



Organic Farming in India: Principles and Perspective

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Organic farming is a crop production system that excludes use of synthetic compounds such as, fertilizers, pesticides, growth regulators and livestock food additives. It can sustain the health of soils, ecosystems and people by combining tradition, innovation and science because it combines crop management and animal husbandry in the agroecosystems which are socially acceptable and ecologically sustainable. Thus, main objectives of organic farming include utilization of the available biomass of crops left in the field to enrich soil fertility, supply of balanced nutrients to the plants and improvement in the soil microbial activity, reduction in the cost of production as well as environmental pollution in eco-friendly manner.

Concept of organic farming

Organic farming includes the concept that the soil, plant, animals, and humans are linked. Concept of organic farming is based on some below mentioned principles:

- 1) Nature is considered as a best role model for farming, since it does not use any inputs nor demand unreasonable quantities of water.
- 2) Organic farming system does not believe in mining of the soil of its nutrients and protect the long term fertility of soil.
- 3) The soil in this system is considered as living entity.
- 4) On sustained basis living population of microbes and other organisms in soil's are significant contributors to its fertility.
- 5) Development of biological diversity and the maintenance and replenishment of soil productivity is the major concern of organic farming systems.
- 6) Importance given on crop rotation, natural predators, biological pest, disease and weed management, resistance varieties instead of chemical control.

Components: Use of external farm inputs is kept to minimum and following components are combined as their compatibility adds to synergistic effect.

Seeds: Instead of Genetically modified (GM) seeds, certified organic/non-GM seeds are used. These seeds are untreated or treated with cow urine, animal dung, biofertilizers and bio-fungicides.

Bio manures: Farm yard manure (FYM) containing dung, urine, straw and farm waste; concentrated organic manures made from non-edible oil cake, edible oil cake, fish meal bones, poultry, sheep/goat manure etc. are a rich source of nutrients and organic matter besides serving as a soil conserving material. Green manuring in situ with plants such as, dhaincha, berseem, Sunnhemp, cowpea, green gram, glyricidia or sesbania increases green

plant mas into the soil which improves its physical and chemical properties and fertility level. Green manuring with leguminous crops can substitute FYM to some extent.

Compost: Conventional compost is prepared from aerobically decomposed products of organic waste left over in the field such as, animal dung, plant debris, crop and fodder residues, weeds left in the field and on the field borders or bunds raw manure, decaying and rotting vegetables whereas vermicompost is a metabolic product of earthworms. Decomposition is quicker when Trichoderma or “Panchagavya” is added to organic matter and this process results in compost of greater nutritive value.

Crop diversification: Yearly crop rotations, inter- /mix cropping and cover crops are routinely followed. Border rows of the main or subordinate crops prevent drift of the chemical sprays or pollens of GM crops from surrounding fields. Trap crops attract and trap insect pests. These crop patterns reduce the incidence of pests and diseases, maintain soil fertility (when used with pulse crops) and optimize the balance of plant nutrients.

Soil solarization: Mulching with polyethylene during the period of intense solar radiation and spreading of dried weeds or crop residues around plant base reduces water evaporation resulting in retention of soil moisture.

Biofertilizers and microbial inoculants: Nitrogen fixers (Azotobacter, Azolla, Rhizobium, Azospirillum, blue-green algae, phosphate solubilizing bacteria and fungi, phosphate mobilizers (vesicular arbuscular mycorrhizae) and other micro-organisms help reduce the dose of other fertilizers.

Microbial pesticides: Pesticides containing microorganisms such as bacteria (*Bacillus subtilis*, *B. thuringiensis*, *Pseudomonas fluorescens*) and fungi (*Trichoderma viride*, *T. harzianum*) are sometimes as effective as synthetic pesticides.

Botanical pesticides: Application of naturally available indigenous plant materials and their products such as, neem- seed kernel extract, water extract of leaves of neem, nirgunc bulb of garlic and onion, chillies, medicinal plants etc. have been recommended for several crops.

Naturally occurring salts: Calcium salts such as, gypsum (Calcium sulphate) and lime (Calcium oxide) are mixed into soil to correct soil pH.

Organic Farming Process: Organic farming and food processing practices are wide-ranging and necessitate the development of socially, ecologically, and economically sustainable food production system. The International Federation of Organic Agriculture Movements (IFOAM) has suggested the basic four principles of organic farming, i.e. the principle of health, ecology, fairness, and care. The main principles and practices of organic food production are to inspire and enhance biological cycles in the farming system, keep and enhance deep-rooted soil fertility, reduce all types of pollution, evade the application of pesticides and synthetic fertilizers, conserve genetic diversity in food, consider the vast socio-ecological impact of food production, and produce high-quality food in sufficient quantity. According to the National Organic Programme implemented by USDA Organic Food Production Act (OFPA, 1990), agriculture needs specific prerequisites for both crop cultivation and animal husbandry. To be acceptable as organic, crops should be cultivated in lands without any synthetic pesticides, chemical fertilizers, and herbicides for 3 years before harvesting with enough buffer zone to lower contamination from the adjacent farms. Genetically engineered products, sewage sludge, and ionizing radiation are strictly prohibited. Fertility and nutrient content of soil are managed primarily by farming practices, with crop rotation, and using cover crops that are boosted with animal and plant waste manures. Pests, diseases, and weeds are mainly controlled with the adaptation of physical and biological control systems without using herbicides and synthetic pesticides. Organic livestock should be reared devoid of scheduled application of growth hormones or antibiotics and they should be provided with enough access to the outdoor. Preventive health practices such as routine vaccination, vitamins and minerals supplementation are also needed.

Principles of Organic Farming

To understand the motivation for organic farming, it is important to understand the guiding principles of organic agriculture. These principles encompass the fundamental goals and caveats that are considered important for producing high quality food, fiber and other goods in an environmentally sustainable way. Organic agriculture are based on dynamic interaction between the soil, plant, animals, humans, ecosystem and the environment.

1. **Principle of Care:** Organic farming should be managed that in precautionary and with responsible manner so as to protect the health and well-being of current and future generations and the environment (precaution).
2. **Principle of Fairness:** Organic farming should be built on relationships that ensure fairness with regard to the common environment (ecological and social justice and fair trade).
3. **Principle of Health:** Organic farming should sustain and enhance the health of soil, plant, animal, human and planet as one and invisible (healthy soil, healthy crops, healthy livestock and healthy people).
4. **Principle of Ecology:** Organic farming should be based on living systems and cycles, work with them emulate them and help sustain them (agro-ecology, diversity and recycling).

Constraints

There is awareness in consumers in cities and towns who accept to pay higher premiums for organically produced farm commodities, but rural population cannot afford to do so.

- Crop yields are rather low in the beginning.
- Skilled labour is needed and high wages are to be paid.
- Organic manures are costly and not easily available.
- Cost of certification is not affordable for small farmers.
- It is difficult to obtain non-treated seeds because general cultivation is done with seeds treated with synthetic insecticides and fungicides.
- Transparency in the supply chain is required.

Perspectives

1. Although organic farming is labour intensive, it provides an opportunity for rural employment and for achieving long term improvement in natural resources. For example, integration of animal husbandry into organic farming provides ready manure and organic materials.
2. Adoption of organic farming may be gradual and can be supported by a sound research and development network that would result in sustainable agriculture which seems to be appropriate to Indian farming conditions in order to make the country self-sufficient in food production. Therefore, policy makers should promote organic farming for good quality of life, restoration of soil health, generation of national economy and creation of better environment. Subsidy may be given to encourage farmers.
3. In areas where water pollution is on increase, conversion to organic farming should be highly encouraged as a restorative measure.
4. There is scanty information on organic technology for all crops. Systematic research on development of suitable varieties/hybrids, plant nutrition and IPM techniques may lead to the increasing demand of organic produce both in retail marketing and export.
5. Under “Bhudan Movement”, waste and fallow lands have been distributed by the government. These areas can probably be brought under organic crops for increasing area and production of food crops. Thus, seed production by public agencies like National Seed Corporation, local agricultural universities and private seed companies could be initiated.

Subsequently, authentic and reliable data should be made available for promotion of organic farming though location specific processes need standardization. Also, there is urgent need to introduce labelling for organic produce as it has been mooted for GM crops.

6. Separate minimum support price for organic produce would encourage and motivate farmers for more crop production. For this purpose, organic zones may be separated from other areas to a maintain distance for isolation especially for seed production.

7. Indian standards are to be revised from time to time in accordance with changes in global standards so that organic produce from India will not be rejected by importing countries. 8. Farmers can take help and advantage of farmercentric certification system known as "Participatory Guarantee System". With this scheme, organic farming in India has grown 25-fold in the past seven years because of combined efforts of farmers, NGOs, government interventions and push from other market forces. Further development would certainly create awareness about organic farming which would transform it with future market potential.

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