

2 Principles of Organic Agriculture

2.1 What is Organic Agriculture?

Introduction

There is a lot of confusion on what actually means organic agriculture. The word “organic” means “of plant or animal origin”, but it also refers to the organisational aspect of an organism. Therefore, “organic agriculture” is not a very precise term. For some people it is the kind of agriculture which is based on organic manures or other natural inputs, i.e. minerals or pesticides of plant origin. In this view, emphasis is given to the renunciation of fertilizers and pesticides which are synthetic or chemical.

For others it refers to agricultural systems, which follow the principles and logics of a living organism in which all elements (soil, plants, farm animals, insects, the farmer etc.) are closely linked with each other. Organic farming therefore must be based on a thorough understanding and clever management of these interactions and processes.

Organic Agriculture is often defined by organic standards which explain what the principles are and which methods and inputs are not permitted. While standards are well suited to define a minimum common ground for the various kinds of organic agriculture, they do not provide many guidelines on how an ideal organic farming system should look like.

2.1.1 Principles and Aims of Organic Agriculture

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 they get reduced through pests, diseases and weeds, which therefore must be combated. Organic agriculture is a holistic way of farming: besides production of goods of high quality, an 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 lot from studying the interactions in natural ecosystems such as forests. The following section shows how principles of a natural ecosystem can be used for designing an organic farming system.

Lessons to be learnt

- *Natural ecosystems can be a model for organic farming systems.*
- *Understand the difference between organic agriculture and related systems.*
- *Organic farming is not a step back to traditional methods but a modern approach.*
- *Become familiar with the advantages, but also with the limitations of Organic Farming.*

Motivation:What is Organic Agriculture?

Ask the participants: How would you define "Organic Agriculture"? Note down the suggestions in keywords on a board, discuss. Come back to the notes in the end of the session and check whether the participant's understanding has changed.

Alternatively, you can put some possible definitions on the board and let the participants give their preference and comments one by one. For this, each participant gets two stickers (pens will also do), a green one and a red one, which he or she can stick to the definitions. Green shows agreement with the selected definition, red disagreement. While placing their stickers, participants shall explain their choice. Conclude by rating the definitions according to the result of the evaluation.

Nutrient cycles in forests

Trees and other plants take up nutrients from the soil and incorporate them in their biomass (leaves, branches etc.). The nutrients go back to the soil when leaves fall or plants die. Part of the biomass is eaten by various animals (including insects), and their excrements return the nutrients to the soil. In the soil, a huge number of soil organisms are involved in the decomposition of organic material which makes nutrients available to plant roots again. The dense root system of the forest plants collects the released nutrients almost completely.

→ Recycling nutrients in organic farms

Organic nutrient management is based on biodegradable material, i.e. plant and animal residues which can be decomposed. Nutrient cycles are closed with the help of composting, mulching, green manuring, crop rotation etc. Farm animals can play an important role in the nutrient cycle: their dung is of high value and its use allows to recycle nutrients provided with the fodder. If carefully managed, losses of nutrients due to leaching, soil erosion and gasification can be reduced to the minimum. This reduces the dependency on external inputs and helps to save costs. However, nutrients exported from the farm with the sold produce need to be replaced in some way.

Soil fertility in forests

Soil and its fertility both together constitute the centre of the natural ecosystem. A more or less permanent soil cover prevents soil erosion and it helps to build up soil fertility. The continuous supply of organic material feeds a huge number of soil organisms and provides an ideal environment for them. As a result the soil becomes soft and capable of taking up and storing large quantities of water.

→ Soil protection in organic farms

Organic farmers give central importance to the maintenance and improvement of soil fertility. They stimulate the activity of soil organisms with organic manures and avoid harming them with chemical pesticides. Mulching and cover crops are used among other methods to prevent soil erosion.

Diversity in forests

Forests host a high diversity of plant varieties of different size, root systems and requirements. Animals are also part of the system. If one organism drops out, it is immediately replaced by another one which fills the gap. Thus space, light, water and nutrients are used to the optimum. The result is a very stable system.

Illustration: Comparing natural and agro-ecosystems

With the help of the following sections and the transparency, explain how the "wisdom" of natural systems are used in organic farms. Illustrate your messages with pictures and examples of local ecosystems and farming practises.

→ Crop diversity in organic farms

Organic farms grow several crops including, trees, either as mixed cropping or in rotation. Animals are an integrated part of the farm system. The diversity not only allows optimum use of the resources but also serves as an economic security in case of pest or disease attack or low market prices for certain crops.

Eco-balance in forests

Pests and diseases do occur in natural ecosystems, but they rarely cause a big damage. Due to the diversity it is difficult for them to spread. Plants usually can recover from an infestation on their own. And many pests are controlled by other organisms such as insects or birds.

→ Bio-control in organic farms

Organic farmers try to keep pests and diseases at a level which does not cause economical damage. The main focus is on supporting the health and resistance of the crop. Beneficial insects are promoted by offering them a habitat and food. If pests reach critical levels, natural enemies and herbal preparations are used.

2.1 What is Organic Agriculture? 2.1.1a

System Approach: Using natural ecosystems as a model

Natural forest ecosystem	→	Organic farm ecosystem
 <p>Diversity Ecobalance Nutrient Cycles Soil fertility</p>		 <p>Crop diversity Bio-control Recycling nutrients Soil protection</p>

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Transparency 2.1.1a: Using a natural forest ecosystem (left) as a model for an "ideal" organic farming system (right).

Discussion: Organic farm ecosystems

Discuss with the participants which of the principles of natural ecosystems they can identify in traditional or organic farm ecosystems of the area. What is their significance for the farmer? Which elements could be included in order to improve the farms?

Back to nature?

Organic farming wants to follow the laws of nature. Does it mean that organic farms must be as close to natural systems as possible? Within the organic movement one will find farmers who focus on natural farming, and others who take a purely commercial approach. The majority of organic farmers probably is somewhere in between these two extremes. Most farmers will expect to get sufficient production from the farm to make a living. For them the challenge is to follow the principles of nature to achieve a high productivity.

Brain storming: What do you expect from organic agriculture?

Ask the participants: «Why are you interested in Organic Farming? What do you expect from organic farming?»

Draw a triangle on the board with the three dimensions of sustainability: ecological aims, economical aims and social aims. Distribute cards and pens to the participants and ask them to write their personal aims and expectations regarding organic agriculture on cards (one aim per card) and pin them on the board. You can also use this exercise as an ice-breaker: divide the participants in groups, supply each group with cards of a particular colour and make a competition among them as to which group manages to name most aims. Conclude the exercise by commenting and discussing the result. Use transparency 2.1.1b in the next section.



Illustration: A brainstorming session on personal sustainability aims concerning organic farming in a training in India.

Sustainability Aims

Organic agriculture claims to be sustainable. But what does sustainability mean? In the context of agriculture, sustainability basically refers to the successful management of resources of agriculture to satisfy human needs while at the same time maintaining or enhancing the quality of the environment and conserving natural resources. Sustainability in organic farming must therefore be seen in a holistic sense, which includes ecological, economical and social aspects. Only if the three dimensions are fulfilled, an agricultural system can be called sustainable.

Ecological sustainability

Some important aspects are:

- 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

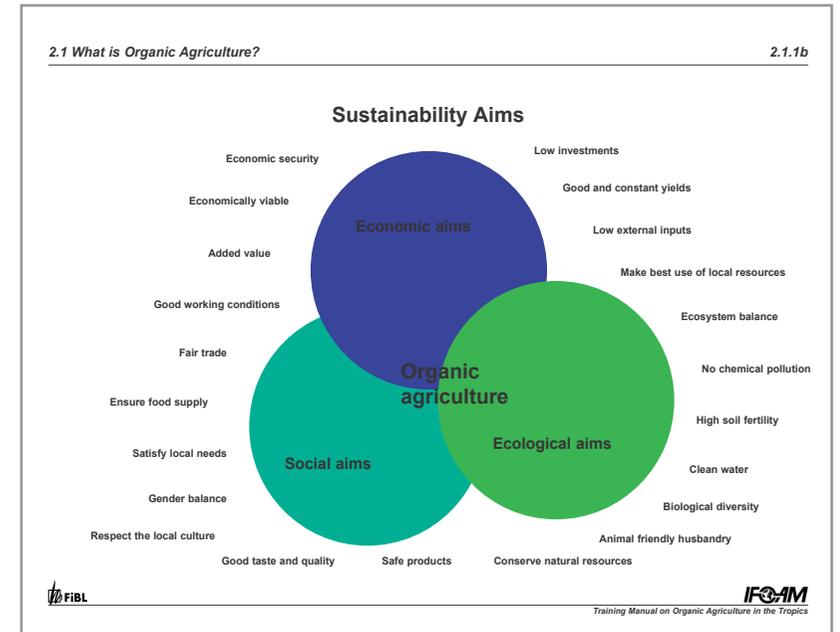
Some important aspects are:

- 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

Some important aspects are:

- 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



Transparency 2.1.1b: The three dimensions of sustainability aims in organic farming, with some examples.

Principles of Organic Agriculture

In a process of several decades, the international organic community, organised in the IFOAM movement, agreed on a common understanding on what the principles of organic agriculture are. They formulated clearly the minimum requirements as written down in the IFOAM Basic standards. These standards are based on a number of principles as given in the introduction of the standards. They address both the general level as well as the field level. The principles show that organic farming is much more than the renunciation of agro-chemicals.

2.1 What is Organic Agriculture? 2.1.1c

Principles of Organic Agriculture

<p>On a general level:</p> <ul style="list-style-type: none">• Improve and maintain the natural landscape and agro-ecosystem• Avoid over-exploitation and pollution of natural resources• Minimize consumption of non-renewable energy and resources• Produce sufficient quantities of nutritious wholesome and high quality food• Provide adequate returns, within a safe, secure and healthy working environment• Acknowledge indigenous knowledge and traditional farming systems	<p>On a practical level:</p> <ul style="list-style-type: none">• Maintain and increase the long-term fertility of the soil• Enhance biological cycles within the farm, especially nutrient cycles• Provide nitrogen supply by intensive use of nitrogen fixing plants• Biological plant protection based on prevention instead of curing• Diversity of crop varieties and animal species, appropriate to the local conditions• Animal husbandry appropriate to the needs of the animals• Ban on synthetic chemical fertilisers, plant protection, hormones and growth regulators• Prohibition of Genetic Engineering and its products• Ban on synthetic or harmful methods, processing aids and ingredients in food processing
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(Adapted from IFOAM Basic Standards and Naturland Principles) Training Manual on Organic Agriculture in the Tropics

Transparency 2.1.1c: A summary of the principles of organic farming according to IFOAM

Discussion: Practical relevance of the principles

Discuss the cited principles one by one. Ask the participants whether they agree with each principle and whether they make sense in local conditions. What needs to be done to achieve the principles in local organic farms?

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.»

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 advantage of the crops.
- **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 marketing their products, bio-dynamic farmers are organised in a world wide certification system named "Demeter". The «Demeter»-label is used to guarantee the consumer that the product has been produced by biodynamic methods.

Other systems of organic agriculture

There is a range of farming systems which usually come under organic farming as long as they fulfil the minimum requirements of the organic standards. Some examples are permaculture and nature-farming. Usually, they cannot be strictly defined as they do not have specific standards.

Organic by Neglect?

In some areas, perennial plantations are farmed with low intensity, by just stopping any nutrient supply or pest management, but continuing to harvest the produce. While maintenance costs thus are low, yields decrease after some time. Some of these neglected plantations got organic certification as they fulfil the minimum criteria of the standards. However, it is rather doubtful whether this approach offers a long term perspective for farmers. As organic farming wants to contribute to food security, organic by neglect is not the right strategy.

2.1 What is Organic Agriculture? 2.1.1d

Bio-dynamic agriculture

Cosmic rhythms:
○ timing the activities of tillage, sowing and harvesting

Vitality:
× quality, not only quantity

Biodynamic preparations:
○ specific preparations applied in diluted form

The Farm Organism:
× the right number of animals






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Transparency 2.1.1d: Characteristics of bio-dynamic agriculture (left), a photo of its founder Rudolf Steiner, cow horns filled with cow dung for the preparation of a bio-dynamic preparation, and the Demeter logo.

2.1.2 Distinction From Other Farming Systems

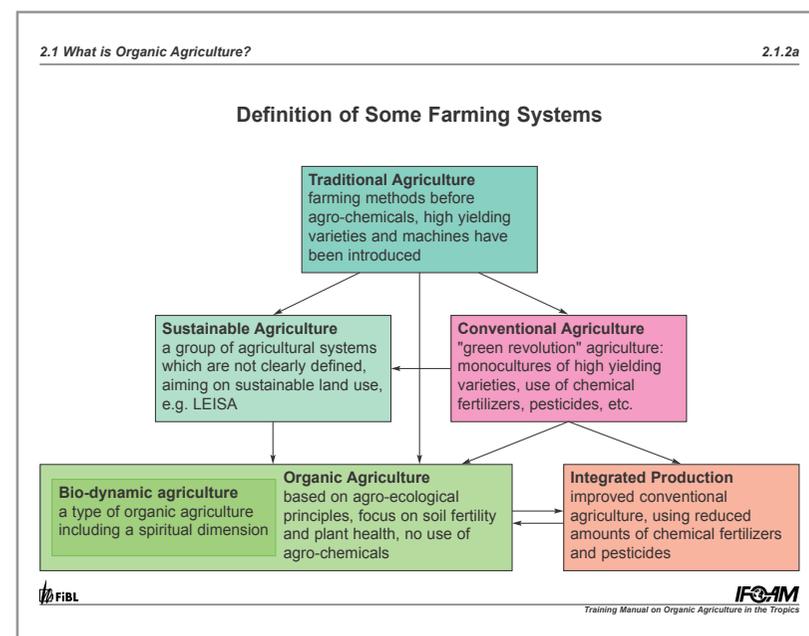
«Sustainable» Agriculture

Since 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. Concerning the goals, sustainable agriculture therefore has much in common with organic agriculture.

However, there is no general agreement to which extent sustainability must be achieved and which methods and inputs can be accepted. Therefore, also systems which do use chemical fertilizers, pesticides or genetically modified organisms call themselves 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 (see section below).

Systems like Low External Input (Sustainable) Agriculture (LEIA or LEISA) or eco-farming partially renounce the use of agrochemicals. They seek to optimise 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. External inputs shall only be used to provide elements that are deficient in the ecosystem and to enhance available biological, physical and human resources.

It is not always possible to draw a clear line between different systems. There are sustainable agriculture systems which are also organic, and there are even organic farms which are not really sustainable, though they fulfil the minimum requirements of the standards.



Transparency 2.1.2a: An attempt to distinguish between some commonly used terms of agricultural systems. The arrows show how they can transform from one type into another.

Discussion: Is organic farming sustainable?

Discuss the provoking questions with the participants in the plenum. Which organic farms do they know or did they hear from? What is their opinion on whether these are sustainable or not? What must be changed to achieve sustainability.

If possible, you can prepare some brief case studies of different organic farms in the region or elsewhere.

Is traditional farming organic?

Agro-chemicals have been used in 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 fertilisers, pesticides and genetically modified organisms. These agricultural systems are referred to as "Traditional Farming".

Over the last few decades, the focus in agriculture typically shifted from mainly subsistence agriculture (for own consumption) to market production (for gaining a financial income). In many countries, the density of population increased tremendously and many traditional farming systems have been unable to meet the yield expectations of the farmers. Due to reduced fallow periods, overgrazing or exploitative cultivation, many traditionally farmed areas face severe degradation. At the same time, higher yielding crop varieties have been introduced which are more prone to diseases. Organic farming tries to meet the increased needs of the growing population while not risking the long-term productivity of the farmland.

Many methods and techniques of organic agriculture have originated from various traditional farming systems all over the world. However, not all traditional systems make use of these methods, sometimes for the simple reason that they are not known in a specific region. In addition, organic farming disposes of a range of rather modern technologies such as the use of antagonistic microbes in pest management, high yielding but disease resistant varieties or the use of highly efficient green manure plants.

Whether a certain traditional farming system can be called organic will depend on whether all the organic standards are fulfilled. For instance, some traditional systems get in conflict with the requirements of organic animal husbandry (e.g. sufficient space and free move), the necessary prevention of soil erosion, the ban to cut forests and to burn biomass (e.g. slash and burn systems).

2.1 What is Organic Agriculture?		2.1.2b
Is Traditional Farming Organic?		
What traditional and organic farming have in common	Organic methods which can be found in traditional farming	What is specific to organic farming
<ul style="list-style-type: none">• No use of chemical fertilizers, insecticides, fungicides, herbicides, growth promoters etc.• No use of genetically engineered plants and animals• Use of animal manures	<ul style="list-style-type: none">• Closed nutrient cycles, low external inputs• Recycling of biomass through mulching or composting• Mixed cropping and/or crop rotations• Sustainable management of resources: soil, energy, water• Maintenance of soil fertility, prevention of soil erosion• Animal friendly husbandry practices	<ul style="list-style-type: none">• Use of microbial preparations for pest management• Release or efficient attraction of beneficial insects• Use of high yielding, but disease resistant breeds of crops and animals• Introduction of efficient green manures, cover crops and nitrogen fixing trees• Use of improved tools for soil cultivation, weeding, sawing etc.• Application of improved compost methods and bio fertilizers
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Transparency 2.1.2b: Common points and differences between traditional and organic farming.

Group work: How organic are traditional systems?

Ask the participants which traditional farming systems are found in their region. Identify 3–4 systems and let the participants join in groups on the basis of the system they feel most familiar with.

Each group shall describe their traditional farming system in a few keywords. With the help of the checklist in Annex 8.1, each group shall discuss which of the principles and minimum requirements of organic agriculture are met in their traditional system and which are not. Which are the problems the traditional systems facing? Can the system be called "sustainable" from an ecological, economical and social point of view? Each group shall present their findings to the plenum.

Integrated Production (IP)

Integrated Production (IP) has gained importance in the last years especially in economies of transition and in industrialised 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 fertilisers can be used, but usually maximum amounts are defined.

The regulations on IP are not always very clear and vary from country to country, if formulated at all. A few countries have developed labels and a control system for integrated production. In some countries integrated systems are called "green production".

Above all, integrated production follows the same approach as conventional agriculture, but tries to reduce the negative effects on product quality and environment. It is far away from the holistic understanding of organic agriculture. However, it can considerably contribute to a healthier environment as it is easier to be followed by a large number of farmers.

Comparison of Integrated Production (IP) and Organic Agriculture

Criteria	Integrated Production	Organic Agriculture
Chemical insecticides, fungicides and herbicides	permitted, with certain restrictions	not permitted
Chemical fertilisers	permitted, with limitations on maximum application	not permitted
Use of GMO	permitted	not permitted
Treated seed material	permitted	no chemical treatment
Animal friendly keeping	some regulations	strict regulations
Fodder purchase	no limitations	defined limits
Use of growth promoters	permitted	not permitted
Animal breeding	high performance, embryo transfer permitted	life performance, no embryo transfer
Animal health	preventive use of chemo-therapeutic medicine permitted	no preventive use of chemo-therapeutic medicine

Transparency 2.1.2c: Comparison of Integrated Production (IP) and Organic Agriculture following some characteristics of the organic farming system.

2.1.3 Why Organic Agriculture?

The term «conventional agriculture» is not very clear, as it depends on whether the conventions in a region are rather traditional or modern. "Conventional Agriculture" usually refers to mainstream agriculture, i.e. agriculture which includes the use of agro-chemicals, in contrast to organic agriculture.

The «Green Revolution» – was it green?

The use of chemical fertilizers and pesticides is a technology which has spread out in most tropical countries since the 1960's. In a new approach referred to as the "Green Revolution", a package of technologies aimed at increasing the yields per cultivated area. This technology package consists of:

- Monocropping of high yielding varieties (HYV)
- Intensive soil tillage (usually with machines)
- Use of herbicides to eliminate competing weeds
- Use of pesticides (insecticides, fungicides, molluscicides etc.) for eliminating pests and diseases
- Intensive fertilization with chemical fertilizers (N, P, K) often combined with intensive irrigation

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 got degraded due to soil erosion, salinisation or a general loss of soil fertility.
- Water: Freshwater resources have been polluted or overexploited through intense use of agro-chemicals and excessive irrigation.
- Bio-diversity: Many wild and cultivated plant and animal species have been extinct 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.

2.1 What is Organic Agriculture? 2.1.3a

The «Green Revolution» – was it green?

The technology package:

- Monocropping
- High yielding varieties
- Mechanisation
- Herbicides
- Pesticides
- Chemical fertilizers



The environmental impact:

- Soil erosion, salinisation
- Water pollution and overexploitation
- Loss of biodiversity, dull landscapes
- Pesticide residues and antibiotics in food

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Transparency 2.1.3a: The technology package of Green Revolution agriculture (left) and its environmental impact (right). Background: Conventional mono-cropping of pineapple.

Experience sharing: The «Green Revolution»

Encourage the participants to share their experience with the introduction of Green Revolution methods in their region. What was a success, where did it fail?

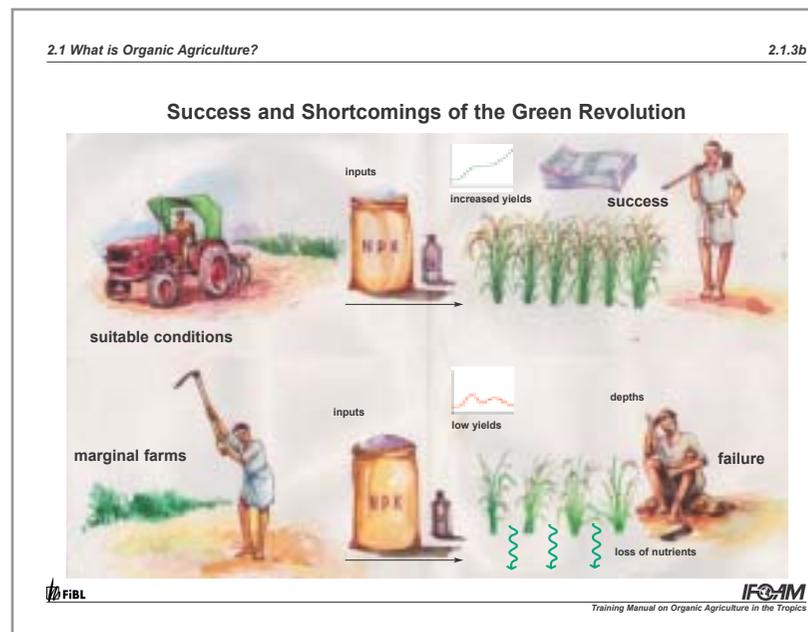
Success and shortcomings of the Green Revolution

It must be acknowledged that with the help of the Green Revolution technologies crop yields increased tremendously, especially in the temperate zones of Europe and North America. Several Southern countries also experienced the Green Revolution as a success story, though the yield increase usually lagged behind the North. India for example managed to become self sufficient in its cereal production, whereas formerly it was subject to severe famines quite often.

However, the success of the Green Revolution in the South was unevenly spread: while the technology brought considerable yield increase in fertile river plains or irrigated land, it rather failed on marginal soils which constitute the majority of the land in the tropics. As the fertile lands usually belong to the more wealthy farmers, marginal farmers did not benefit that much from the new technologies.

One reason for its failure on marginal lands is the low efficiency of fertilizer application on tropical soils: Unlike soils in temperate regions, many tropical soils do not retain chemical fertilizers well (see chapter 3.1.1). The nutrients get easily washed out from the soil or evaporate as gas (N). A majority of the applied fertilizers may therefore get lost.

In countries where labour is comparatively cheap but inputs are expensive, expenses for agro-chemicals can make up a large proportion of the production costs. Frequently, these inputs are purchased on loans which are to be paid back when the harvest is sold. If yields are lower than expected (e.g. because soil fertility decreased) or crops entirely fail (e.g. due to attack of an uncontrollable pest or disease), farmers still have to cover the costs of the agro-chemicals they used. Thus, indebtedness is a widespread problem among farmers in the South, and many are getting deeper and deeper into the "debt trap". As prices for agricultural products tend to decrease continuously while prices for inputs increase (e.g. due to reduced subsidies), it is getting difficult for many farmers to earn a sufficient income with conventional agriculture.



Transparency 2.1.3b: Top: In favourable conditions, the use of chemical fertilizers, pesticides and machines can produce high yields and income. Bottom: Marginal farmers can face severe problems if the expensive chemical fertilizers and pesticides do not result in the expected yields.

Group work: A time line

Analyse the history of the agricultural development of the region. Form groups of participants belonging to one geographical area. Draw a time line on paper charts, e.g. of the last 50 years (mark: 1950's, 1960's, 1970's etc.). Discuss and note down the development in agriculture in the specific region. Consider environmental, economical and social aspects. The following questions may help:

- What was the traditional agricultural system?
- Which were the first "modern" technologies? How were they introduced?
- How did the farmers initially react? Did they adopt the new methods?

- *What were the experiences of the farmers? Which success stories happened?*
- *What problems appeared? How were they dealt with?*
- *What is the present situation in agriculture? Where to go now?*

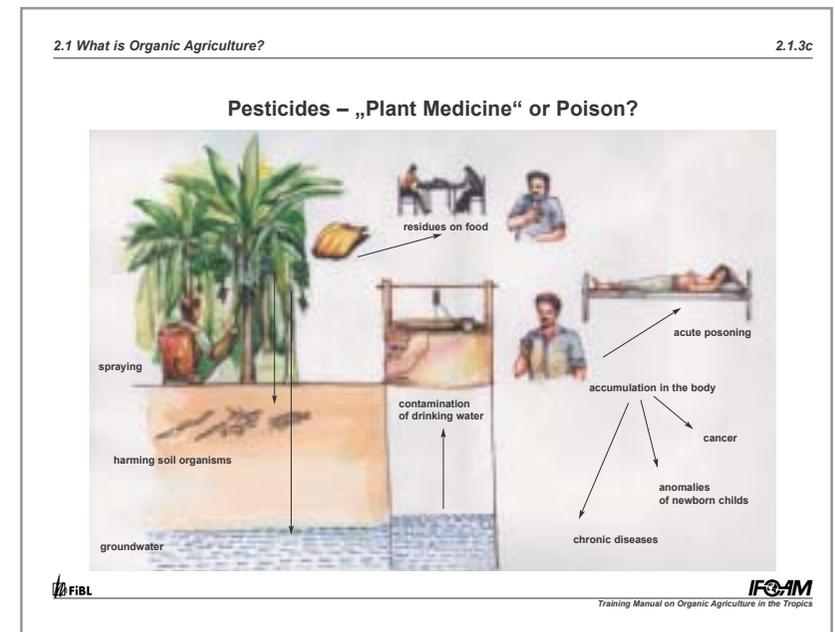
If time allows, (elderly) farmers of the region can be invited and interviewed.

Pesticides: «Plant Medicine» or poison?

In some local languages, pesticides are called «medicine», having in mind their curing effect on sick or infested plants. Most chemical pesticides, however, have a range of unwanted side effects:

- Killing also non-target and beneficial insects sometimes offers ideal condition for new pests to develop.
- Many pesticides are also harmful to soil organisms, that are important to keep plants healthy. Therefore, the application of pesticides may call for further need for the same.
- When applying pesticides, farmers risk to get poisoned. It is estimated that worldwide, severe poisoning with agro-chemicals causes 200'000 deaths per year.
- Part of the pesticides will still remain on the products after harvesting, thus reaching consumers. They also infiltrate into the ground water, contaminating the drinking water.
- Some pesticides are very persistent and get accumulated in the body. Many of them show their effect only in the long term: they can cause chronic diseases, anomalies on newborn children, cancer etc.

Many pesticides are already banned in industrialised countries because they are too dangerous. Still, some of them are sold to southern countries, where the awareness of their potential risk is still low. Some developing countries face big problems with the disposal of huge stocks of prohibited pesticides which they received from northern companies.



Transparency 2.1.3c: Effects of pesticides on soil and water, how they get into the human food chain and what they cause.

Experience sharing: Negative impact of pesticides

Ask the participants: "Have you heard of negative impacts of chemical pesticides in your area?" Share the experience and stories.

Benefits of Organic Agriculture

The advantages of organic farming compared to conventional agriculture can be summarised as follows:

- 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 utilisation 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)

Recommended Readings

- «*Training Manual on Organic Farming in Medium and High Potential Areas*», KIOF.
- «*What is Organic Farming?*», HDRA.

Useful websites

- <http://www.farmingsolutions.org/>
- <http://www.attra.org/>