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Effect of long-term management on yield of dicotyledon plants in cotton systems

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Organic agriculture is a promising solution to sustainably improve crop yields. For several crops, yield from organic farming have been recorded to be lower than yield from conventional farming. However, such data is context dependent and there is very little information on performance of organic systems in the tropics. Particularly, solid data on the benefits and drawbacks of organic agriculture in the tropics is still missing.
In 2007, we set up a long-term farming system comparison trials (LTE) for cotton systems in Madhya Pradesh India. Cotton is the main cash crop in our region and is grown in a two-year crop rotation. The other crops grown with cotton in our region are chickpea, wheat and soybean. In our field trials we are comparing the following treatments: (i) organic, (ii) bio dynamic, (iii) conventional, and (iv) BT conventional (genetically modified) cotton. We have been taking data on multiple parameters such as crop yields, soil nutrients, soil microbial properties and system profitability
Our data indicates that with good management organic systems can become more sustainable than conventional systems both economically and ecologically. Multiple indicators in our trials show this; the performance of crops has improved over the years, reducing the profitability gap between organic and conventional farming systems. In addition, positive impacts on soil fertility indicators (e.g., soil organic carbon) are detectable after 10–12 years in our organic LTE systems. We have also recorded our organic systems to harbour higher biodiversity. Despite our positive results, adaption of best management practices by the farmers remains one of the biggest challenges.
We need more studies on long-term cumulative effect of system approaches on fertility, health and the productive capacity of agricultural lands in conventional and organic farming systems. We need to understand what extent system approaches can enhance the resilience of cotton systems.

Keywords: Chickpea, cotton, crop rotation, dicotyledon, long term system, organic, soybean, treatment, wheat

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