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Recent Development and Environmental impact of Organic Farming with particular rural area (Karrapur, Sagar, M.P.)

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Abstract

India is mainly an agricultural country. Most of its population is dependent directly on agriculture. The number of farmers adopting organic farming has increased in the recent past. Some farmers interested in converting to organic farming in the near future in Madhya Pradesh due to the low cost of production. Our economy is based on sustainable agriculture, particularly rainfed agriculture where vegetables occupy a predominant role to play in feeding human, animals and soil. There is increasing recognition that ecosystems and their services need to be managed in the face of environmental change. Organic farming involves holistic production systems that avoids the use of synthetic fertilizers, pesticides and genetically modified organisms, thereby minimizing their deleterious effect on environment. Organic farming is beneficial for natural resources and the environment.

Organic farming is a system that favour's maximum use of organic materials and microbial fertilizers to improve soil health and to increase yield. This article explains the development stages, techniques of organic farming in Karrapur, Sagar, Madhya Pradesh. The main focus: the development and essential characteristics of organic farming; the basic concepts behind organic farming; historical background; developmental era of organic farming; methods of organic farming; importance of organic farming in environmentally friendly approaches relevance of organic farming in the Indian context. The study may help farmers adopt organic agriculture on a large scale in Bundelkhand, India.

Keywords: Organic Farming, Organic agriculture, Environmental impact, Farming system.

Introduction

The most common organic farming system in Bundelkhand is based on a large fraction of grass–clover and fodder crops in the rotation in combination with a stock of ruminant animals, typically for dairy production. Modern agricultural farming practices, along with irrational use of chemical inputs over the past four decades have resulted in not only loss of natural habitat balance and soil health but have also caused many hazards like soil erosion, decreased groundwater level, soil salinization, pollution due to fertilizers and pesticides, genetic erosion, effects on environment, reduced food quality and increased the cost of cultivation, rendering the farmer poorer year by year (Ram, 2003).The design and management of organic crop rotations involve many considerations. Contrary to conventional crop production where the management factors can be optimized individually, many factors and their interactions must be included in the design and management of organic crop selection. The main reason is that crop management of organic crop rotations must focus on the prevention of problems (Donald, 2004). The primary management options in organic crop rotations are manure application, mechanical weed control, straw removal, soil tillage and harvest time. The objective of the study is to explore the possibilities for both short-term and long-term increases in organic cereal production through manipulation of crop selection design on different soil types. Growing environmental awareness and several food hazards have substantially decreased the consumer's trust towards food quality in the last decades. Intensive conventional farming can add contamination to the

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food chain. For these reasons, consumers are quested for safer and better foods that are produced through more ecologically and authentically by local systems. Organically grown food and food products are believed to meet these demands (Rembialkowska, 2007). In current years, organic farming as a cultivation process is gaining increasing popularity (Dangour et al., 2010). Organically grown foods have become one of the best choices for both consumers and farmers. But the question is that what is meant by organic farming? (Chopra et al., 2013). The term 'organic' was first coined by Northbourne, in 1940, in his book entitled 'Look to the Land'. Northbourne also defined organic farming as 'an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity'. Whereas, conventional farming is the cultivation process where synthetic pesticide and chemical fertilizers are applied to gain higher crop yield and profit. In conventional farming, synthetic pesticides and chemicals are able to eliminate insects, weeds, and pests and growth factors such as synthetic hormones and fertilizers increase growth rate (Worthington, 2001).

Aims of organic farming:

•To produce sufficient quantities of high-quality food, fibre and other products.

• To work compatibly with natural cycles and living systems through the soil, plants and animals in the entire production systems.

• To recognize the wider social and ecological impact of and within the organic production and processing system.

• To maintain and increase long-term fertility and biological activity of soils using locally adapted cultural, biological and mechanical methods as opposed to reliance on inputs.

• To maintain and encourage agricultural and natural biodiversity on the farm and surrounds through the use of sustainable production systems and the protection of plant and wildlife habitats. Aims of Organic Farming

• To create a harmonious balance between crop production and animal husbandry.

• Organic farming severely restricts the use of artificial chemical fertilizers and pesticides.

• Instead, organic farmers rely on developing a healthy, fertile soil and growing a mixture of crops.

Positive effect of Organic Agriculture:

• Maintaining environmental health by reducing the level of pollution.

• Dangerous chemical residue in the product.

• It reduces the cost of agricultural production and also improves the soil health.

• Increasing income and reducing production costs.

•Producing safe and diversified food.

• Being environmentally, socially and economically sustainable in the long term.

Need for survey and assessment:

There has been a lot of debate in recent years about the feasibility of organic farming under Indian conditions (Tiwari,2005). The most often debated questions related to organic farming include its production potential, economic feasibility and the possible environmental benefits like improved soil quality and health (Ramesh and Subba, 2005). 04 site selected for organic farming which located in Bundelkhand (Figure 1)

Methodology

Replicated soil samples (from the top 0—15 cm depth) were collected from Karrapur, Sagar and nearby conventional farms. A total of 100 soil samples were collected *for* the analysis. The analyse included soil physical (bulk density), chemical (pH, EC, organic carbon), biological (dehydrogenase, alkaline phosphatase, microbial biomass carbon) parameters and macro (N, P and

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K) and micronutrient (Zn, Cu, Fe, Mn) status of soil by adopting standard analytical methods (Singh, 2005).

Figure 1. Organic farm located in karrapur, Sagar, Madhya -Pradesh (India)

Open Field Cultivation

Shade net house cultivation

- 01-06 photographs show the step-by-step methods and cultivation of vegetables (capsicum and tomato) in organic farm.

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Table 1. Soil quality parameters as affected by organic (Org.) and conventional (Con.) farming.

Soil quality parameter	Karrapur (site1)		Tinsua (site 2)		Banda (site 3)		Sagar (site4)	
	Org.	Con	Org.	Con.	Org.	Con.	Org.	Con.
Physical mg-l Bulk density	1.23	1.27	1.18	1.26	1.24	1.27	1.19	1.26
Chemical pH	5.99	6.02	6.28	6.54	7.51	7.34	5.94	5.68
Electrical conductivity	0.13	0.11	0.14	0.14	2.83	2.97	1.64	1.17
Organic Carbon (%)	1.48	1.12	0.98	0.76	1.28	0.84	1.60	1.44
Biological Dehydrogenase	85.3	66.0	118.1	71.6	53.6	39.8	53.9	29.8
Alkaline phosphatase	66.l	57.9	58.8	52.8	89.2	76.2	76.3	76.2
Microbial biomass carbon	230	200	239	180	278	245	248	192
Macronutrients (kg.ha-1) Nitrogen	212	157	181.2	160.0	189.9	163.5	234.6	203.2
Phosphorus	9.34	6.60	22.04	26.40	19.01	15.02	15.11	14.52
potassium	429	436	412.2	270.2	457.2	422.2	287.1	298.7
Micronutrient (ppm) Zinc	1.13	0.94	1.17	0.71	2.87	1.28	1.58	1.37
Copper	4.95	4.42	3.42	3.51	1.99	1.44	4.62	2.95
Iron	4.35	4.17	3.93	3.17	12.8	8.31	44.84	31.57
Manganese	5.53	5.25	4.62	5.26	15.6	9.32	42.57	32.53

*Each value is the average of 50 soil samples.

The soil quality parameters in organic and conventional farms in different 04 sites are given in Table 1. The bulk density of soil is less in organic farms which indicates better soil aggregation and soil physical conditions. Improvement in soil organic matter decreased the bulk density by dilution of the denser fraction of the soil (Wallingford, 1975). There was a slight increase in soil pH and electrical conductivity in organic farm compared to conventional farms. On an average there was 25.1% increase in organic carbon of soil in organic farm (1.33%) compared to the conventional farms (0.89%) which is a good indicator of soil quality. Regular organic additions (manures) have the largest effect in soil organic matter. Dehydrogenase, alkaline phosphatase and microbial biomass carbon were higher in organic soils by 48.21%, 28.4% and 34.4% respectively compared to the conventional farms. This indicates higher microbial activity in organic soils which is essential for nutrient transformations and increased availability of these nutrients to the plants. Increased nutrient avail-ability in organic manure treatment could

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also be due to increased dehydrogenase and phosphatase activity. In general, increase in microbial biomass carbon in organic manure amended soils was due to increased availability of substrate-C that stimulates microbial growth, but a direct effect from microorganisms added through the compost is also possible (Powlson, 1987). In organically managed soils, both macronutrients (N, P and K) and micronutrients (Zn, Cu, Fe, Mn) were available in larger quantities compared to the conventional soils. Similar increase in soil quality by the addition of manures in organic farming was reported from India (Ramesh, 2008 and Ramesh 2009)

Conclusion

Developing India have a certain comparative advantage in organic agriculture, as they possess relatively abundant labour and use relatively fewer agrochemicals in production. In developing countries, organic agricultural systems achieve equal or even higher yields, as compared to the current conventional practices, which translate into a potentially important option for food security and sustainable livelihoods for the rural poor in times of climate change. Organic farming yields more nutritious and safe food. The organic farming process is more eco-friendly than conventional farming. The study provides data to overall improvement of soil quality parameters, indicating better soil health. Moreover, the organic produce market is now the fastest growing market all over the world including India. Organic agriculture promotes the health of consumers of a nation, the ecological health of a nation, and the economic growth of a nation by income generation holistically. India, at present, is the world's largest organic producers (Willer and Lernoud, 2019) and with this vision, we can conclude that encouraging organic farming in Bundelkhand region.

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