

# **Organic Farming for Sustainable Agriculture**

M. Singh\*

Department of Botany, CCS Univeristy, Meerut, (U.P) India \*Corresponding Author Email Id: msingh@gmail.com

#### ABSTRACT

India is mainly an agricultural country. Nearly three-fourth of its population is dependent directly on agriculture for a living. Therefore, any improvement in agriculture is intimately linked with joy and happiness of the people of this country. Indian agriculture continues to face serious challenges from ever increasing population. Cultivation of high yielding crop varieties responsive to fertilizers and irrigation and the intensive cropping systems pose the problem of weeds, insects and pests causing tremendous losses to crop and their produce. Our economy is based on sustainable agriculture, particularly rainfed agriculture where vegetables occupy a predominant role to play in feeding human, animals and soil.

#### **INTRODUCTION**

The pollution free environment is essential for sustaining life of all living being on the earth. While technology induced farming is required for feeding the surging, population, the excessive use of chemicals, fertilizers, pesticides and weedicides in agriculture has caused problems to all living beings on the earth. Eco-friendly farming has emerged as the only answer to bring sustainability to agriculture. It not only advocates for stopping or restricting the use of pesticides, but it emphasizes the need for gardening which should create an ecological balance and a microenvironment suitable for health and growth of soil microflora plants, animals, farm workers and finally the vast population which consume the farm produce. So let us see the wonders of Organic Farming.





#### WHAT IS ORGANIC FARMING?

Organic farming in simple terms means cultivation of plant without the use of synthetic fertilizers or pesticides. When we garden organically we need to think of plants as a part of a whole system within nature. Organic gardening begins with paying attention to the soil and adding organic matter to the soil using locally available resources.

Organic farming is a production system, which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators or livestock feed additives to the maximum extent feasible.

Organic refers to agricultural production systems used to produce food and fiber. All kinds of agricultural products are produced organically, including produce, grains, meat, dairy, eggs, and fibers such as cotton, flowers, and processed food products. Organic farming management relies on developing biological diversity in the field to disrupt habitat for pest organisms, and the purposeful maintenance and replenishment of soil fertility. Organic farmers are not allowed to use synthetic pesticides or fertilizers. Some of the essential characteristics of organic systems include: design and implementation of an "organic system plan" that describes the practices used in producing crops and livestock products; a detailed record keeping system that tracks all products from the field to point of sale; and maintenance of buffer zones to prevent inadvertent contamination from adjacent conventional fields.

The other key for organic gardening is to choose plant suited to the site and adapted to the specific climatic condition. These plants are by nature healthy and productive. Organic farming system rely on crop rotations, crop residues, animal manure, legumes, green manure, off and on farm organic wastes, mechanical cultivation, mineral bearing rocks and aspects of biological pest control, to maintain productivity and tilth, to supply plant nutrient and to control weeds and other pests.

The organic approach to gardening and farming recognizes that the whole environment in which plants grow is much more than the sum of its individual parts, and that all living things are inter-related and inter-dependent. Organic growing involves treating soil and nurturing environment as a resource to be husbanded for future generations.

Providing plant with a balanced food supply by feeding the soil living creatures that live with composts, manures and or organic materials. Choosing renewable resources, thereby creating a sustainable reducing pollution future. of the environment, recycling by garden. household and other wastes, rather than dumping and burning them.

Organic manures like farmyard manures, crop residues, biogas slurry, crop wastes, oilcakes, earthworms and composts help in improving fertility of soil. Application of these soil amendments would change the environment by rhizophere affecting porosity, aeration, temperature, water holding capacity and soil microflora. These manures contain the ingredients necessary for the crops such as nitrogen, phosphorous, potash, sulphur, calcium, and magnesium et. Role of earthworms is also important as earthworms play a critical role in aeration, soil turnover and promotion of microflora required for plant growth. In one hectare of soil, rich in organic matter and good moisture content,



one can expect a population of 50,000 to 4,00,000 earthworms, which are able to produce 25-30 tonnes of castings. Castings of the earthworms are rich in many soil nutrients such as nitrogen (2.5%), Sulphur (2.9%), potash (1.4%), Calcium, magnesium etc. Addition of organic amendments and castings of earthworms (rich in Actinomycetes) to soil been proved effective in have also number of diseases controlling and nematodes.

#### HOW DO ORGANIC FARMERS FERTILIZE CROPS & HOW DO THEY CONTROL PESTS, DISEASES, AND WEEDS?

Organic farmers build healthy soils by nourishing the living component of the soil, the microbial inhabitants that release, transform, and transfer nutrients. Soil organic matter contributes to good soil structure and water-holding capacity. Organic farmers feed soil biota and build soil structure and water-holding capacity. Organic farmers feed soil biota and build soil organic matter with cover crops, compost, and biologically based soil amendments. These produce healthy plants that are better able to resist disease and insect predation. Organic farmers' primary strategy in controlling pests and diseases is prevention through good plant nutrition and management. Organic farmers use cover crops and sophisticated crop rotations to change the field ecology, effectively disrupting habitat for weeds, insects, and disease organisms. Weeds are controlled through crop rotation, mechanical tillage, and hand-weeding, as well as through cover crops, mulches, flame weeding, and other management methods. Organic farmers rely on a diverse population of soil organisms, beneficial insects, and birds to keep pests in check. When pest populations get out of balance, growers implement a variety of strategies such as the use of insect predators, mating disruption, traps and barriers. Under the National Organic Rule, growers are required to use sanitation and cultural practices first before they can resort to applying a material to control a weed, pest or disease problem. Use of these materials in organic production is regulated, strictly monitored, and documented. As a last resort, certain botanical or other nonsynthetic pesticides may be applied.

Intensive agriculture with the use of agrochemicals in large amount has, no doubt, resulted in manifold increase in the productivity of farm commodities but the adverse effect of these chemicals are clearly visible to soil structure, soil microflora, quality of water, food, fodder and food materials. Pesticides and nitrates from fertilizers have been detected in ground water in many agricultural regions. High concentration of nitrates in drinking water affects human health, particularly infants and can prove fatal in some cases. Traces of banned DDT, BHC isomers have been found in soil, cereals, pulses, vegetables oils, bovine or human milk, butter fat, fish, meat, eggs, vegetables, fruits, animals feed and drinking water. The world Health Organization has estimated that globally atleast three million people are poisoned by pesticides every year, out of who 20,000 die. A majority of pesticides deaths are reported to be occurring in developing countries; which use only 25% of the global pesticides.

# WHAT DOES CERTIFIED ORGANIC MEAN?

Certified organic refers to agricultural products that have been grown and processed according to uniform standards, verified by independent state or private organizations accredited by the USDA. All



products sold as "organic" must be certified. Certification includes annual submission of an organic system plan and inspection of farm fields and processing facilities. Inspectors verify that organic practices such as long-term soil management, buffering between organic farms and neighboring conventional farms, and record keeping are being followed. Processing inspections include review of the facility's cleaning and pest control methods, ingredient transportation and storage, and record keeping and audit control. Organic foods are minimally processed to maintain the integrity of food without artificial ingredients or preservatives. Certified organic requires the rejection of synthetic agrochemicals, irradiation and genetically engineered foods or ingredients.

#### ORGANIC FOOD MORE NUTRITIOUS THAN CONVENTIONAL FOOD

The definitive study has not been done, mainly because of the multitude of variables involved in making a fair comparison between organically grown and conventionally grown food. These include crop variety, time after harvest, post-harvest handling, and even soil type and climate, which can have significant effects on nutritional quality. A 2002 report indicates that organic food is far less likely to contain pesticide residues than conventional food (13% of organic produce samples vs. 71% of conventional produce samples contained a pesticide residue, when long-banned persistent pesticides were excluded).

# **ORGANIC FOODS IS SAFE**

Organic food is as safe to consume as any other kind of food. Just as with any kind of produce, consumers should wash before consuming to ensure maximum cleanliness. As cited above, organic produce contains significantly lower levels of pesticide residues than conventional produce. It is a common misconception that organic food could be at greater risk of E. coli contamination because of raw manures application although conventional farmers commonly apply tons of raw manure as well with no regulation whatsoever. Organic standards set strict guidelines on manure use in organic farming: either it must be first composted, or it must be applied at least 90 days before harvest, which allows ample time for microbial breakdown of any pathogens.

#### ORGANIC FOOD REALLY A SIGNIFICANT INDUSTRY

Approximately 2% of the U.S. food supply is grown using organic methods. Over the past decade, sales of organic products have shown an annual increase of at least 20%, the fastest growing sector of agriculture. Organic foods can be found at natural food stores and major supermarkets, as well as through grower direct marketing such as CSAs (Community Supported Agriculture) and farmers' markets. Many restaurant chefs across the country are using organic produce because they desire its superior quality and taste. Organic food is also gaining international acceptance, with nations like Japan and Germany becoming international important organic food markets.

#### **ORGANIC COST MORE**

The cost of organic food is higher than that of conventional food because the organic price tag more closely reflects the true cost of growing the food: substituting labor and intensive management for chemicals, the health and environmental costs of which are borne by society. These costs include cleanup of polluted water and remediation of pesticide contamination. Prices for



organic foods include costs of growing, harvesting, transportation and storage. In the case of processed foods, processing and packaging costs are also included. Organically produced foods must meet stricter regulations governing all these steps than conventional foods. The intensive management and labor used in organic production are frequently (though not always) more expensive than the chemicals routinely used on conventional farms. There is mounting evidence that if all the indirect costs of conventional food production were factored into the price of food, organic foods would cost the same, or, more likely. is cheaper than conventional food.

#### AGRICULTURE'S CONTRIBUTION TO AIR POLLUTION & CLIMATE CHANGE

Public attention tends to focus on the more visible signs of agriculture's impact on the environment, whereas it seems likely that the non-visible or less obvious impacts of air pollution cause the greatest economic costs. Agriculture affects air quality and the atmosphere in four main ways: particulate matter and GHGs from land clearance by fire (mainly rangeland and forest) and the burning of rice residues; from rice and methane livestock production; nitrous oxide from fertilizers and manure; and ammonia from manure and urine.

### POLLUTION FROM BIOMASS BURNING

Soot, dust and trace gases are released by biomass burning during forest, bush or rangeland clearance for agriculture. Burning is traditionally practiced in "slash and burn" tropical farming, in firing of Savannah regions by pastor lists to stimulate forage growth and in clearing of fallow land and disposing of crop residues, particularly rice. This burning has had major global impacts and has caused air pollution in tropical regions far away from the source of the fires. Two developments should result in an appreciable fall in air pollution from biomass burning. Deforestation often achieved is bv burning, or fire is used after timber extraction to remove the remaining vegetation. The projected reduction in the rate of deforestation will slow down the growth in air pollution. The shift from extensive to intensive livestock production systems will reduce the practice of rangeland burning under extensive grazing systems, although the latter systems seem likely to remain dominant.

Organic agriculture is a production management system, which favors renewable resources and recycling and returning to the soil the nutrients found in waste products. With regard to livestock, organic farming places particular emphasis on animal welfare and the use of natural foodstuffs. Organic farming uses the environment's own systems for controlling pests and diseases in growing crops and rearing livestock and avoids the use of synthetic pesticides, herbicides, synthetic fertilizers, growth promoters and gene manipulation, as well as the prophylactic use of antibiotics and the zoo technical use of hormones. In turn, organic farmers use a range of techniques that help sustain ecosystems and reduce pollution.

# **FUTURE THRUSTS**

- Developing and facilitating various systems for organic produce sales,
- Targeting organic farming to environmentally sensitive areas,
- Encouraging the exchange of technical information between farmers,



- Ensuring that the Common Agricultural Policy supports the development of organic farming,
- Ensuring traceability and organic food authenticity.

#### THE BENEFITS OF ORGANIC FARMING ON RURAL DEVELOPMENT

Organic farming and integrated farming also represent real opportunities on several contributing to levels. vibrant rural economies through sustainable development. Indeed, new employment opportunities in farming, processing and related services are already evident in the growth of the organic sector. As well as environmental advantages, the these farming systems can bring significant benefits both to the economy and the social cohesion of rural areas. The availability of financial support and other incentives for farmers to convert to organic production is designed to help the sector grow still further and to support associated businesses throughout the food chain.

#### THE ROLE OF ORGANIC FARMING IN ENHANCING BIODIVERSITY

In organic agriculture, biodiversity is both instrument and aim. Natural ecological balance, below and above ground, is key to its success. A healthy soil is the base for food production and a diversity of plants and animals on land prevents pest and disease outbreaks. Although, organic agriculture is committed to the conservation and enhancement of biodiversity, many systems today remain limited to input substitution. To be unlocked, the real potential of organic agriculture on biodiversity requires a stronger shift to a systems approach, based on improved understanding of ecosystem functions.

The presentation below describes the promising, but still scattered, results observed in organic agriculture systems. The food chain is described for soil systems, farming systems and the larger ecosystem. This involves descriptions of the impact of organic management on soil biodiversity, genetic resources for food and agriculture and wildlife biodiversity.

# ORGANIC AGRICULTURE NURTURES SOIL BIODIVERSITY

Building of soil fertility is the cornerstone of organic agriculture. Organic practices create suitable conditions for soil biotic and abiotic resources through: manipulation of crop rotations and stripcropping; green manuring and organic fertilization (animal manure, compost, crop residues); minimum tillage; and avoidance of pesticides and herbicides use. Europe Scientific research in has demonstrated that organically managed significantly increase biological soils activity and total density and diversity of soil microorganisms. Such biodiversity enhances nutrients recycling and soil structure.

# ORGANIC AGRICULTURE AND NATURE CONSERVATION

There is no doubt that farmers are the most important managers of natural resources. Several studies indicate that organic agriculture safeguards non-agricultural biodiversity and offers a viable alternative in protected area categories where human activities are allowed. Most importantly, huge land surface surrounding the protected areas requires an agro-ecosystem management that preserves the safety and integrity of the landscape. If farmland bordering and connecting protected areas employ organic methods, there is no reason to fear the loss of wildlife or contamination of air, water and soil. These



buffer zones are critical to the success of conservation in the protected areas. Organic agriculture enhances people's ability to live in harmony with nature and to derive economic benefit from their land. Considering that most protected areas traditionally belonged to local villagers, organic agriculture allows local people to maintain some control over their land, protect land and biodiversity through their farming practices, reap its benefits for themselves and, at the same time, conserve and improve the natural environment. The direct impact that organic agriculture has on ecosystems can be seen on different scales: on-farm, farm margins, and overall ecosystem. While on-farm biodiversity has been discussed in the sections above, the following sections will consider the interactions of organic agriculture with the wider landscape, namely protected areas and buffer zones.

# CONCLUSION

Farmers and forest dwellers are the main users and managers of the earth's natural resources. Land management, including its domesticated and wild biodiversity, relies on agricultural activities that build selfregenerating food systems. The sustainable management of farms and the appropriate agricultural and environmental policies has a great responsibility with regards to the linkages between agriculture and nature conservation.

Meeting food needs while protecting the natural heritage is a challenge shared by all countries of the planet. Organic agriculture can meet this challenge head-on by:

Promoting market-based incentives that compensate farmers for their stewardship efforts, thus maintaining their economic viability;

- Replacing polluting agricultural practices with approaches that can reverse the dramatic trends in biodiversity loss;
- Thriving on community participation in land conservation.

Organic agriculture has demonstrated its ability to not only produce commodities but also to "produce" biodiversity at all levels. However, it is logical to assume that in wild areas, organic agriculture is a disturbance to natural habitats by the very fact of human intervention. In any case, it offers an important step towards a solution to many of the threats that conventional agriculture has on biodiversity. Organic agriculture should be considered simply as the most appropriate starting point from additional conservation needs. which where they exist, can be built. Its widespread expansion would be a costefficient policy option for biodiversity.

Research and development is necessary to better understand the complex ecological processes as well as the management capacity of farmers. If organic agriculture is given the consideration it merits, it has the potential to transform agriculture as the for main tool nature conservation. Reconciling biodiversity conservation and food production depends upon a societal commitment supporting organic to agriculture. Thus, organic gardening is combating pests and diseases without using pesticides that may prove harmful to human health and that of domestic and wild animals. Encouraging and protecting wildlife, by creating suitable habitats and by minimizing use of harmful pesticides. Creating a safe and pleasant environment in which to work and play; moving with the times-taking new scientific discoveries and ideas into account, as well as the best traditional knowledge. Organic gardening



#### Indian Journal of Organic Farming Volume 1 Issue 1

2021

is not a closed farming strategy. Scope for utilizing all renewable natural resources for farm production taking into consideration eco-system and environmental protection forming way for sustained use of farm inputs is open. gardening good Organic using horticultural practices; recognizing the importance of genetic diversity and hence the preservation of threatened plant varieties. Thus. organic farming is certainly an answer for making available safe food and clean environment.

#### REFERENCES

- 1) A. Howard, An Agricultural Testaments, Oxford University Press, 1940.
- E. A. Stockdale, N. H. Lampkin, M. Hovi et al., "Agronomic and environmental implications of organic farming systems," Advances in Agronomy, vol. 70, pp. 261–327, 2001.
- P. K. Chhonkar, "Organic farmingmyth and reality," in Proceedings of the FAI Seminar on Fertilizer and Agriculture meeting the Challenges, New Delhi, India, December 2002.
- P. K. Sofia, R. Prasad, and V. K. Vijay, "Organic farming tradition reinvented," Indian Journal of Traditional Knowledge, vol. 5, no. 1, pp. 139–142, 2006.

- 5) S. Chandra and S. K. Chauhan, "Prospects of organic farming in India," Indian Farming, vol. 52, no. 2, pp. 11–14, 2004.
- 6) K. K. M. Nambiar, P. N. Soni,M. R. Vats, D. K. Sehgal, and D.K.Mehta, "AICRP on long term fertilizer experiments," Annual Reports 1987-88 and 1988-89, IARI, New Delhi, India, 1992.
- S. Kalyan, "Development of sustainable farming system model for the Irrigated agro-ecosystem of Eastern UP, ICAR, Adhoc project," Final Annual Report, Department of Agronomy, Institute of Agricultural Science, Banaras Hindu University, Varanasi, India, 2005.
- A. Inoko, "Compost as source of plant nutrients," in Organic Matter and Rice, S. Banta and C. V. Mendoza, Eds., pp. 137–146, IRRI, Los Banos, Philippines, 1984.
- 9) Z. I. Zhu, C. Q. Liu, and B. F. Jiang, "Mineralization of organic nitrogen, phosphorus and sulphur in some paddy soils in China," in Organic Matter and Rice, pp. 259–272, IRRI, Los Banos, Philippines, 1984.
- 10) H. L. S. Tandon, "Fertilizers and their integration and organics and biofertilizers," in Fertilizers, Organic Manures, Recyclable Wastes and Bio-Fertilizers, H. L. S. Tandon, Ed., pp. 32–36, FDCO, New Delhi, India, 1992.