



The Concept and Scope of Organic Agriculture in India

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Organic agricultural system involves biodiversity at soil, crop, field level and integration of crop and livestock production systems on the farm. Organic agriculture refers to the avoidance of chemical inputs and the application of agro-ecological principles. Agronomic practices with genetic diversity at crop level provide insurance against biotic and abiotic stresses on crop yield and quality. Presently, more than 95% of organic production is based on crop varieties that were bred for the high-input conventional farming. These varieties lack qualities required for growth under organic and low-input production conditions. In order to optimize the organic farming system there is a need to develop new varieties that are adapted to organic farming systems. The desired variety traits include adaptation to organic soil fertility management, implying lower and organic inputs, a better root system and ability to interact with beneficial soil micro-organisms, ability to suppress weeds, contributing to soil, crop and seed health, good product quality, high yield level and high yield stability. Organic farming systems aim at resilience and buffering capacity in the farm ecosystem by stimulating internal self-regulation through functional agrobiodiversity in and above the soil, instead of external regulation through chemicals.

Conventional farming has played an important role in enhancing food productivity but since it has largely been dependent on intensive inputs of chemicals viz. synthetic fertilizers and pesticides, which have raised many environmental and public health issues including reduction in biodiversity, environmental contamination and soil erosion, which has led to an increasing interest in alternative farming practices with lower use of synthetic chemicals and greater dependence on natural biological processes. Organic farming enhances soil biodiversity, alleviates environmental concerns and improves food safety through eliminating the applications of synthetic chemicals, thus most negative effects attributed to conventional farming are reduced. Organic agriculture is becoming widespread due to increased consumer demand and regulatory and political support. A global survey has recently shown that there are more than 24 million hectares of land under organic management. In the early stages of transition from conventional to organic systems, yield reduction due to nutrient limitation and pest incidence is a major concern for organic farmers. Therefore, identifying transition strategies that partially or gradually reduce conventional inputs can serve as alternatives that could potentially minimize economic hardships as well as benefit microbial growth and minimize yield loss. Microorganisms play a dominant role in nutrient cycling and pest control in organic farming systems, and their responses to changes in soil management practices may critically impact crop growth and yield.

In India, chemicals and water intensive technologies resulted in 25% land degradation, erosion of seed diversity and depletion of water table in Haryana and Punjab states. About 90% waste water discharged in rivers does not meet environmental requirements. Today about 60% Indian agriculture rainfed and more than 70% healthy and fresh looking vegetables contain high levels of residual pesticides. Indian agriculture consumes about 50% workforce (75% BPL), 80% natural fresh water resources, 25% of total electricity and 70% of central govt subsidies. In India there was a record production estimated 264.38MT in 2014, which declined in 2015 and 2016. Agriculture contributes 14% in National GDP and employs 58.2% people. From 2005-2012, about 3.7 crore farmers have quit agriculture; the rate of quitting agriculture is 2300 farmers/day, 62% ready to leave and 60% of them see no future for their children. Since 1995, 2.8 lakh farmers in India have committed suicide due to indebtedness for purchase of chemicals, crop failures and harassment by lenders. Small holdings (<1ha) are another reason. Indian pesticides Industry is worth 4.25 billion US\$ in 2014 with 12-13% growth and likely to reach 7.5 billion US\$ in 2019. Though pesticide use in India is 570g/ha (productivity 30-50% lower than China) compared to Japan (11 kg/ha), China (5.6 kg/ha), Fertilizers consumption in the country is 51 mill MT. Its use in 1951-52 was 1kg/ha compared to 2012-13 where it is about 133kg/ha (560% increase). India has emerged as a major agricultural exporter, with exports climbing from just over \$5 billion in 2003 to more than \$ 6.4 billion in 2016. There is possibility to evoke enthusiasm in agriculture and migration of youth back to agriculture through greater mechanization, integrated farming depending in farm size- agriculture, animal husbandry, poultry, fish farming, mushroom etc., value added agriculture viz. organic farming and investments in post harvest infrastructure. Agricultural technologies can increase global production by 67% and cut food prices to half by 2050.

2nd Green revolution is likely to be based on organic farming in 54-70% rainfed areas. Presently total area under organic certification is about 5.71 mill ha with certified organic agricultural production of 1.35 mill MT, organic export of 2.64 lakh MT worth 298 mill US\$. Indian agriculture in ancient times primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes), biological materials and beneficial microbes (biofertilizers/bioagents) with the release of nutrients for increased sustainable production in an eco friendly pollution free environment. The knowledge was based on ancient Indian literature and ITKs, use of composts, biofertilizers, biopesticides and agronomic practices. Organic farming can easily be adopted in hilly areas of the country due to less chemicals in hills. Various techniques used in organic farming include Homa farming (Agnihotra, Tryambkam), Biodynamic farming (biodynamic calendar, biodynamic composts, horn manures), Vedic krishi (use of cow urine, cowdung, buttermilk etc, panchgavya, botanical extracts in cow urine etc. FYM, Nadep compost, Indore compost, biofertilizers and biopesticides and Agronomic practices (crop rotation, Intercropping, green manuring and mulching).

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