

Long-term comparison of farming systems in the Tropics

2007 – 2024 SysCom trial in Bolivia, Kenya, and India by FiBL

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Abstract

There is substantial evidence that carrying on business as usual with the prevalent agricultural management practices is not a sustainable option, particularly when considering the issues associated with climate change, biodiversity loss, and depletion of natural resources. Several alternative production systems, including agroecology and organic farming, are proposed for environmental and social benefits. Studies conducted under temperate environments have established the benefits of organic farming practices over conventional practices. Still, little scientific evidence is available on the performance of organic systems under tropical conditions. The SysCom program has addressed this gap with 17 years of successful participatory and production systems research. The trials are located in Bolivia with a focus on agroforestry and cocoa, in Kenya with focus on cereal, legumes and vegetables, and in India with a focus on cotton. The main findings are:

Yield: In general, organic farming yields were comparable to conventional farming. For example, in Kenya, French beans or potato yields under organic systems were slightly lower than conventional in the short term but matched or exceeded conventional yields over time. The same is the case for agroforestry systems in Bolivia.

Soil Health: Organic farming systems showed consistently better soil health indicators across all sites. Soil organic matter, microbial activity, and nutrient content were higher in organic plots, indicating better sustainability and resilience.

Biodiversity: The trials documented higher biodiversity in organic systems, especially in soil organisms. This biodiversity is crucial for ecosystem services like pest control and nutrient cycling.

Economic Viability: While organic farming often involves higher labor inputs, the reduced costs of synthetic inputs and premium market prices for organic products make it economically viable, in Kenya, India and Bolivia

The long-term benefits of soil health, biodiversity, and economic returns are significant. The SysCom trials prove that organic farming can be a sustainable and economically viable alternative to conventional farming in the tropical and subtropical regions and in a smallholder context. To reach equal yields and fully exploit the benefits of organic farming systems, active organic management is crucial, including, for example, adequate crop rotations, plant varieties, and nutrient and pest management such as push-pull systems. The results suggest that organic farming practices can be adapted to different local contexts and, with proper support, could contribute to food security and sustainable development in these regions.

We conclude that for a sustainable transformation of the food systems, we need to embrace a system approach with solutions that have multiple, converging, and positively reinforcing outcomes that bring beneficial synergistic effects across multiple domains.

FiBL promotes the learnings to science, farmers, and policymakers through its capacity-building activities and numerous publications available online.

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Track 4: Policies for Scaling up Organics and Agroecology

Topics: Tools and Best practices in Organic policy advocacy

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