

## Organic Farming for Crop Improvement and Sustainable Agriculture

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### SUMMARY

Sustainable development has caught the imagination and action of the world for more than a decade. Sustainable agriculture is necessary to attain the goal of sustainable development. According to the Food and Agriculture Organization (FAO), sustainable agriculture is the successful management of resources to satisfy the changing human needs while maintaining or enhancing the quality of environment and conserving natural resources. Organic farming is one of the several approaches found to meet the objectives of sustainable agriculture. Organic farming is one of the widely used methods, which is thought as the best alternative to avoid the ill effects of chemical farming. It also has far more advantages over the conventional and other modern agricultural practices that are available today.

### INTRODUCTION

There are several definitions of organic farming but the most coherent and stringy definition is given by the US Department of Agriculture (USDA). According to it, organic farming is defined as a system that is designed and maintained to produce agricultural products by the use of methods and substances that maintain the integrity of organic agricultural products until they reach to the consumers. Organic farming seems to be more appropriate, as it considers the most important aspects like sustainability of natural resources and environmental safety. It is a production system which favour maximum use of organic materials (like crop residue, animal residue, legumes, on and off farm wastages, growth regulators, bio-pesticides) and discourages the use of synthetically produced agro-inputs for maintaining soil productivity, fertility and pest management under conditions of sustainable natural resources and healthy environment.

### Principles of Organic Farming:

- To work within a closed system and draw upon local resources as much as possible
- To maintain long-term fertility of soils
- To avoid all forms of pollution that may result from agricultural techniques
- To produce foodstuffs in sufficient quantity and having high nutritional quality
- To minimize the use of fossil energy in agricultural practices
- To give livestock conditions of life that confirm to their physiological needs
- To make it possible for agricultural producers to earn a living through their work and develop their potentialities as human being

### The main pillars of organic farming are:

- Organic threshold standards
- Reliable mechanisms regarding certification and regulatory affairs
- Technology packages
- Efficient and feasible market network

### Components of Organic Farming

#### Crop and Soil Management

Organic farming system encourages the use of rotations and measures to maintain soil fertility. Carefully managed soil with a high production of humus offers essential advantages with respect to the water retention capacity, ion exchange, soil erosion and animal life in the soil. Green manuring and inter-cropping of legumes is another important aspect for biological farming systems. It not only helps in controlling weeds but also in improving its chemical and physical properties by reducing the leaching of nutrients and reducing soil erosion

### **On-farm Waste Recycling**

Increase in price of chemical fertilizers has enabled organic wastes to regain an important role in the fertilizer practices on the farm. Good manure management means improved fertilizers value of manure and slurry and less nutrient losses. Composting of all organic wastes in general and Farm Yard Manure (FYM) or feedlot manure in particular is important in organic farming.

### **Non-chemical Weed Management**

Weed management is one of the main concerns in organic agriculture. Generally, all aspects of arable crop production play an important role in a system approaching to problems. The elements to consider in preventing weed problems are crop rotation, green manuring, manure management and tillage. Mulching on a large scale by using manure spreaders may also be useful in weed control.

### **Domestic and Industrial Waste Recycling**

Use of sewage and sludge for crop production can form an important component of organic farming if treatment and application methods are improved further.

### **Energy Use**

The energy required for production, measured per rupees of produce for organic farms is only one third compared to their conventional counterparts. Because N fertilizer and pesticides are not used by biological farmers, the comparison of total energy input/ha with total energy output favours biological farming systems.

### **Food Quality**

Food quality is one of the main issues, which concerns both scientists and consumers. Nitrates in water and farm produce, desirable components, pesticide residues, keeping quality and physiological imbalances are some of the important aspects of food quality.

### **Integrated Intensive Farming System (IIFS)**

IIFS involves intensive use of farm resources. To be ecologically sustainable, such intensification should be based on techniques which are knowledge intensive and which replace to the extent possible, market purchased chemical inputs with farm grown biological inputs.

### **Microbial Fertilizers/Biofertilizers As A Nontraditional Additive for Organic Farming:**

Bio-fertilizers are the biological active product called microbial inoculates containing active strain of selective micro-organisms like bacteria, fungi, algae or in combination.

### **Advantages of Bio-Fertilizers**

- They enhance bio-mass production and grain yield by 10-20%
- They are cheap and can help to reduce the consumption of chemical fertilizer
- They make nitrogen available directly to the plant
- They solubilize phosphorus and increase phosphorus uptake to the plants
- They enhance plant growth due to release of hormones, vitamins, auxins
- They improve the soil properties and sustain soil fertility
- They control and suppress soil borne diseases
- They are suitable in organic farming.

### **Utilization of Green Manuring Crops in Organic Farming**

Green manuring is an essential component of tropical organic farming using green manures, often known as cover crops, are plants which are grown to improve the structure and nutrient content of the soil.

### **Advantages of Green Manuring**

- It adds organic matter to the soil
- The green manure crop return plant nutrients taken up by the crop from deeper layers, to the upper top soil
- It improves the structure of soil and other physical properties
- It facilitates penetration of rain water, thus decreasing run-off and erosion
- The green manuring crops hold plant nutrient that would otherwise be lost by leaching
- Leguminous plants add nitrogen to the soil
- It increases the availability of certain plant nutrients like phosphorus, calcium, potassium, magnesium and iron

### **CONCLUSION**

Agriculture remains the key sector for the economic development of most developing countries, because for development, any country should be self-sufficient for food shelter and cotton. To make a country self-sufficient, there has been intensive use of fertilizer for the last four decades, which has created several problems linking excessive fertilizer use with environment. Increased amount of nitrate in drinking water is due to excessive and improper use of nitrogen fertilizers, which is most important fertilizer related pollution issues. To overcome such problems organic farming receives the top priority in sustainable agriculture. Experiments conducted on different legume crops grown under varying agro-ecological conditions proved the potentiality of bio-fertilizer and organic wastes as important source of plant nutrients. Organic farming is practical proposition for sustainable agriculture if adequate attention is paid to this issue.

### **REFERENCES**

Rajib Roychowdhury *et al.* / OnLine Journal of Biological Sciences 13 (2): 50-65, 2013