P1.39 Title

Yields and gross margins of cotton-based production systems under organic and conventional management in India

Authors

Christian Andres1, Dionys Forster1, Rajeev Verma2, Christine Zundel1,3, Monika M. Messmer1, Paul Mäder1, Gurbir S. Bhullar1*
1 Research Institute of Organic Agriculture (FiBL), Switzerland
2 bioRe Association, India
3 Federal Office of Agriculture, Switzerland

Abstract

The debate on the relative benefits of conventional and organic farming systems has in recent time gained significant interest. So far, global agricultural development has focused on increased productivity rather than on a holistic natural resource management for food security. Thus, developing more sustainable farming practices on a large scale is of utmost importance. However, information concerning the performance of farming systems under organic and conventional management in tropical and subtropical regions is scarce.

This study presents agronomic and economic data from the conversion phase (2007-2010) of a farming systems comparison trial on a Vertisol soil in Madhya Pradesh, central India. A cotton-soybean-wheat crop rotation under biodynamic, organic and conventional (with and without Bt cotton) management was investigated.

We observed a significant yield gap between organic and conventional farming systems in the 1st crop cycle (cycle 1: 2007-2008) for cotton (-29%) and wheat (-27%), whereas in the 2nd crop cycle (cycle 2: 2009-2010) cotton and wheat yields were similar in all farming systems due to lower yields in the conventional systems. In contrast, organic soybean (a nitrogen fixing leguminous plant) yields were marginally lower than conventional yields (-1% in cycle 1, -11% in cycle 2). Averaged across all crops, conventional farming systems achieved significantly higher gross margins in cycle 1 (+29%), whereas in cycle 2 gross margins in organic farming systems were significantly higher (+25%) due to lower variable production costs but similar yields. Soybean gross margin was significantly higher in the organic system (+11%) across the four harvest years compared to the conventional systems.

Our results suggest that organic soybean production is a viable option for smallholder farmers under the prevailing semi-arid conditions in India. Future research needs to elucidate the long-term productivity and profitability, particularly of cotton and wheat, and the ecological impact of the different farming systems.