

## **Agroecological Production Systems Track**

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### **Abstract**

Agro-ecological production system is a promising way to support transition towards more sustainable food systems by achieving more out of the soil and other natural production resources through sustainable, context-specific practices. Agroecology is an integrated approach that encompasses the relationship between agricultural production system and ecological processes by allowing agricultural practices to be more respectful of the environment and its ecological specificities. As such, scientific literature traces Agroecology to the 1920s identifying grassroots social movements and family farmer practices expressed in public guidelines and national policies for sustainability.

In a rapidly changing world with population surge, climate change and increased appetite for agricultural commercialization agroecology has since been viewed as unsatisfactory in respective response dimensions. This led to increased conversion of land to agricultural land accompanied by heavy use of chemicals to fast track food production in time and volumes. Business objectives of most seed companies guide production of the same seed for all irrespective of the agroecological zones, and uniformity replaces diversity as the standard. Continued investments in these high external input, resource intensive production systems result in modified agro-ecosystems causing massive biodiversity loss, soil depletion, deforestation and high levels of greenhouse gas emissions.

Agroecological systems embraces the inexplicable interconnectedness and interdependencies nexus factors such as energy, water and climate underscoring why it is vital to account for cross-sectoral linkages. That is why according to the Food and Agriculture Organization (FA) Agroecology is defined as an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems, seeking to optimize the interactions between plants, animals, humans and the environment while taking into consideration the social aspects that need to be addressed for a sustainable and fair food system.

Small scale farming is the core of many countries that reference Agriculture as the backbone of their economy with over 80% of the population deriving a livelihood from this value chain. In Kenya for instance, over 85% of the farming is carried out by smallholder farmers, usually utilizing family labour and jointly working on the small agricultural land holdings. Agroecological is adopted by default since these systems are not intensive in the use of capital, labor, or chemical inputs, but rather in the efficiency of biological processes such as

photosynthesis, nitrogen fixation, and the solubilization of soil phosphorus; as well as the enhancement of biological activity above and below ground. The *inputs* of the system are the natural processes themselves.

However, the opportunity for improved productivity addressing food and nutrition security in agroecological systems may remain elusive without support of global, national and sub national policy frameworks to integrate environmental concerns into agricultural development in relation to management of rangelands, forests, water quality, wildlife and conservation of genetic resources. Scientific knowledge on agroecology is rapidly increasing which combined with experiential knowledge unlocks innovations in this sector.