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

Figure 1 : Research platform, crops soybean & cotton

Background

Cotton as a cash crop is a key income source for smallholder farmers in India. The other crops grown with cotton as rotational crops in our region are soybean, wheat and chichpea etc (Figure 1).

Aim

Assessing the importance of dicotyledon as rotational crop in organic cotton production on a long term system.

Method

- In 2007: set up of the long-term farming system comparison trials (LTE) for cotton systems in Madhya Pradesh India. (Figure 2)
- Treatments: (i) organic, (ii)bio dynamic, (iii) conventional, and (iv) BT conventional (genetically modified) cotton.
- Main crop: cotton and dicotyledon crop (soybean) is a rotational crop, grown in a two-year crop rotation (Figure 3).

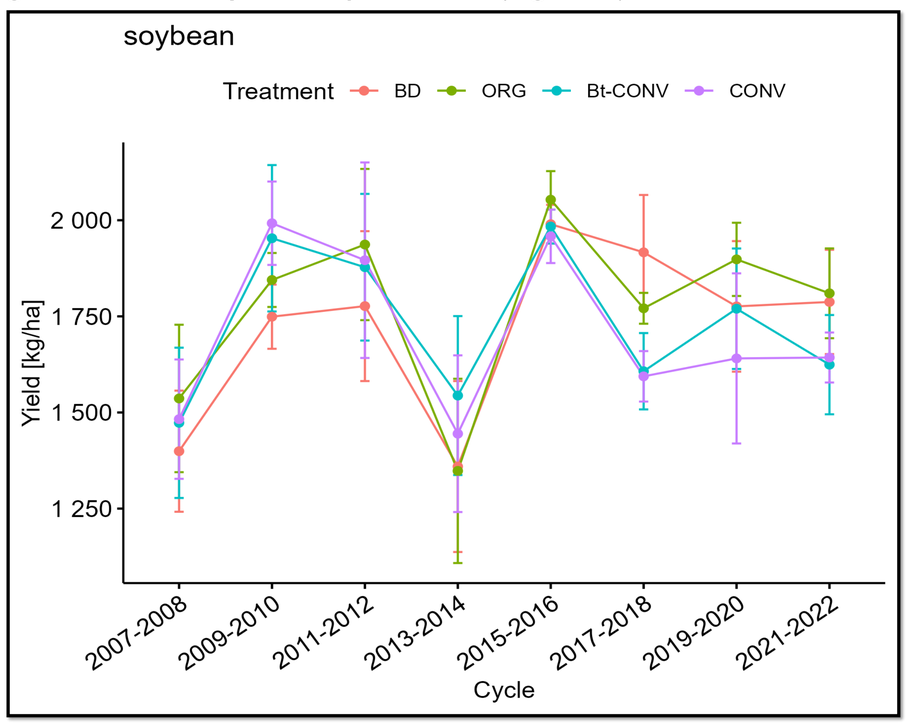

Figure 4 : Yield of soybean crop of four farming system (Organic, Biodynamic, Conventional and BT Conventional)

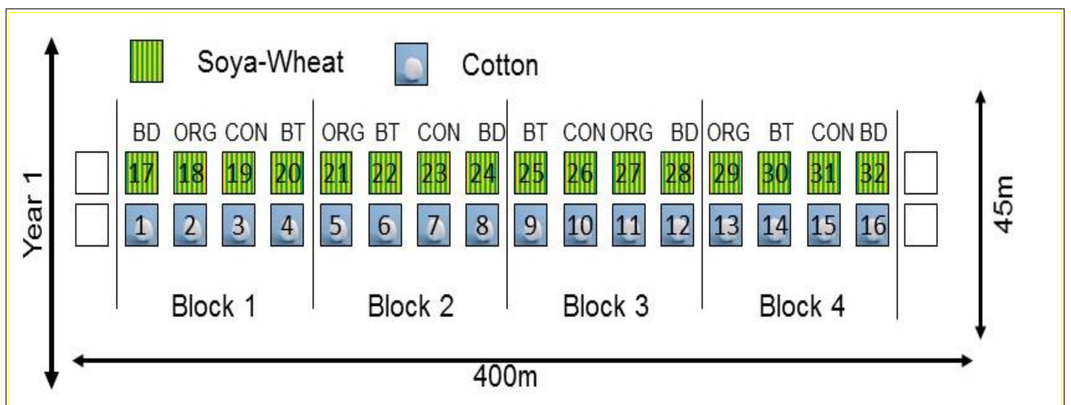

Figure 2 : Layout design of LTE trial

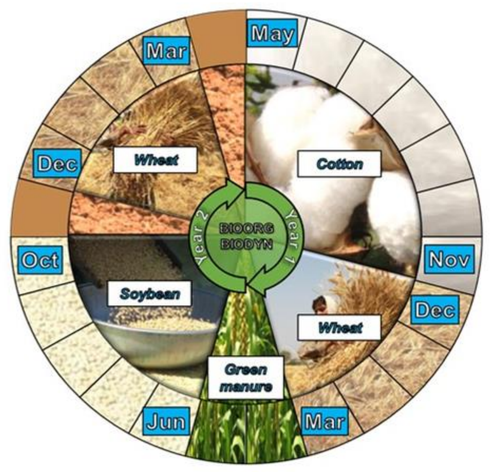

Figure 3 : Crop rotation system at LTE trial

Results

- Soybean yield is stable and similar in all management systems. Hence, it is a suitable crop for organic systems ((Figure 4).
- The performance of crops has improved over the years, reducing the profitability gap between organic and conventional farming systems.

Conclusion

- Soybean (dicotyledon) crop are capable of equal performance in both system as they are capable of symbiotic assimilation of nitrogen and thus do not rely on external N inputs.
- Our data indicates that with good management organic systems can become more sustainable than conventional systems growing with soybean dicotyledon crop rotation.

Andres, C., Bhullar, G.S.* (2016) Sustainable intensification of tropical agro-ecosystems: need and potentials. Frontiers in Environmental Science 4

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