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“Towards shifting paradigms in agriculture
for a healthy and sustainable future”

A Synthesis of Twelve Years of the “Long-Term Farming Systems Comparisons in the Tropics (SysCom)”

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Abstract

There is substantial evidence that carrying on with the prevalent agricultural management practices is not a sustainable option. As an alternative system to conventional agriculture, organic farming precludes the use of synthetic pesticides and fertilisers and seeks to produce food while improving environmental and human health. It is, however, legitimate to question whether organic agriculture can contribute to sustainable development as it is often perceived to be based on ideology. Comparative long-term studies were often conducted under temperate environments, and thus several questions remain open regarding the performance of organic systems under tropical conditions. The SysCom programme (<https://systems-comparison.fibl.org>) has addressed this gap by over a dozen years of long-term farming systems comparisons research on different organic and conventional agricultural production systems in Kenya, India, and Bolivia.

The results from the programme show that crop productivity of organic systems can match those of conventional systems yet varies depending on the type of crop and management practices. The variation in yields of annual organic crops can primarily be explained by the slow release of nutrients from applied inputs or their lower nutrient content and yield losses from pest and disease pressure. This is often the case if organic systems try to mimic conventional methods and only substitute conventional inputs. In perennial production systems, the results show that the system's complexity (monoculture vs. agroforestry) has a more significant influence on the total productivity than the type of farming system (organic vs. conventional). The profitability of all the organic systems was found to be mainly influenced by crop productivity. However, by employing a systemic approach and implementing good agricultural practices, organic systems could be managed successfully and profitably. Organic systems also offer additional benefits to society as well as to the environment when compared to conventional systems, e.g., i) buildup of soil fertility over the long-term, ii) reduction of pesticide residues in soils, crop products, and run-off water, iii) higher concentrations of vital elements in food crops, iv) enhanced flora and fauna diversity and abundance, v) a reduction of non-renewable energy resources used, and vi) increased resilience.

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