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Organic farming Systems and benefits of organic agriculture

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Introduction:

What is Organic Agriculture

For some people organic agriculture is "farming without chemical fertilizers and pesticides". This is short and concise, but misses important characteristics. Organic agriculture follows the logic of a living organism in which all elements (soil, plants, farm animals, insects, the farmer etc.) are closely linked with one other. Organic farming therefore must be based on a thorough understanding and clever management of these interactions and processes. The US Department of Agriculture has framed the following definition: "Organic farming is a production system that avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming systems rely on crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, and aspects of biological pest control to maintain soil productivity and tilt, to support plant nutrients and to control insects, weeds and other pests."

Principles and Aims of Organic Agriculture

In a process of several decades, the international organic community, organized in the IFOAM movement (International Federation of Organic Agriculture Movements), agreed on a common understanding of what the principles of organic agriculture are. IFOAM clearly formulated the minimum requirements in the "IFOAM Basic Standards". These standards are based on a number of principles that show that organic farming is much more than renouncing the use of agro-chemicals.

A System Approach

Conventional farming puts its focus on achieving maximum yields of a specific crop. It is based on a rather simple understanding: crop yields are increased by nutrient inputs and are reduced through pests, diseases and weeds – elements that must be combated. Organic agriculture is a holistic way of farming: besides production of goods of high quality, an

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important aim is the conservation of the natural resources fertile soil, clean water and rich biodiversity. The art of organic farming is to make the best use of ecological principles and processes. Organic farmers can learn a great deal from studying the interactions in natural ecosystems such as forests.

Ecological Sustainability

- < recycling the nutrients instead of applying external inputs
- < no chemical pollution of soil and water
- < promote biological diversity
- < improve soil fertility and build up humus
- < prevent soil erosion and compaction
- < animal friendly husbandry
- < using renewable energies

Social Sustainability

- < sufficient production for subsistence and income
- < a safe nutrition of the family with healthy food
- < good working conditions for both men and women
- < building on local knowledge and traditions

Economic Sustainability

- < satisfactory and reliable yields
- < low costs on external inputs and investments
- < crop diversification to improve income safely
- < value addition through quality improvement and on-farm processing
- < high efficiency to improve competitiveness

Bio-dynamic Agriculture

Bio dynamic farming is a special type of organic agriculture. It fulfils all principles and standards of organic farming but goes a step beyond: bio-dynamic farming includes a spiritual dimension of agriculture. It is based on the concept of "anthroposophy" developed in the 1920's by the Austrian philosopher Rudolf Steiner. He aimed at a new approach to science which integrates observation of natural phenomena and spiritual dimensions. In the words of Steiner: "Matter is never without spirit, and spirit never without Matter."

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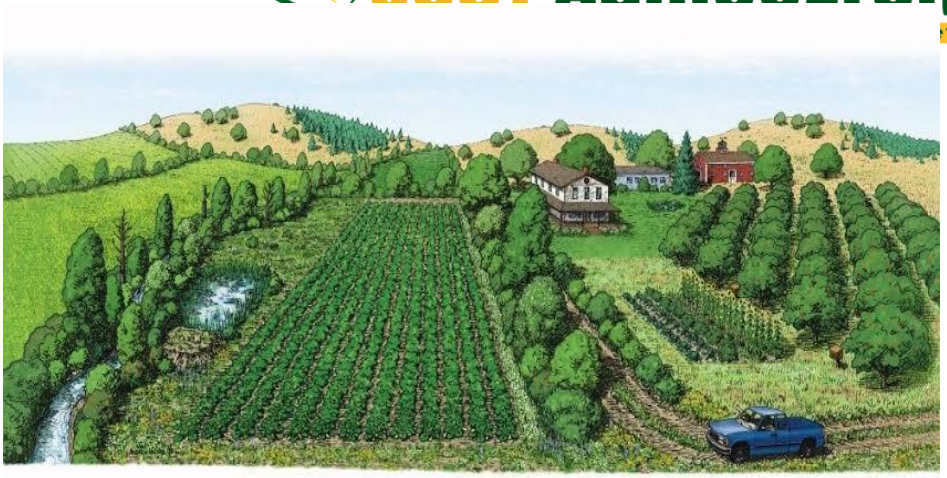

Some foundations of bio-dynamic farming are:

Cosmic Rhythms:

The rhythms of the sun, moon, planets and stars influence the growth of plants. By timing the activities of tillage, sowing and harvesting, the farmer can use this influence to the crops´ advantage.

Vitality:

Besides the physical and chemical characteristics, matter has a vital quality which influences organisms. Thus, bio-dynamic farmers and gardeners aim at quality, and not only quantity.

Biodynamic Preparations:

Certain naturally occurring plant and animal materials are combined in specific preparations and applied in highly diluted form to compost piles, to the soil or directly to the plants. The forces within these preparations shall organize the elements within the plants and animals.

The Farm Organism:

A farm is considered as a whole organism integrating plants, animals and humans. There should be just the right number of animals to provide manure for fertility, and these animals should be fed from the farm itself.

For product marketing services:

Bio-dynamic farmers are organized in a worldwide certification system named "Demeter". The "Demeter"-label is used to assure the consumer that the product has been produced by bio-dynamic methods.

Traditional Organic Farming

Agro-chemicals have been used on a large scale only since the 1960's. Therefore, farming communities which have not been influenced by the so-called "Green Revolution" automatically meet the most important criteria of organic agriculture, i.e. the non-use of any chemical fertilizers, pesticides and genetically modified organisms. These agricultural systems are referred to as "Traditional Farming". Is Traditional Farming Organic? Agro-chemicals have been used on a large scale only since the

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Sustainable" Agriculture

As the negative environmental impact of green revolution in agriculture became more and more obvious, sustainability in agriculture became a widely accepted objective. Sustainable kinds of agriculture claim to be environmentally sound, resource-conserving, economically viable, socially supportive and commercially competitive. As far as goals are concerned, sustainable agriculture therefore has much in common with organic agriculture. However, there is no general agreement to what extent sustainability must be achieved and which methods and inputs can be accepted. Therefore, systems which do use chemical fertilizers, pesticides or genetically modified organisms are classified as sustainable. Integrated Production (IP) or Integrated Pest Management (IPM), for example, only avoids certain highly toxic pesticides and reduces the application of others to a certain extent. Systems such as Low External Input (Sustainable) Agriculture (LEIA or LEISA) or eco-farming partially renounce the use of agrochemicals. They seek to optimize the use of locally available resources by interlinking the components of the farm system so that they complement each other and have the greatest possible synergistic effect.

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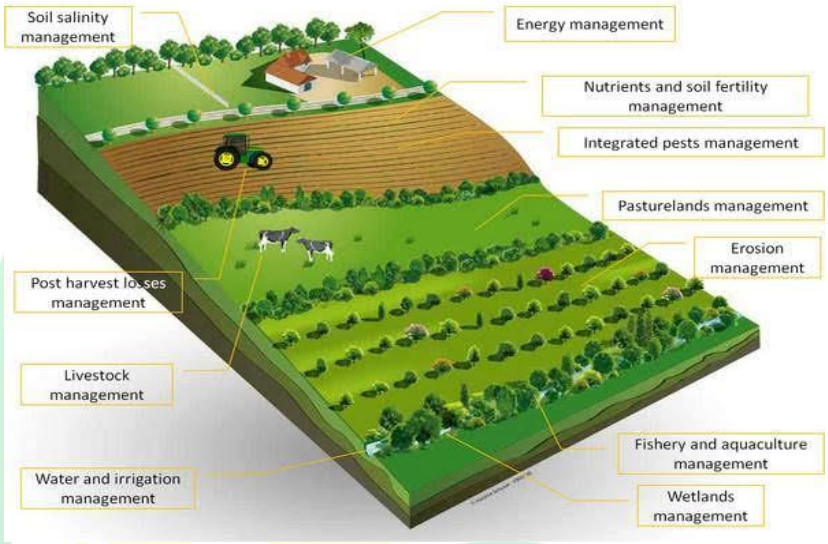
Integrated Production (IP)

Integrated Production (IP) has gained importance over the last few years, especially in economies of transition and in industrialized countries. It does not refrain from using agro-chemicals, but aims at a reduction of its application. For plant protection, a combination of bio-control methods and chemical pesticides is used (Integrated Pest Management). If damage by pest or disease reaches defined threshold levels, chemical



pesticides are applied. For plant nutrition, chemical fertilizers can be used, but usually maximum amounts are defined. Herbicides also are used.

Why Organic Agriculture

After the initial success of the "Green Revolution" it became evident that this kind of farming has many unwanted side effects, both on natural resources (soil, water, bio-diversity) and on human health:

< Soil: Vast areas of once fertile lands were degraded due to soil erosion, salinization or a general loss of soil fertility.

< Water: Fresh water resources have been polluted or over-exploited through intense use of agro-chemicals and excessive irrigation.

< Bio-diversity: Many wild and cultivated plant and animal species were wiped out and landscapes became dull.

< Human Health: Residues of harmful pesticides in food or drinking water endanger both farmer's and consumer's health. Further health risks from antibiotics in meat, BSE infection (mad cow disease) and genetically modified organisms (GMO).

< In addition, this kind of agriculture is based on an excessive use of external inputs and consumes a lot of energy from non-renewable resources.

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Benefits of Organic Agriculture

< soil conservation and maintenance of soil fertility
< less pollution of water (groundwater, rivers, lakes)
< protection of wildlife (birds, frogs, insects etc.)
< higher biodiversity, more diverse landscape
< better treatment of farm animals
< less utilization of non-renewable external inputs and energy
< less pesticide residues in food
< no hormones and antibiotics in animal products
< better product quality (taste, storage properties)