Everlyn Nyongesa, smallscale farmer Kenya.

tion-sensitive, and territorially grounded. Its application requires ethical governance, including protection of traditional seed systems, knowledge networks, and Free, Prior, and Informed Consent (FPIC), safeguarding communities from appropriation while preserving biocultural heritage (16).

## The Central Role of Women in Food Sovereignty and Nutrition

From planning to consumption, women are central across all stages of food systems, sustaining household and community food security (2). Their caregiving roles and dependence on ecosystem services make them primary users of non-timber forest products and key holders of ecological and nutritional knowledge (8).

Daily responsibilities for food, water, fuel, and care generate knowledge critical for nutrition-sensitive

agroforestry. In diverse contexts, women identify and conserve NUS, expanding dietary diversity and food resilience; until 2012 in the Colombian Amazon, dozens of edible species known to women were yet undocumented (8). At the same time these responsibilities impose physical and time burdens, while barriers restrict women's access to land, resources, information, and decision-making (2, 17).

These inequalities undermine food security, reinforcing low-diversity, market-oriented production (9). Gender dynamics shape agroforestry outcomes: greater equity empowers women, and empowered women drive more resilient and sustainable food systems (17).

Agroforestry for food security must therefore embed inclusive governance: strengthening women's leadership, securing resource access, supporting women's networks, reducing labor burdens, and integrating social dimensions into project design (18). These measures enable effective and sustainable initiatives.

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