



**MANAGEMENT OF ORGANIC EXPLOITATIONS
GREENFOOD PROJECT
2010-1-ES1-LEO05-20948**



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1. INTRODUCTION

Agricultural management is an occupation which involves the fields of science regarding the production of food necessary for human survival. It deals with farming techniques, the domestication of animals and the general processing of food as a science. There are numerous agricultural jobs that require management, especially on projects working in the scientific disciplines and with farm labor. With the changing dynamics of global food production, this field proves to be one of the fastest growing in the world.

Since concepts like productivity and food safety play such an important role in the food supply of the world, agricultural management careers have high potential. Outbreaks of contaminated food sources have prompted new government regulatory bodies to manage the process of food production from both plant and animal sources. In addition, population growth and the use of certain foods such as corn as biofuel have limited the growth potential of the industry. The goal today for agricultural management is to strive for new ways to produce the necessary quantities for the growing population, while maintaining the quality that society has come to expect from its food sources.

2. TO MANAGE THE CONVERSION FROM CONVENTIONAL TO ORGANIC

2.1. IFOAM Principles and Definition

The International Federation of Organic Agriculture Movements (IFOAM) is a worldwide umbrella organization that unites 750 member organizations from 116 different countries. Its main goal is the adoption of ecological, social and economical systems which are in accordance to Organic Agriculture's principles.

In March 2008 the World Board approved the following definition according to IFOAM (International Federation of Organic Agriculture Movements):

"Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved".

According to IFOAM organic agriculture is based on the following principles:

- The principle of **health**: Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible. This principle mentions that the health of human and communities must be in connection with the health of the whole ecosystem. As it is known the main characteristic of a living system is health, regarding to the maintenance to physical, mental, ecological and social well being.

The main goals of organic agriculture are:

- ⇒ the maintenance and strengthen of the whole ecosystem's health
 - ⇒ the production of high quality food with high levels of nutrition.
 - ⇒ the avoidance of fertilizers and chemicals during the cultivation phase which can effect humans, animals and ecosystem's health.
- The principle of **ecology**: Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

It declares that the procedure of organic production has to be based on ecological and recycling processes. The ecology of production environment can have as a result the nourishment and well-being as well. Life cycles and natural ecological balances ought to fit with organic agriculture and animal husbandry and wild harvest. Organic management must be conformed to ecology, culture and conditions of each country. Reuse,

recycling and efficient management of materials and energy are enough to reduce the levels of inputs. This will have as a result the maintenance and improvement of environment's quality and the resources' conservation as well.

- The principle of **fairness**: Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.

The main characteristics of fairness are:

- ⇒ equity
- ⇒ respect
- ⇒ justice and
- ⇒ stewardship

of the shared world, both among people and in their relations to other living beings.

This principle underlines that everyone who is involved in organic agriculture should guidance the human relationships in a way that ensures fairness at all levels and to all parties. It aims to produce an adequate supply of good quality food and other products. Apart from these this particular principle mentions also the animals should be provided with the proper conditions and of life which are in accordance with their physiology, behavior and well-being. Fairness requires systems of production, distribution and trade that are open and equitable and account for real environmental and social costs.

- The principle of **care**: Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

This principle emphasizes that regarding to the management, development and technology options in organic farming the basic elements are prevention and liability. Science is necessary to ensure that organic agriculture is healthy, safe and ecologically. But scientific knowledge should collaborate with practical experience, accumulated wisdom and traditional and indigenous knowledge. With this collaboration valid solutions, tested by time can be offered. Organic agriculture should prevent significant risks by adopting appropriate technologies and rejecting unpredictable ones, such as genetic engineering.

2.2. Regulation of Organic Farming

In 1991 Organic Agriculture was been recognized in an official way by the 15 states which were EU members at that time. This recognition achieved by the adoption of Regulation (EEC) No. 2092/91 of European Council of Agricultural Ministers. Initially, this Regulation regulated only plant products. Later on some additional provisions regarding to animal feed and protection, prevention of illness, veterinary treatment, livestock breeding generally and the use of livestock manure as well.

On 1st of January 2009, the EEC Regulation 2092/91 was been replaced by the new Regulation no. 834/2007 of 28 June 2007 on organic production and labeling of organic products and repealing Regulation (EEC) No. 2092/91. Under this regulation underlying the legal framework and guidelines for all stages of production, distribution, inspection and labeling of organic products in EU. These guidelines can be modified by the European Council of Agricultural Ministers.

The area of applicability of the new Regulation is the following agricultural products:

- ✓ Living or unprocessed products
- ✓ Processed foods
- ✓ Animal feed
- ✓ Seeds and propagating materials
- ✓ Collection of wild plants and seaweed

The Regulation starts with the old Regulation and next focuses on the process that shaped the new framework. Furthermore, this Regulation includes the provisions for labeling and the obligatory logo for organic products which is in force from 1st of July 2010 and a historical overview of the new Regulation's creation.

According to the organic regulation and after the revision process the new issues are relevant to organic production, labeling and inspection and are listed below:

- ↻ Objectives and principles are laid down for the first time
- ↻ No significant changes in production rules
- ↻ A risk-based control approach, although the obligatory on-the-spot control each year remains
- ↻ The scope of the regulation to be extended: standards for organic yeast have been formulated
- ↻ Clearer labeling rules to apply from July 1, 2010
- ↻ The import scheme has been rationalized

During 2008, apart from Regulation (EC) No. 834/2007 two more Regulations for the production, import, distribution and labeling of organic products was adopted. These Regulations are the following:

- Commission Regulation (EC) No **889/2008** of September 5th 2008, on detailed production rules for plants, livestock and processed products including yeast, and their labeling and control and,
- Commission Regulation (EC) No **1235/2008** of December 8th 2008, on detailed rules for imports of organic products from third countries.

The first Regulation (EC) No. 889/2008 regulates all levels of plant and animal production from the land cultivation and animals' breeding to the processing and distribution of organic food and their inspection. The Regulation includes highly technical terms, and a detailed extension of the original regulation on organic products. Also, there are many annexes giving a reference to the following subjects:

- Permitted products in organic agriculture, including fertilizers, soil ameliorants, pesticides etc
- Minimum requirements for the size of the premises and exercise, including pasture for organic livestock, depending on the species and growth stage of animals
- Non-organic feed for animals, feed additives and processing aids for the production of compound feed and premixes which are permitted in organic animal husbandry
- Non-organic ingredients, additives and processing aids which are permitted in organic food production (including production of yeast)
- Requirements regarding to the EU organic logo

The second Regulation (EC) No 1235/2008 comes to ensure the import of organic products from third countries that haven't get a bilateral recognition yet. This recognition regarding to the third countries by Commission in collaboration with Member States supervises the organic production and inspection will continue to be applied in accordance with the main objectives and principles of organic legislation.

The next tables represent an overview to organic Regulations (EC) 834/2007 and 889/2008.

Area	General Provisions in (EC) No 834/2007	Detailed Regulation in (EC) No 889/2008	Positive lists in Regulation (EC) No 889/2008, Annexes
Scope, Principles and Definitions	Title I – III Art. 1 – 11		
Plant Production	Title III Art. 12 – 13	<ul style="list-style-type: none"> ◆ Art. 3 – 6, 40 <i>(General Requirements)</i> ◆ Art. 45, 48 – 56 <i>(Seed and Propagating material)</i> 	<ul style="list-style-type: none"> ◆ Annex I <i>(Fertilizers and soil conditioners)</i> ◆ Annex II <i>(Pesticides)</i> ◆ Annex X <i>(Seed)</i> ◆ Planned: Disinfection agents
Livestock Production	Title III Art. 14 – 15	<ul style="list-style-type: none"> ◆ Art. 7 – 26 <i>(General Requirements)</i> ◆ Art. 39 – 44 and 46 – 47 <i>(Exceptional Production Rules)</i> 	<ul style="list-style-type: none"> ◆ Annex III <i>(Housing)</i> ◆ Annex IV <i>(Stocking Densities)</i> ◆ Annex V <i>(Feed)</i> ◆ Annex VI <i>(Feed Additives)</i> ◆ Annex VII <i>(Cleaning and Disinfection)</i>
Food and Feed Processing	Title III Art. 18 – 21	<ul style="list-style-type: none"> ◆ Art. 27 – 29 	<ul style="list-style-type: none"> ◆ Annex VIII <i>(Substances allowed for processing)</i> ◆ Annex IX <i>(Allowed non-organic ingredients)</i>
Control	Title V Art. 27 – 31	<ul style="list-style-type: none"> ◆ Art. 63 – 69 and 91 – 92 <i>(General Requirements)</i> ◆ Art. 70 – 73 <i>(Plant Production)</i> ◆ Art. 74 – 79 <i>(Livestock Production)</i> ◆ Art. 80 and 86 – 90 <i>(Processing)</i> 	<ul style="list-style-type: none"> ◆ Annex XII <i>(Operator Certificate)</i> ◆ Annex XIII <i>(Vendor Declaration)</i>
Labeling and Transport	Title IV and VI Art. 23 – 26	<ul style="list-style-type: none"> ◆ Art. 30 – 35 ◆ Art. 57 – 62 	<ul style="list-style-type: none"> ◆ Annex XI <i>(Logo)</i>

Table 1: Regulations for production and processing of organic food and feed in (EC) 834/2007 and in (EC) 889/2008. *Source: IFOAM*

Area	Framework Regulation (EC) No 834/2007	Implementing Rules	Annexes to Regulation (EC) No 1235/2008
Import of Compliant Products	Art. 32	<ul style="list-style-type: none"> ◆ Reg. 1235/2008 Art. 3 – 6 ◆ Reg. 889/2008 Art. 81 – 85 	<ul style="list-style-type: none"> ◆ Annex I <i>(List of Control Bodies)</i> ◆ Annex II <i>(Certificate for Documentary Evidence)</i>
Import of Equivalent Products	Art. 33	<ul style="list-style-type: none"> ◆ Reg. 1235/2008 Art. 7 – 13 ◆ Reg. 889/2008 Art. 81 – 85 	<ul style="list-style-type: none"> ◆ Annex III <i>(List of Third Countries)</i> ◆ Annex IV <i>(List of Control Bodies)</i> ◆ Annex V & VI <i>(Certificate for Inspections)</i>

Table 2: Regulation for imports of organic products from Third Countries in (EC) 834/2007 and the implementing rules in (EC) 1235/2008. *Source: IFOAM*

The table below shows all the EEC and EC Regulations regarding to organic agriculture since 1991.

Date	No	Title
08.04.2011	344	Commission Implementing Regulation "Amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labeling of organic products with regard to organic production, labeling and control"
31.05.2010	471	Commission Regulation "Amending Regulation (EC) No 1235/2008, as regards the list of third countries from which certain agricultural products obtained by organic production must originate to be marketed within the Union"
24.03.2010	271	Commission Regulation "Amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007, as regards the organic production logo of the European Union"
05.08.2009	710	Commission Regulation "Amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007, as regards laying down detailed rules on organic aquaculture animal and seaweed production"
19.06.2009	537	Commission Regulation "Amending Regulation (EC) No 1235/2008, as regards the list of third countries from which certain agricultural products obtained by organic production must originate to be marketed"

Date	No	Title
		<i>within the Community"</i>
25.05.2009		Council Decision <i>"Conclusion of the Agreement between the European Community and the Swiss Confederation amending the Agreement between the European Community and the Swiss Confederation on trade in agricultural products"</i>
15.12.2008	1254	Commission Regulation <i>"Amending Regulation (EC) No 889/2008 laying down detailed rules for implementation of Council Regulation (EC) No 834/2007 on organic production and labeling of organic products with regard to organic production, labeling and control"</i>
08.12.2008	1235	Commission Regulation <i>"Laying down detailed rules for implementation of Council Regulation (EC) No 834/2007 as regards the arrangements for imports of organic products from third countries"</i>
29.09.2008	967	Council Regulation <i>"Amending Regulation (EC) No 834/2007 on organic production and labeling of organic products"</i>
05.09.2008	889	Commission Regulation <i>"Laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labeling of organic products with regard to organic production, labeling and control"</i>
06.05.2008	404	Commission Regulation <i>"Amending Annex II to Council Regulation (EEC) No 2092/91 on organic production of agricultural products as concerns the authorization of spinosad, potassium bicarbonate and copper octanoate and the use of ethylene"</i>
17.04.2008	345	COMMISSION REGULATION <i>"Laying down detailed rules for implementing the arrangements for imports from third countries provided for in Council Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs"</i>
28.06.2007	834	Council Regulation <i>"Organic production and labeling of organic products and repealing Regulation (EEC) No 2092/91"</i>
02.02.2007		Corrigendum to Council Regulation (EC) No 1991/2006 of 21 December 2006 amending Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs
14.08.2003	1452	Commission Regulation <i>"Maintaining the derogation provided for in Article 6(3) (a) of Council Regulation (EEC) No 2092/91 with regard to certain species of seed and vegetative propagating material and laying</i>

Date	No	Title
		<i>down procedural rules and criteria relating to that derogation"</i>
05.02.2003	223	Commission Regulation "Labeling requirements related to the organic production method for feeding stuffs, compound feeding stuffs and feed materials and amending Council Regulation (EEC) No 2092/91"
24.06.1991	2092	Council Regulation "Organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs"

Table 3: Regulations Regarding to Organic Agriculture, *Source: IFOAM*

2.3. Conversion Management Planning

The most important stage in the certification process of a farm is the conversion from conventional to organic. In practice, the transition phase for the most cultivations is a two – years period. This time is deemed necessary under European Legislation, to "detoxify" the field of received chemicals. Moreover, those fields are located near garbage dump, industrial zone, airport and busiest streets are excluded from the outset.

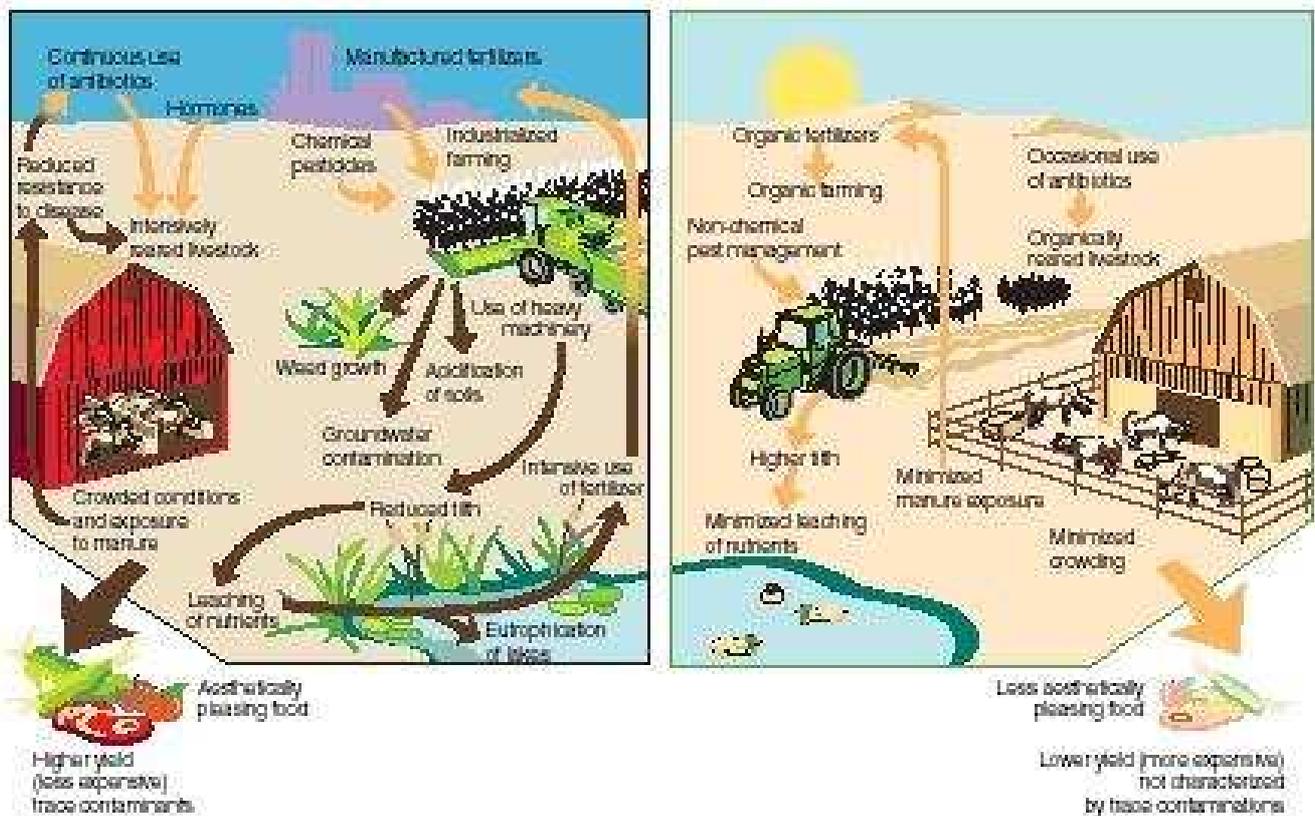
During the conversion phase, the products are available to the market and labeled as coming from a farm in conversion to organic agriculture. Indeed, organic farmers call on consumers not to be cautious of the "conversional" products because if they really want to boost and promote organic agriculture and reduce the prices of organic products, they should support organic producers in their infancy.

The conversion phase however, is not only for the field bur for the farmers as well, especially in the case that the farmers is someone who has involved in organic agriculture without having absolutely no previous experience (e.g. a city resident who decided to change his life). According to "BioHellas¹" General Director's opinion "Agrochemicals is a type of doping". The big challenge is all farmers to become conscious organic farmers. That is why the Control Bodies are stricter to farmers during the conversion period.

After the passage of the conventional period, the farm is now organic and producers can sell their products with the EU organic logo on them. However, controls and inspections do not stop after the receiving the certification. Whenever infringement is found, the producers suffer the penalties. If it is, for example, a deliberate use of fertilizers or pesticides, this producer may be even

¹ BIOHellas is a Greek Control and Certification Body of Organic Agriculture. It develops with integrity and credibility in the field of organic products certification providing reliable services aiming to the protection of the consumer and the environment as well as to the improvement of foods and other agricultural products' quality.

excluded from the system of organic agriculture. But if the offence is due to contamination from adjacent conventional fields (a situation that the Control Body's agronomists are able to certain it) then these products can not receive a certification the organic farmer suffer a financial loss because he/she can not sell these products as organic.



Picture 1: Intensively managed agriculture (left) compared with organic farming (right),
 Source: <http://www.scienceclarified.com>

2.4. Administrative Commitments

Conversion is the process of changing the way that someone manages a farm to meet organic standards. It takes longer than a single season. Time has to be allowed for the changes to take effect. Organic farmers may be able to start conversion - subject to restrictions - by converting an area large enough in order to achieve a sustainable organic unit. Before taking any steps, they may want to get advice on whether organic conversion is right for them. The following figure shows the elements that are required for the adoption of organic farming.



Figure 1: Acquired Elements for the adoption of Organic Farming

They should also consider which of the control bodies (CBs) is most appropriate to their area and needs. Once they decide to convert to organic farming, they will have to prepare documentation and plan crop and livestock conversion.

❖ Documenting conversion

A **written conversion plan** is essential for successfully moving into organic farming. Organic farmers must also produce a farm business plan. They must produce a detailed conversion plan and submit it for approval to their chosen Control Body. Their plan should cover the conversion period and beyond.

It should include:

- ◆ soil management
- ◆ crop rotations
- ◆ grazing management
- ◆ livestock management/health plan and budgets

At the beginning of the conversion period, they should begin to record all inputs, operations and sales. Their organic certification will depend on their farming practices being audited, so keeping their records up to date is important.

❖ Crop conversion

It usually takes at least two years until a farm is eligible for organic status and organic certification. The Control Body of each farmer can advise them further. Some timescales are below:

- ♦ three (3) years for established orchards of perennial soft, top and vine fruits e.g. apples, pears, cherries and grapes
- ♦ twelve (12) months for grass intended for pig and poultry grazing, provided that the farmers have not applied any banned products to the soil over the previous twelve (12) months
- ♦ two (2) years for land intended for ruminant grazing and annual crops, e.g. vegetables, grassland and cereals

❖ Livestock conversion

In a general frame the following can be converted subject to certain conditions:

- ♦ animals intended for meat consumption
- ♦ animals that produce milk and eggs
- ♦ non-organic chicks that are bought in for table production

Livestock conversion may be a one – or two – phase process. It may be chosen to convert land first and then convert the livestock operations once the land has achieved full organic status.

Alternatively, it may be considered converting both at the same time. This is where breeders manage the land and breeding stock – to full organic standards throughout a two – year conversion period. Although more demanding, this does mean that as soon as the land achieves organic status, farmers may sell as organic any young stock born three months after the start of conversion.

Under certain circumstances, they may be able to reduce the two and three year conversion periods by up to four months if they can show independent proof that they have only applied approved materials to the land for the six months before they registered the land as in conversion.

3. MANAGEMENT PLANNING

3.1. Agro-ecological Approach and Mix Farming

Organic agriculture can yield long term benefits for the environment and humanity as well. At the same it can contribute to solving problems of rural

sector and the whole society. Below are listed the most important of these benefits. More specifically, the benefits of organic agriculture have to do with the environment.

❖ Sustainability

Organic agriculture cultivates products taking into consideration the medium – term and long – term interventions on agro-ecosystems. In this way can be achieved ecological balance, preservation of soil fertility and avoidance problems related to weeds.

❖ Soil

The organic farming practices such as crop rotation and use of symbionts contribute to soil conservation. More specifically they favour soil flora and fauna thus improving the soil structure and more stable systems are created. As a result of this, the soil ability to hold nutrients and water can be increased. Further more, the exposure time in soil corrosive forces is reduced, thus the biodiversity is increased, the loss of nutrients is limited and the soil productivity is increased.

❖ Water Resources

The prohibition on the use of chemical fertilizers and pesticides during organic farming and the use of only organic fertilizers contribute to water filtration. Biological systems with high nutrient retention capacity can significantly reduce the risk of ground water pollution.

❖ Wind

The prohibition on the use of agro – chemical reduces the use of non – renewable energy sources. Organic practices contribute to the return of carbon in the soil, increase productivity and carbon storage, so a reduction of greenhouse gas effect and global warming.

❖ Biodiversity

Organic agriculture favour biodiversity on three levels:

- 1.** Genes: seeds and species with greater resistance to diseases and climate stress are preferred.
- 2.** Species: a variety of cross-fertilization plants and animals is used in order to maximize the cycle of nutrition and energy during agricultural production.
- 3.** Ecosystem: the preservation of natural areas around organic farms and lack of agrochemicals as well favors the welfare of wild species and the colonization of new species.

❖ Genetically Modified Organisms

Organic agriculture enhances the natural biodiversity and prohibits the use of GMOs for which we do not know the effects on human and animal health and on the environment also. Consequently, organic products offer security regarding to these specific organisms.

❖ Ecology

Organic farming promotes the development within the agro-ecosystems actions beneficial for agricultural production and environmental conservation, such as the formation and improvement of soil, recycling waste and increasing nutrient cycle.

In the performance of organic farming producers are required to cooperate with nature and to develop appropriate processes during the production procedure. The organic agricultural practices aim at reducing human intervention to the minimum level in order the corresponding environmental impact to be reduced. Typical practices of organic production include (European Commission, 2008):

✓ Rotation

Rotation is in relevance with the sequence of crops in the same field. It is a method for the rational use of the available natural resources. During this method is accomplished natural fertilization and enrichment of soil with nutrients as well.

✓ Limit use of fertilizers and pesticides

Limit use of synthetic fertilizers and pesticides, animal antibiotics, preservatives and additives in food processing and other inflows too strict.

✓ Prohibition of Genetically Modified Organisms

The use of any Genetically Modified Organisms (GMOs) is not allowed.

✓ Use of self – produced resources

The use of resources generated in organic farms is allowed. These resources can be animal manure for fertilizing purposes or food that is produced in the farm.

✓ Animal husbandry practices per kind

The breeding of animals is implemented with specific farming practices that are peculiar to the special characteristics and needs of different animal kinds.

✓ Mix farming

During mix farming different plant species are cultivated, so the organic farmer operates all the positive interactions derived by the coexistence. Planting of various plants among cultivations enhances their protection.

The plants protect each other and are influenced to their advantage against harmful insects and other diseases.

With the term "mix farming" is meant the cultivation of two or more different crops at the same time. Generally, in this system, crops with different maturation and harvest time are cultivated on the same parterre. They are usually plants with different root systems and with different nutrient requirements. For this reason a great attention in the choice of crops to be grown together must be paid, so one should not harm another and could take advantage of the best in the space that is available to them.

It is noteworthy that according to some experiments have shown that plants in mix farming thrive and attribute better than other plants in single cultivation. This happens because in one hand they are a kind of a "plant community" that get used to the environment in which they are grown and are in a constant competition with each other, and on the other hand because plants depend on one specie to another and they protect each other. For example mix farming onion and garlic with many other vegetables. An important factor however, is the best development and/or infection of beneficial microorganisms in the soil, as it is approved by several researches and investigations.

Mix farming is a cultivation method which gives the opportunity to have great and rich production from a small cultivated area with very good financial results. A reduce on watering can be achieved because of the continuous soil cover, savings on staff days and cost because of the development of a small number of pests and saving in concoctions due to better pest prevention. Many crops that are planted on or near to the planting lines (cultivated or uncultivated plants e.g. garlic, basil, marigold etc) have as a result to keep away various pests (e.g. nematodes) and fungal diseases (e.g. mildew).

Nevertheless, mix farming still is an intensive method of cultivation that has as a result, soil nutrients to be depleted rapidly. This means that to sustain the soil to remain fertile and productive, an enrichment of the soil with organic matter (compost) or even animal manure, must be happened before or after of each cultivation.

3.2. Technical and Administrative Commitments

Starting the conversion of a farm from conventional to organic is a period during which are not produced organic products but the use of prohibited substances is reduced gradually. Furthermore the farm is adapted to treatment conditions of the enemies – diseases and nutrient problems through the principles of organic

farming. After this period the products of this farm receive the stamp of "Organic Agriculture Product" and put on the shelf for selling as organic.

Some technical and administrative commitments that an organic farmer has, are listed below:

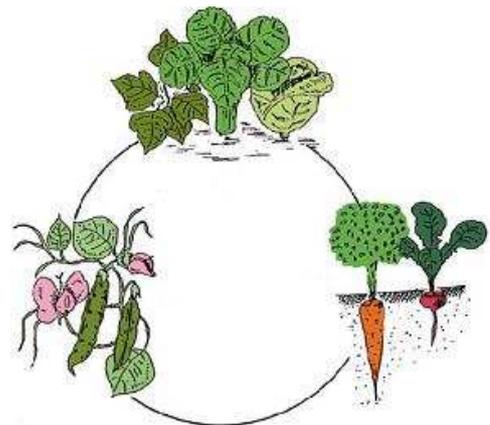
- ✓ The use of synthetic fertilizers for 36 months before the harvest period of the certified organic agricultural products is prohibited.



- ✓ The use of synthetic pesticides (fungicides, insecticides, herbicides) for 36 months before the harvest period of the certified organic agricultural products is prohibited.



- ✓ The implementation of crop rotation which include leguminous crops that can improve the soil or mix farming of cereals every five years at least. The method of rotation on one hand contributes to the reduction (due to the disruption of the biological cycle) of weeds, insects and diseases and on the other hand reinstates or conserves the soil fertility and health status. For the maintenance or restoration of soil fertility suitable rotation systems are applied with leguminous crops, organic fertilizers and additions of various kinds of compost.



3.3. Food Chain Traceability

In the food chain, the term "**traceability**" means the ability to trace and follow a food, feed, food producing animal or substance through all stages of production and distribution. "**Stages of production**" and "**distribution**" means any stage including import, from and including the primary production of food, up to and including its sale or supply to the final consumer and, where relevant to food safety, the production, manufacture and distribution of feed.

Usually the manufacturing systems, including food manufacturing, are registered to the ISO 9001 Quality Standards. These require that the product should be able to be traced from the current stage back through all its stages of manufacture through accurate and timely record-keeping. During the last years computer records solely can be used as evidence of compliance instead of paper documentation that used to be before.

In primary production, traceability has been defined as the ability to trace the overall history of the product through the supply chain to or from the place and time of production, including the identification of the inputs used and production operations undertaken. A food chain traceability standard applied in order to document the history or to identify the cultivated location of a product, or the relevant components, inside to an individual company or in a coordinated food chain system.

All the procedures and relative activities that carried out through the whole food chain have as a result a safe food product. An appropriate traceability system contributes to the creation of a feedback loop for the improvement of product quality, conditions and delivery related costs. Furthermore it subscribes to the transparency in distribution routes and the improvement of chain efficiency.

What the standard is?

It is generally accepted that traceability is the key element in food legislation (e.g. EU Reg. 178/2002) and in the food safety standards (e.g. ISO 22000) as well.

The technical standard which provides a harmonized approach to systems of traceability according to the available best practices is coming from the International Organization for Standardization (ISO). This Standard, ISO 22005, offers the general provisions and principles and the basic requirements as well for the design and implementation of the system.

The certification of food chain traceability can make an individual company's processes more visible and reliable, allowing the communication of trust and accountability. The standards provide a general framework in order to be established an effective and flexible traceability system for the achievement of various aims. These aims and objectives can be following:

- ✓ Food safety's support
- ✓ Product's origin documentation
- ✓ Facility of product's withdrawal and/or recall
- ✓ Identifying responsible parties in the feed and food chain
- ✓ Facilitating verification of specific information about the product
- ✓ Communicating information to relevant stakeholders and consumers

Preparation for certification

For the design and implementation of an effective and proper traceability system the traceability system's objectives must be defined and the next issues have to be determined:

- ✓ The needed information that had to be obtained from the suppliers in the coordinated food chain.
- ✓ The needed information that had to be collected concerning the overall process history
- ✓ The needed information that had to be provided to the customers

The main planning process includes:

- ✓ Definition of the product and/or its ingredients
- ✓ Definition of the lot
- ✓ Identification of the lot
- ✓ Documentation of the materials' flow
- ✓ Documentation of the media
- ✓ Data management
- ✓ Regain of the information for communication

This process entails managing detailed tracking and tracing reports on the flow of the raw material, the accountability of all parties involved in the process, and proof of application of a management system regime.

3.4. Multifunctionality

Agriculture operates within complex systems and is multifunctional in its nature. A multifunctional approach to implementing agricultural knowledge, science and

technology (AKST) will enhance its impact on hunger and poverty, improving human nutrition and livelihoods in an equitable, environmentally, socially and economically sustainable manner.

Multifunctionality recognizes the inescapable interconnectedness of agriculture's different roles and functions, i.e., agriculture is a multi-output activity producing not only commodities, but also non-commodity outputs such as environmental services, landscape amenities and cultural heritages.

During the last 60 years, a promotion of the intensive production practices of high-yielding staple food crops is taking place. To make farms more productive inputs of fertilizers, pesticides and other chemical inputs are used. This can have as a result an excessive environmental damage. It is a reality that in many regions all over the world there are farmers who don't have a sufficient access to the technologies, inputs, knowledge and innovation that may stretch the productivity while protecting health and the environment as well.

Thus, for the maintenance and restoration of soil fertility and the maintenance of sustainable production an increased attention has to be paid on the special agricultural practices. These practices could be such as low input resource – conserving technologies which are based on integrated crop management systems and an understanding of agro-ecology and soil science as well. For example, agro-forestry, conservation agriculture, organic agriculture etc. These technologies can have as a result to reduce the necessity for high levels of inputs and furthermore are proper on social level approaches to small – scale farming.

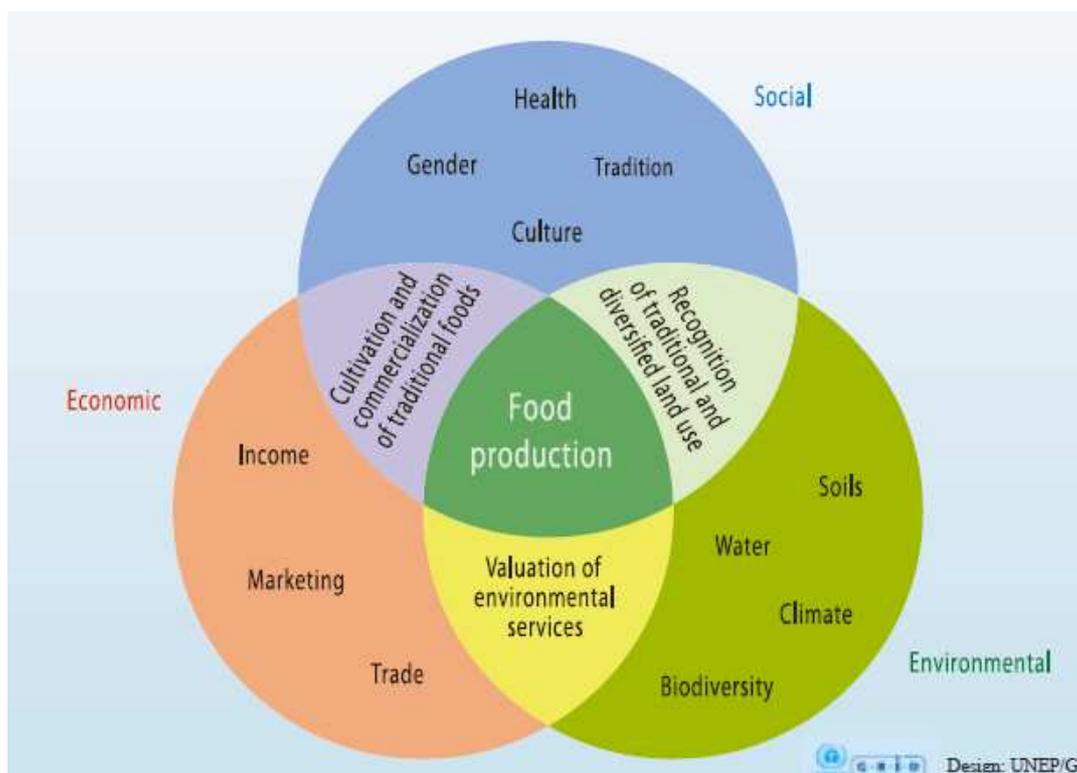


Figure 2: The inescapable interconnectedness of agriculture's different roles and functions, *Source: International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD)*

Social functionality

- ✓ Stakeholders' sensitization for the sustenance of the agricultural diversity and food systems, including the cultural dimensions.
- ✓ Education and training of policymakers and other relative personnel in planning and decision making and in comprehension and working in an effective way with rural populations.
- ✓ Investments in increasing the educational and training level for farmers and rural population in order to promote their relation in development procedures.
- ✓ Investments in new technologies of communication and in the society of information (ICTs) in order to be created great opportunities for increasing the scope of educational and interactive learning.
- ✓ Giving the opportunity to women to deal with financial issues and natural resources as well within the creation of new legal laws and measures.
- ✓ Support the development of women's income generating activities and reinforce women's organizations and networks.

Environmental functionality

- ✓ Provide safe water and encourage efficient water – use practices.

- ✓ Decrease of the greenhouse gas emissions.
- ✓ Minimize the adverse impacts of climate change through integrating new and improved crop varieties and livestock breeds.
- ✓ Maintenance and enhancement of environmental and cultural services through support of agro-ecologically practices.

Economic functionality

- ✓ Promotion of market and trade policies that benefit small-scale producers by leveling the playing field and increasing opportunities for value addition.
- ✓ Increase the access to financial services and products, such as savings services and crop or rain insurance. These elements are critical and important for building assets and reducing the risk which is associated with adopting new technology, transitioning to sustainable agricultural practices, and innovating production and marketing methods
- ✓ Use microfinance to allow small-scale producers to expand production, buy fertilizer friendly to the environment and other inputs and technologies, and to diminish seasonable fluctuations in income.

4. GLOSSARY

Agriculture

Agriculture is the production, processing, marketing, and use of foods, fibers and by-products from plant crops and animals. Agriculture was the key development that led to the rise of human civilization; with the husbandry of domesticated animals and plants (i.e. crops) creating food surpluses that enabled the development of more densely populated and stratified societies. The study of agriculture is known as agricultural science. Agriculture is also observed in certain species of ant and termite. Agriculture encompasses a wide variety of specialties and techniques, including ways to expand the lands suitable for plant raising, by digging water-channels and other forms of irrigation. Cultivation of crops on arable land and the pastoral herding of livestock on rangeland remain at the foundation of agriculture. In the past century there has been increasing concern to identify and quantify various forms of agriculture. In the developed world the range usually extends between sustainable agriculture (e.g. permaculture or organic agriculture) and intensive farming (e.g. industrial agriculture).

Agrochemicals

Or agrichemical is a contraction of agricultural chemical, is a generic term for the various chemical products used in agriculture. In most cases, agrichemical refers to the broad range of pesticides, including insecticides, herbicides, and fungicides. It may also include synthetic fertilizers, hormones and other chemical growth agents, and concentrated stores of raw animal manure.

Agro-ecology

The application of ecological principles to the production of food, fuel, fiber and pharmaceuticals. The term encompasses a broad range of approaches and is considered as "a science, a movement and a practice".

Agro-forestry

An integrated approach of using the interactive benefits from combining trees and shrubs with crops and/or livestock. A combination of agricultural and forestry technologies in order to create more diverse, productive, profitable, healthy and sustainable land – use systems.

Biodiversity

Is the degree of variation of life forms within a given ecosystem, biome, or an entire planet. Biodiversity is a measure of the health of ecosystems. Greater biodiversity implies greater health. Biodiversity is in part a function of climate. In terrestrial habitats, tropical regions are typically rich whereas polar regions support fewer species.

BioHellas

Is a Certification Body that develops with integrity and credibility in the field of organic products certification providing reliable services aiming to the protection of the consumer and the environment as well as to the improvement of foods and other agricultural products' quality.

Conservation Agriculture

A concept for resource-saving agricultural crop production that strives to achieve acceptable profits together with high and sustained production levels while concurrently conserving the environment" (FAO 2007).

Conversion

Products of Organic Agriculture in transition. The products of vegetable origin only, produced on plots' in conversion to organic farming. In these plots, the principles of organic agriculture for at least a year, thus ensuring the absence of pesticide residues in the finished product.

Crop Rotation

Is the practice of growing a series of dissimilar types of crops in the same area in sequential seasons for various benefits such as to avoid the build up of pathogens and pests that often occurs when one species is continuously cropped. Crop rotation also seeks to balance the fertility demands of various crops to avoid excessive depletion of soil nutrients. A traditional element of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops. It is one component of polyculture. Crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.

Ecology

It is the scientific study of the relation of living organisms with each other and their surroundings. Ecology is not synonymous to "environment" or environmental science but it is a sub – discipline of biology which is the study of life. It is closely related to physiology, evolutionary biology and genetics. An understanding of how biodiversity affects ecological function is an important focus area in ecological studies.

European Council of Agricultural Ministers

The Agriculture and Fisheries Council is, together with the General Affairs and External Relations Council and the Ecofin Council, one of the Council's oldest configurations. It brings together once a month the Ministers for Agriculture and Fisheries and the European Commissioners responsible for agriculture and rural development, fisheries and maritime affairs, as well as consumer health and protection.

Eurostat

Eurostat is the statistical office of the European Union situated in Luxembourg. Its task is to provide the European Union with statistics at European level that enable comparisons between countries and regions.

Fertilizer

Is any organic or inorganic material of natural or synthetic origin (other than liming materials) that is added to a soil to supply one or more plant nutrients essential to the growth of plants. A recent assessment found that about 40 to 60% of crop yields are attributable to commercial fertilizer use.

FiBL

The Research Institute of Organic Agriculture FiBL Switzerland, FiBL Germany and FiBL Austria are centres for research and consultancy on organic agriculture. FiBL has long been committed to the international development of organic agriculture (there are, for instance, close links with the International Federation of Organic Agriculture Movements IFOAM). FiBL has competencies in organic soil management, plant production, holistic animal health, animal ethology and organic animal breeding, in socioeconomics, in comprehensive analysis of the organic market and in organic food processing and production.

Genetically Modified Organism (GMO)

A genetically modified organism (GMO) or genetically engineered organism (GEO) is an organism whose genetic material has been altered using genetic engineering techniques. These techniques, generally known as recombinant DNA technology, use DNA molecules from different sources, which are combined into one molecule to create a new set of genes. This DNA is then transferred into an organism, giving it modified or novel genes. Transgenic organisms, a subset of GMOs, are organisms which have inserted DNA that originated in a different species.

IFOAM

International Federation of Organic Agriculture Movements (IFOAM) is the worldwide umbrella organization for the organic movement, uniting more than 750 member organizations in 116 countries.

Integrated Crop Management Systems (ICM Systems)

A system of crop production which conserves and enhances natural resources while producing food on an economically viable and sustainable foundation. It is based on a good understanding of the interactions between biology, environment and land management systems.

International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD)

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) is a unique international effort that will evaluate the relevance, quality and effectiveness of agricultural knowledge, science, and technology (AKST); and effectiveness of public and private sector policies as well as institutional arrangements in relation to AKST.

ISO 9001 Quality Standards

The ISO 9000 family of standards relate to quality management systems and are designed to help organizations ensure they meet the needs of customers and other stakeholders (Poksinska et al, 2002). The standards are published by ISO, the International Organization for Standardization and available through National standards bodies.

Mix Farming

Is the combining of two independent agricultural enterprises on the same farm. A typical case of mixed farming is the combination of crop enterprise with dairy farming or in more general terms, crop cultivation with livestock farming. Mixed farming may be treated as a special case of diversified farming. This particular combination of enterprises, support each other and add to the farmer's profitability.

Organic Agriculture

Organic agriculture is a system that relies on ecosystem management rather than external agricultural inputs. It is a system that begins to consider potential environmental and social impacts by eliminating the use of synthetic inputs, such as synthetic fertilizers and pesticides, veterinary drugs, genetically modified seeds and breeds, preservatives, additives and irradiation. These are replaced with site-specific management practices that maintain and increase long-term soil fertility and prevent pest and diseases.

"Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system." (FAO/WHO *Codex Alimentarius* Commission, 1999).

Organic Certification

Organic certification is a certification process for producers of organic food and other organic agricultural products. In general, any business directly involved in food production can be certified, including seed suppliers, farmers, food processors, retailers and restaurants. Requirements vary from country to country, and generally involve a set of production standards for growing, storage, processing, packaging and shipping.

Organic plant protection

The key to organic plant protection (without chemicals) is correct growing methods and prevention. The organic plant protection is dependent on 3 basic practices:

- *Proper crop rotation:* Crops of the same family should not follow each other (example: Tomato cannot follow eggplant).
- *Correct Fertilization/watering:* Plants that are not healthy are easily sick or attacked by insects. Over watering can cause root and stem fungi that can destroy the plant.
- *Crop watching and treatment:* Spot check (check a few plants in different places) for insects and disease every day and treat for the problem. Diseases and insects are easier to control when the problem is small. Be sure to check around wells or other places with standing water as they may be insect breeding sites.

Organic products

Organic products are the result of cultivation without chemical fertilizers, pesticides and toxic pesticides. The control of plant diseases and soil fertilization are made with natural methods and organic supplies. The organic products are the result of traditional knowledge and the sciences search for health solutions. In organic farming does not use antibiotics and hormones.

Pesticides

Pesticides are substances or mixture of substances intended for preventing, destroying, repelling or mitigating any pest.[1] A pesticide may be a chemical substance, biological agent (such as a virus or bacterium), antimicrobial, disinfectant or device used against any pest. Pests include insects, plant pathogens, weeds, molluscs, birds, mammals, fish, nematodes (roundworms), and microbes that destroy property, spread disease or are a vector for disease or cause a nuisance. Although there are benefits to the use of pesticides, there are also drawbacks, such as potential toxicity to humans and other animals.

Soil Management

It concerns all operations, practices and treatments used to protect soil and enhance its performance.

Sustainability

Is the capacity to endure. In ecology, the word describes how biological systems remain diverse and productive over time. Long-lived and healthy wetlands and forests are examples of sustainable biological systems. For humans, sustainability is the potential for long-term maintenance of well being, which has environmental, economic, and social dimensions.

Traceability

"Traceability is the ability to chronologically interrelate uniquely identifiable entities in a way that is verifiable. Traceability is the ability to verify the history, location, or application of an item by means of documented recorded identification". *"Glossary," ASME Boiler and Pressure Vessel Code, Section III, Article NCA-9000*

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6. SELF ASSESSMENT

1. According to IFAM's definition "Organic agriculture combines...":

- knowledge, motivation and technical aspects
- society, economy and environment
- tradition, innovation and science

2. According to IFOAM the principles that organic agriculture is based on are:

- Health, Ecology, Fairness and Environment
- Health, Ecology, Fairness and Care
- Health, Ecology, Biodiversity and Care

3. Commission Regulation (EC) No 889/2008 deals with:

- Crop production rules, livestock, labelling and control of organic products
- Rules for imports of organic products
- The official recognition of organic farming

4. The conversion phase for the most cultivations from conventional to organic farming takes:

- 12 months
- 24 months
- 36 months

5. Pesticides and fertilizers during the implementation of organic agriculture are:

- Totally allowed
- Partially allowed
- Forbidden

6. Traceability is the ability to:

- Conserve and enhance natural resources while producing food on an economically viable and sustainable foundation
- Verify the ingredients of a product and the way of production
- Verify the history, location or application of an item through all stages of production and distribution

7. The agriculture's different roles and functions are:

- Marketing – Health – Climate
- Social – Economic – Environmental
- Culture – Trade – Biodiversity

8. Applying integrated crop management systems can be achieved a reduction of high levels of inputs

- True
- False
- Depending on the agricultural production

9. The technical standard which provides a harmonized approach to systems of traceability according to the available best practices is coming from the:

- International Federation of Organic Agriculture Movements (IFOAM)
- European Agriculture and Fisheries Council
- International Organization for Standardization (ISO)

10. With mix farming can be achieved:

- rich production from a small cultivated area with very good financial results
- a reduction on watering, savings on staff days and cost
- all of the above