



## PILOTING JOB ROTATION PROGRAMME FOR EMPLOYMENT DEVELOPMENT IN AGRICULTURE

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## ORGANIC AGRICULTURAL PRODUCTION

E-Learning Training Materials– ENG-02

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# **ORGANIC AGRICULTURAL PRODUCTION**

## **E-Learning Training Materials – ENG-02**

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## ORGANIC AGRICULTURAL PRODUCTION

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### GOAL

To meet the training needs of businesses and cooperatives on organic agricultural production

### OBJECTIVE

To improve the competence of employees and prospective employees in business and cooperatives on organic agricultural production

### GAINS

- 1) General Organic Agriculture Know the rules.
- 2) Know the general organic production methods.
- 3) Know the general organic production standards.

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## **1. WHAT IS ORGANIC FARMING?**

### **1.1. Organic Farming Concept, Principles and Scope**

Organic agriculture, improper and excessive applications in production systems to re-establish the natural balance is lost, people and contains friendly production systems on the environment and essentially synthetic chemical medicines and fertilizers (commercial medicines and fertilizers) to ban the use of organic and green manure, crop rotation, soil conservation, increase the resistance of plants and animals, making good use of the natural enemies of pests is a production method that aims to improve the quality of the product, not the amount of increase in production.

#### **Organic, Ecological and Biological Agriculture is a Synonym**

For organic farming in the UK organic (organic), Germany ecological (ökologisch) and biological France (bioloqu) the words are used. However, the EU organic farming organic farming regulation (Council Regulation 2092/91) in the clearly stated as they are synonymous with each other (Anonymous, 1991).

#### **According to IFOAM Organic Farming**

The result of long study definition of organic farming, the International Federation of Organic Agriculture Movements (IFOAM) has been approved in Italy by 2008. Accordingly: "Organic agriculture; land is a production system that maintains the ecosystem and human health. System instead of the use of inputs with adverse effects; ecological processes, based on biodiversity and cycles adapted to local conditions. Organic farming benefits the environment we live in, traditions to promote fair relationships and a good quality of life for all concerned, brings together innovation and science. "That's why organic farming health, ecology, fairness and care is based on the principle (IFOAM, 2009).

### **1.2. The Aim of the Organic Farming**

The main purpose of organic farming, economic, social, as an agricultural option sustainable environmentally, to enrich the soil, maintain genetic diversity in nature, sufficient quantities of high quality food production, provide, use renewable resources as much as possible in the production system, environment, plants, animals and to protect human health, it is to get more healthy food and textile raw materials (Çakmakçı and Erdoğan, 2005, Özbağ, 2010; Akman, 2013) Organic agriculture products after sowing or planting a abandoned to its own devices without any application or obsolete and not turn into a business. On the contrary, based on the opinion for the needs of the future, care, attention is a form of agriculture that requires knowledge and dedication.

### **1.3. Organic Agriculture in the World**

The beginning of organic farming movement in the world dates back to the 1930s. With the start of the legislation at national level on organic farming, various farmers' organizations, academics and other civil society organizations came together in 1970, the International Organic Agriculture Movements Union (IFOAM International Federal of Organic Agriculture Movements) have established. This Union and institutes of 600 members representing over 100 countries worldwide. The union for verification of a single source of organic farming practices which differ depending on the countries in the world, has established standards for organic production system. 32 certification bodies in the world uses the IFOAM standards. It is a production system according to IFOAM organic farming. IFOAM standards are listed as follows (Wynen, 1997):

- To produce sufficient amounts of food with high nutrient content;
- Improving the quality of life with and take into account the structural loop -natural systems and processes together;
- The continuation of farming system -Biological loop-soil and surface vitality within the farm system in the plant and take the principles of animal production systems, including their homes;
- Water, water resources and aquatic creatures to use all the careful thinking and healthy;
- Have to help water and soil conservation;
- As do-able, within agricultural systems using renewable sources;
- Organic matter and taking into account the nutrients, to work as much as possible in a closed system;
- Work with materials suitable for reuse provided within or outside the farm;
- Livestock media that conforms to the right to natural behavior;
- Minimum download all factors of pollution arising from -Agricultural activities;
- Plant And to include the environment of wildlife, maintain the genetic diversity of agricultural systems and the environment;
- In accordance with-the United Nations Human Rights header content of organic production and processing jobs running on the quality of life of all people, basic needs, and the need to ensure adequate income as being satisfied with their jobs
- Carefully examine the social and ecological impacts of farming system and take into account;
- To produce non-food products in terms of content and renewable resources.

Total organic farmland in the world is over 40 million hectares of organic farmland up to Oceania, followed by Europe, Latin is located in the United States and North America (Figure 1; FiBL, 2015) Oceania in the first place to get the world about organic agriculture having 40% originates from Australia. Break open the world organic agricultural production acreage in Australia with over 17 million hectares in first. Australia is in excess of 3 million hectares of production area with Argentina, with around 2 million hectares of production areas is followed by the US and China. Later that countries are more than 1 million hectares of production areas in Spain, Italy, France and Germany (FiBL, 2015). 2013. As of the third place in terms of acreage in China, as in all the other products in organic farming was an important episode in the last year.

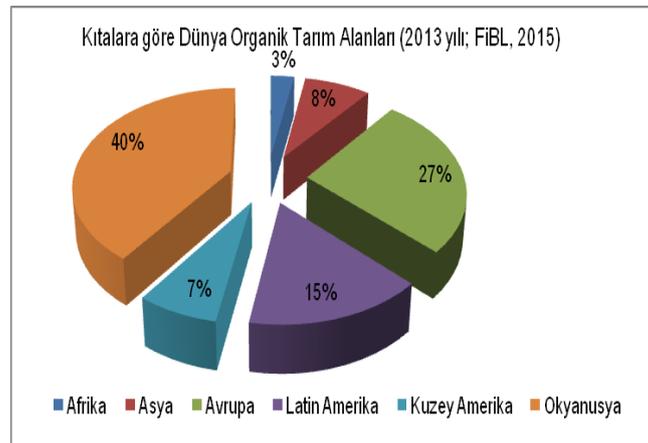


Figure 1. The organic production areas in the world according to continent (FiBL, 2015)

When the number of enterprises in terms of comparisons between countries, Mexico, Indonesia, Italy, the Philippines, Uganda, appears to be the leader of a group that the majority of developing countries such as Tanzania. The most important reason is that in this country the land is very small businesses such as Turkey (Willer and Yussef is 2003-2006). A large number of certification and control organizations operating in the organic production system in the world, if the check is applied correctly in terms of organic production and organic production, product or business gives organic farming certification.

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## 1.4. Organic Agriculture in Turkey

The first legal regulations on organic farming activities in Turkey, the European Union (EEC) No 2092/91 Council Regulation result, because the Union does limit the organic products imported from countries that do not comply with their own legislation on June 18, 1994 22145 Official Gazette the "Regulations Regarding the Production of Plant and Animal Products Using Ecological methods" and has been made. However, a law on organic farming as there was no legal basis for the Regulation on that date and the name had not been a clear definition of organic farming in the Regulations.

Organic Agriculture Law, published December 3, 2004 and dated 25 659 Official Gazette promulgated, then repealed Regulation mentioned above, on June 10, 2005 "Organic Regulation on Agricultural Principles and Implementation" was enacted. Both organic farming activities in the Regulation on the law, "soil, water, plants, producing animal and organic products or inputs by using natural resources or cultivating, collecting products from natural areas and resources, harvesting, slaughter, processing, grading, packaging, labeling, storage , storage, transportation, marketing, import and export products or inputs other operations until it reaches the consumer "is defined as (Article 3, paragraph b).

While it is relatively late legislation in Turkey, starting the organic production goes back to the early 1980s. Unlike European countries, external demand has improved due to organic agriculture in Turkey. First, European-based companies, to take on the European market again, our traditional export products with organic production taking contracted production has been on the agenda in Turkey. Turkey as well as in the world in terms of manufacturer prices for organic products is higher than the price of conventional products. However, this will vary from product to product. This price premium is defined as the price varies between 10-30% compared to conventional. However, this price difference is further increased until the consumer is gone from the product manufacturer. General contract farming method is applied in organic agriculture in Turkey. Contracted form of agriculture, farmers and the recipient firms to make a separate contract for each year. This organic production in the state pays the company made agreements inspection and certification costs. Thus, farmers' production costs in artmaktadir.organic production, traditional export products (nuts, dried apricots, such as raisins, dried figs) and while mainly medicinal plants that can be harvested from the wild, it is added to many herbal products as well as animal products from the list in recent years. Organic vegetable production in organic livestock production is gradually strengthening, yet presents itself with new investments. In particular, organic honey, egg and cow's milk production has increased considerably in the last few years. In fresh apricots dried apricots in organic crop production is in the first place. Apricots, dried figs, raisins and nuts are followed. Placement varies according to the year in first place in trade and organic production is located in our traditional product. Another important export organic products, cotton, apple juice, frozen fruit and lentils. This product anise, fennel and coriander and chickpeas with medicinal plants such as frozen vegetables are followed. Turkey takes first place in the world for organic cotton production.

## 2. BASIC RULES IN THE TRANSITION TO ORGANIC FARMING

### 2.1. Prerequisites for Organic Production Manufacturer

People will come to organic production, with the company or organization must first embrace the following conditions:

- ✓ to believe the benefit of organic farming;
- ✓ to believe that organic agriculture is a share scheme;
- ✓ to accept lower yields can be taken in the first year;
- ✓ acknowledges that the goal of transition to organic agriculture is to restore the lost soil fertility;

- ✓ to agree to the registration system.

## 2.2. Transition to Organic Farming

Businesses engaged in agriculture varies in nature. In organic farming the situation is the same. Organic farms are classified according to his growing product group:

1. Plant breeding enterprises engaged;
2. enterprises engaged in animal husbandry;
3. mixed enterprises is a combination of plant and animal breeding.

The data structure of authorized institutions decide whether a company is eligible to transition to organic farming. Transition to organic farming may vary depending on the nature of each business. Conventional farming enterprises engaged in the agricultural production system has two stages of the transition to organic farming:

- The passage of the whole business organic farming
- gradually over time as the business go through organic farming

A gradual transition is appropriate for the following two situations:

- In cases where the piece of land Businesses
- Crop and animal production enterprises

Of all businesses that provide minimum requirements to watch the roads they have to get certified organic products it is shown schematically in Figure 2. As can be seen from Figure 2 is the first to establish a connection with a company authorized to do business will start to organic farming.

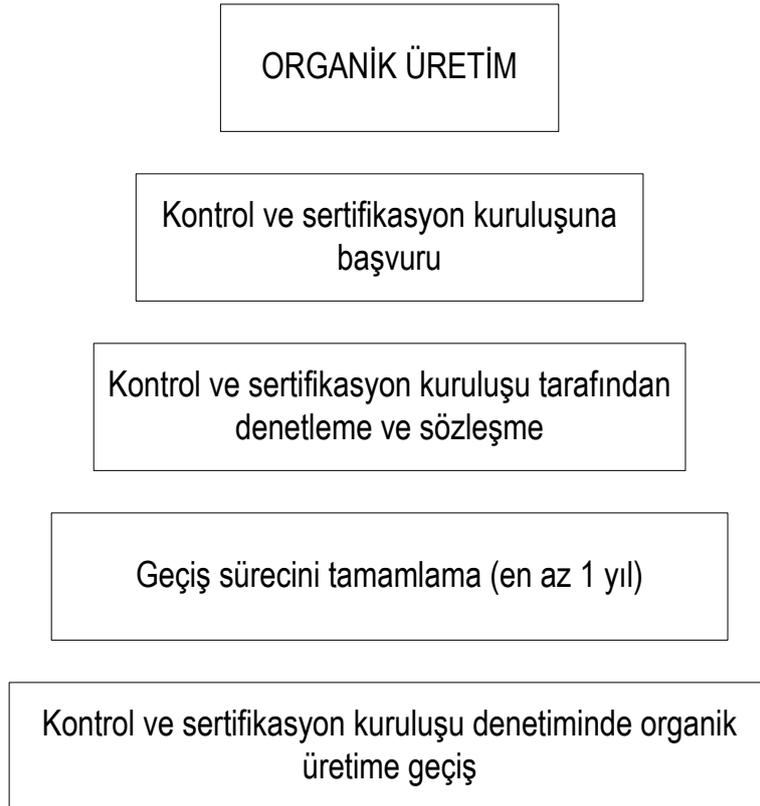


Figure 2. paths to be followed to switch to organic production

## 2.3. Application Control and Certification Organization

Monitoring organic production also has two stages:

1. Control
2. Certification

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Control by the end of the beginning stages of organic farming activities "Principles of Organic Agriculture and the belirlenmesidir.sertifikasyo been made in accordance with the Regulation on the application that the control is performed according to the rules of organic farming called the certification process. What do we do if aquaculture production systems in the past, will begin a controlled organic agriculture and to apply for the certification body and certification procedures. Control food organizations authorized by the Ministry of Agriculture and Livestock is made. Control and certification body must be independent of each other. So while the other is an organization controlled by controlling it should be done on certification and certificate. Failure to run the same organization with the same person in terms of inspection and certification unit in Turkey can be one of two processes.

### 3. ORGANIC VEGETABLE PRODUCTION

#### 3.1. Nutrient Agriculture Gaining Ground

##### Nitrogen

Nitrogenous fertilizers used in organic systems generally, fish and plant extracts are used in small amounts in some garden plants. The conversion of organically bound nitrogen in the soil, while the  $NH_4^+$  form ammonification name is called to transform into ammonium nitrification  $NO_2$  and  $NO_3$ . All of these operations are described as the mineralization of nitrogen. Almost all organic forms of nitrogen in the soil.  $N_2$  bacteria from binding microorganisms in soil or continue to function regardless of common amphibian. Partners who are called symbiosis sustain life.  $N_2$ -fixing microorganisms in the soil can be classified as major (SOYERGIN, 2013):

1. Aerobic bacteria (Azotobacter, Azomonas, Sprill I, Myco-bacterium, Methylomonas etc.).
2. Facultative anaerobic bacteria (Bacillus, Enterobacter, Klebsiella)
3. Anaerobic bacteria (Clostridium, Desulfatomacl I, Desulfovibrio)
4. Fotesentetik bacteria (Rhodosprill I, I Chromatia, Rhone-DOPS of-domonas etc.).
5. Blue-green algae (Plecton average, Anabaena, Calothrix)

Free living is located in the bacteria that promote plant growth, biological warfare agents or encouraging the development of plants to microorganisms used as biological fertilizer rizobakteri on (PGP) is called is Acetobacter, Acinetobacter, Achromobacter, Aereobact is, Agrobacterium, Alcaligenes, Artrobact is, Azospirill I, Azotobacter, Bacillus Burkholderia, Clostridium, Enterobacter, Erwinia, Flavobacterium, Klebsiella, Micrococcus Pseudomonas, Rhizobium belong to Serratia and Xanthomonas ((Rodriguez and Fraga 1999; Sturz and Nowag 2000; equally et al., 2003; Çakmakçı and Erdoğan, 2005; Flag and Ökmen, 2014).

##### Phosphorus

Phosphorus in the soil (P), the main source of soil and rock minerals d. Approximately half of the organic phosphorus in the soil, the other half contains inorganic form. Organic phosphorus can be achieved by animal manure and green manure, but mostly the product to meet the phosphorus removed with the soil is not enough. Organic farming rules allow limited use of inorganic phosphorus fertilizer. Therefore, it is an important problem to provide the CRF. 1 kg of phosphorus per year rainfall meeting / P / ha / year under olmaktadır.organik of phosphate fertilizer used in agriculture is less characteristic solubility. The most commonly used raw phosphate or phosphorus fertilizer in calcareous soil ( $pH > 7.5$ ), aluminum calcium phosphate (SOYERGIN, 2013).

##### Potassium

Utilized in routine use in organic farming potassium (K) is not acceptable for a mineral resource. Resources allowable low solubility and having a low chlorine content, potassium rocks (lagbenit as Adulari rock potassium), wood ash and plant extracts such as Kali vinasse is a by-product of the sugar

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industry. Compared to conventional fertilizers used in agriculture it is providing very few K of ground rocks. 20 kg / ha is recommended for 1 ton C / ha application rocks. K utility of the addition of rock dust during the composting of manure or organic waste liquid extract with rock dust treatment is increasing. However, a visible lack of available organic standards are less restrictive. Soil K index below 2 and soil clay content is less than 20% of Soil Association K<sub>2</sub>SO<sub>4</sub> (potassium sulfate) or soluble N mineral (sylvinite) as it allows the use of water-soluble N forms. Other certification bodies allow the use of these materials is a demonstrative needs. Commercial use of KCl earth ions Cl not allowed because it will have a negative effect on the osmotic effect of living. Due to the high concentrations of fertilizer to be added to Cl may be harmful to the development of young plants dry weather. Organic standards therefore allows the use of KCl sylvinite or kainite instead, provided that it contains low C (SOYERĞİN, 2013).

### Calcium

Organic standard calcium (Ca) as ground lime stone, chalk, and water permits the use of animal materials such as shells of liming. Besides the supply of C element with liming, liming application to raise the pH of the soil yapılmaktadır. asit positive impact on the acidity of the soil must be done according to soil analysis results. The recommended amount of lime according to soil pH is given in Table 1 below and structure (SOYERĞİN, 2013).

Table 1. Soil reaction to remove the 6.50'y limestone (x) amount (kg / ha) (SOYERĞİN, 2013)

pH	Sand	Tin	Clay loam	Organic soil
4.5-6.5	250	650	780	1940
5.0-6.5	200	510	630	1400
5.5-6.5	130	380	450	960

x) commercial lime (CaO) is used, 56% of the above amounts must be calculated.

### Sulfur

Elemental sulfur (S) application to allow organic standards. In addition, the use of gypsum with 15% SO<sub>4</sub> may be applied under the supervision of the control and certification organization. In organic farming soil earth elemental sulfur powder is used when the attitude ENDER by mixing the soil. In case of high soil pH so low that more than 8 or less than 6.5, the removal of nutrients by plant roots problems arise. Elemental sulfur powder is applied to the most accurate and most economical way to adjust the pH of the soil. The amount of sulfur powder to be used to reduce the soil pH are presented in Table 2 below (SOYERĞİN, 2013).

Table 2. The amount of sulfur necessary to adjust soil acidity in the 6.50'y (kg / ha) (SOYERĞİN, 2013)

pH	sandy soil	Loamy soil	clayey soil
8.5-6.5	220	280	340
8.0-6.5	130	170	220
7.5-6.5	60	90	110

## 3.2. Organic Fertilizers

The organic system of nutrients removed by the product due to the lower yields is the removal of said amount of earth considerable amount of nutrients although lower than in conventional systems. However, for long-term soil productivity, these elements must be put in place (Çakmakçı and Erdoğan, 2005; SOYERĞİN, 2013) met with legumes grown in rotation with nitrogen .Organik system. Other elements are renewed by the decomposition of soil minerals and rain. But all this came to meet with all of the lost nutrients are needed for the use of soil improvers can not be sufficient (Aksoy and Altındaşlı, 1998; and Başalan Up, 2008; SOYERĞİN, 2013). Organic soil improvers manure can be used in conditions in Turkey, compost, various agricultural waste (cakes, sunflower stalks, corn cobs, rice

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husks, etc.) And slaughterhouse waste (kantoz, bone, etc.) Can be considered. Some of the nutrient content of organic materials are given in Table 3 (SOYERGİN, 2013).

Table 3. Nutrient content of some organic materials (SOYERGİN, 2013)

Source	% N	% P <sub>2</sub> O <sub>5</sub>	% K <sub>2</sub> O	Available
Barnyard manure	0,5-1,0	0,15-0,20	0,5-0,6	Middle
Chicken manure	2,87	2,90	2,35	Medium-fast
compost	1.5-3.5	0.5-1.0	1.0-2.0	Slow
Horse manure	0.3-2.5	0.15-2.5	0.5-3.0	Middle
Bone	0.7-4.0	18.0-34.0	0.	Slow-medium
Blood powder	12.0	1.5	0.57	Medium-fast
seaweed	0.	0.	4.0-13.0	-
Wood ash	0.	1.0-2.0	3.0-7.0	Fast
Cotton toh.küs.	6.0	2.0	1.0	Slow

### Barnyard manure

Manure, large and small animal droppings spread under abetting consists of animals in the barn. Manure, while positively affects soil structure, will have a positive impact on the amount of product on the other hand by providing the necessary nutrients for plants. These effects can be summarized as follows (SOYERGİN, 2013):

- It increases the water holding capacity of soil.
- independent flowing water on the surface of the soil, prevents evaporation and moved to the land suitable for agriculture to be taken.
- soil allows the pan to come easy.
- soil temperature to the appropriate case for the plant growth.
- it has an impact on the pH of the soil.
- manure, soil aeration due to the positive impact of organic structure. On the other hand, the resulting fragmentation of manure in soil carbon and organic acids, they shape into plant-available form of plant nutrients for plants.
- The ranch is given to excess fertilizer to the soil microorganisms. Thus the speed of the biological changes in the soil increases.
- The different animal manure N, P, K content is given in Table 4.

Table 4. Different nutrient content of manure (Follett et al., 1981)

Fertilizer	Nutrient, % dry matter		
	N	P	K
Cattle manure	2,0 (1,0)	1,0 (0,5)	2,0 (1,0)
Horse manure	1,7 (1,0)	0,3 (0,2)	1,5 (0,9)
Sheep manure	4,0 (1,0)	0,6 (0,2)	2,9 (0,7)
Pig manure	2,0 (1,0)	0,6 (0,3)	1,5 (0,8)
Chicken manure	3,9 (1,0)	2,1 (0,5)	1,8 (0,5)

The numbers in parenthesis indicate N = 1.0 when P and K proportional values.

### Chicken Manure

Chicken manure, farmyard manure than other more valuable in terms of nitrogen content, moisture content is low and the high amount of dry matter. However, if used directly in the plant can cause severe burns. Therefore, by applying a small amount of soil or straw, and peat moss mixed with the diluted plant nutrient levels it can be used. Tank for accumulating and adding water and sufficiently facilitate

dissolution, diluted and facilitated the addition of both irrigation water. Of chicken manure nutrient content are given in Table 5 (SOYERGİN, 2013).

Table 5. Chicken nutrient content of manure (depending on oven-dried weight basis) (Aydeniz and Brohi, 1991)

Content	%
Nem	36,9
N	2,0
P	1,91
K	1,88
Ca	3,42
Mg	0,52
S	0,49
	ppm
Fe	1347
Zn	120
Mn	333
Cu	31
B	28
Mo	135

### Compost

All organic waste vegetable or animal origin derived from outside the agriculture business or the company used in making compost. Vegetable stems, leaves, weeds, kitchen waste are suitable for composting. Said base is prepared by thoroughly mixing these materials in order to place the stack compressed. Alta is prevented by laying a layer of straw leakage. It may be in the 1-1.5 m high pile on. Above the ground covered and left to ferment. Depending on the type of fermentation material may be 6-24 months. However, during that time, pile occasionally deteriorate vented, the mature portion slightly wetted and dried leaves. But not always for the stack is compressed too much. Table 6 are as desirable characteristics for an ideal compost (SOYERGİN, 2013).

Table 6. Ideally, a compote of properties (Aim and Read, 1998)

Features	Desired values
C:N oranı	25-30
Particle size	Aeration system 10 mm, 50 m long piles and natural ventilation conditions 50-60%
Moisture content	Oxygen content should be ensured between 10-18%
Air flow	55-60 0C
Heat	5.5 to 9.0
PH	If natural air, 1.5 m high, 2.5 m wide and made heaps desired length.
Stack Height	Selülotikfungus and bio-fertilizers
Microbiological activity	

### Green Manure

Mainly green fertilizers, plants grown in soil organic matter necessary to provide, in a specific period of development and is not brought under ground while applying the green state. If it is grown in a wide variety of plants leguminous plants as green manure plants are always preferred over non-leguminous

plants and are considered to be the best green manure crops. Often grown as a green manure crop plants are given in Table 7 (SOYERĞİN, 2013).

Table 7. Green manure crops (SOYERĞİN 2013, Kacar and Katkat, 1999)

Leguminous plants	Non-legume crops
Clover	Rye
Red clover	Oat
Stone clover	Barley
Soya bean	Millet
Canadian feed peas	Buckwheat
Bean feed	Wheat
red clover	Grass
Japanese clover	Sudan grass
Wild hairy vetch	Mustard
Austria peas	Rape

Burial time and shape of the green manure crops

Green manure crops in the most appropriate development stages, the aboveground organs has been fully formed, legumes should be buried under the soil of 1/10 when the flowers open. It can be done in three ways:

- to take direct,
- After Saw and
- After passing the rollers (Larch et al., 2003)

When mixed into the soil it depends on the following properties of green manure crops.

1. Development degree,
2. The climatic conditions
3. Soil characteristics and
4. Characteristics of the crop to be planted

Green manure crops should not be buried in a soil that has green and juicy (Larch et al. 2003).

#### 4. FIGHTING DISEASE AND PEST MANAGEMENT IN ORGANIC FARMING

Organic farming plant protection is active and two passive approach said to be in combat diseases and pests. The disease conditions that are essential to prevent the emergence of insect or plant-damaging factors. This case is the subject of passive plant protection. Passive plant protection train in resistant plants, planting adjusting the planting time, issues such as balanced fertilization takes place. While in active plant protection issues pests or diseases, taking direct aim is preparation and application of pesticides is very well suited for organic farming. Find out alone, passive and active plant protection in organic farming should not be considered independently. Organic products are the highest quality standards, freshness, content has a taste and variety. Grown organic products from 1950, leaving toxic residues used in conventional agriculture since effective and are produced without synthetic chemicals. Today, organic farming has not a primitive agricultural model; Contrary to a deliberately controlled and improved agricultural production techniques.

On the basis of organic farming,

- Whether to make the substitution of sustainable soil fertility;
- Persistent toxic chemical content and use of pesticides and fertilizers;
- Natural regeneration, enhancing the sustainability and ecological compatibility; Biologically it is to create and support agriculture.

This taking into account national and regional circumstances, the principles of organic farm agricultural activities gain variation. But generally it includes the following activities:

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- Minimum tillage with appropriate methods;
- Efforts to maintain and increase soil fertility;
- Use of organic fertilizers instead of chemical fertilizers;
- Durable selection of healthy seeds and plant varieties;
- Appropriate methods of sowing;
- Instead of direct use in plant protection chemical inputs and input use organic methods;
- harvesting, storage, processing and packaging operations to be carried out in organic methods.

#### 4.1. Methods Used in Organic Agriculture in the Fight Against Plant Diseases and Pests

##### Cultural Measures

- ❖ Plant diseases and pests that make it difficult to live, including the fight against proliferation of reducing or preventing the operation method. In the fight against pests and disease and weed control primarily benefited from cultural measures. The aim of crops or products to advance the measures taken to protect the damage of pests and diseases.

##### Prevention of Transmission of Diseases and Pests

- ❖ Healthy Plant Breeding
- ❖ Growing it in the proper place
- ❖ Tillage Fertilization
- ❖ Irrigation and Drainage
- ❖ Rare Breeding
- ❖ Rejuvenation and pruning

##### Durable Cultivate Plant Species and Varieties

- Setting Sowing and Transplanting Time
- Harvest Time and Shape
- Rotation (rotasyonbit on the Elimination of Waste and Weeds
- Trap Plants
- Using Cover Plants

##### Mechanical Challenge

To prevent mechanical combat diseases and pests can not or do harm is a form of struggle against the hand or tools. Located in dense populations of some pests can be reduced by crushing manually or wire brush.

##### Physical Challenge

Diseases and pests change the physical properties of the environment they live or through activities aimed at reducing the application is given a physical fight name. Hot-air application weevil (*Sitophilus granarius*), Mill moth (*Ephestia kuehniella*) as it applied against insects that damage stored products. The soil solarization process until the depth of 10-15 cm by many pathogenic fungi, nematodes, weed seeds and can be destroyed. Tubers, roots, underground organs or steel, such as onions, producing organs such as seedlings and seeds in hot water kept for a certain period can be destroyed as a result of some viral diseases and pests. This body of practice is necessary to pay attention to protect the viability of plants.

##### Biotechnical Methods

Targeted biology of pests, using an effect on the physiology and behavior of some of the artificial or natural substances, methods applied by pests to disrupt the normal specifications are accepted as biotechnological methods. These methods include mass trapping and mating disruption techniques (pheromone) or diversionary technique has been successfully applied in organic agriculture (Figure 3,

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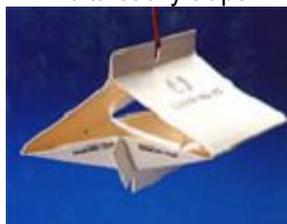
Figure 4). Turkey codling moth in apple orchards in this method features (*Cydia pomonella*) and apple body would Kabukiza (*Synanthedon myopoeformis*); In cherry garden leaf roll (*Archips* spp.) and cherry fruit fly (*Rhagoletis cerasi*), olive moth in olive groves (*Prays oleae*) and olive fly (*Bactrocera oleae*) ;, bunch moth in the vineyard (*Lobesia botrana*); greenhouse vegetable and ornamental plant cultivation in Leafminer (*Liriomyza* spp.) and whiteflies (*Trialeurodes vaporariorum* and *Bemici tabaci*) is used in the fight. Greenhouse vegetable and ornamental plant cultivation in Leafminer (*Liriomyza* spp.) What and whitefly to (*Trialeurodes vaporariorum* and *Bemici tabaci*), cherry fruit fly in cherry orchards (*Rhagoletis cerasi*) "against yellow sticky traps it has been used successfully and should bear dissemination priorities. Prevent codling moth mating or diversionary technique in our country (*Cydia pomonella*) and the cluster moth (*Lobesia botrana*) has been effective in dealing with practical bulunarak. The most important advantage is that it can be adapted to highly specific environmental conditions and the biotechnical method is not however cause unwanted side effects (Anonymous, 2014; Akman, 2014).



Delta sticky traps



Wing trap



Diamond trap



Funnel traps (green)

Figure 3. Trap types



*Agrotis ipsilon* / *Booth pheromone*



*Cydia pomonella* / *Codling moth pheromone*

Figure 4. Some pheromones

### Biocontrol

Plant diseases in the field of culture, through the suppression of weeds and pests, natural enemies to keep them from the bottom of the economic damage level is called biological control of pest control activities performed making use of beneficial microorganisms. It is known that exist in nature, such as biotic factors, which keep pests in balance. This biotic factors, natural enemy insects (parasites and predators), beneficial mites, entomopathogenic by (protozoa, bacteria, viruses, fungi, nematodes), birds and mammals are (Figure 5,6,7,8). The most successful example of biological control in Turkey, citrus mealybug, *Planococcus citri* to combat insect predators and parasitoids produced in insect *Cryptoleamus montrozier* is released each year insectaria *Leptomastix dactylopii*. The known interactions between beneficial microorganisms is essential for successful biological control of plant pathogens. Beneficial microorganisms producing antibiotics, pathogens and nutrients, and / or by entering the place of competition, prevent development of pathogen microorganisms living in

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hiperparazit or antagonists may suppress the pathogen. In addition, vegetable oils are used as plant disease and pest control. The most commonly used vegetable oils and rapeseed oils obtained from seeds of the neem plants. Neem tree 200 over the oil obtained from the seeds of the insect species known to be effective. The oil of thyme is known to be effective against many plant diseases (Aksoy et al., 2007; and Bařalan Up, 2008; Anonymous, 2014).



Figure 5. Internal Parasites Ota

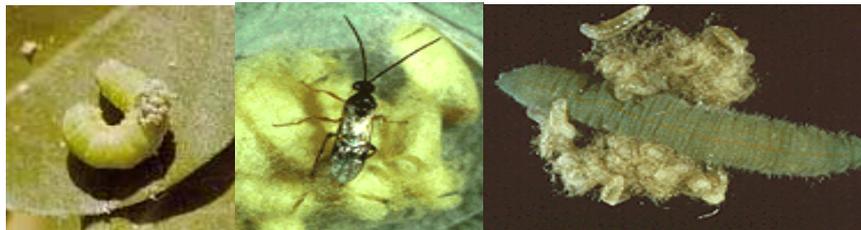


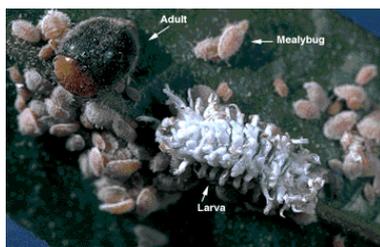
Figure 6. External parasitoids



Aphid predators



Colorado potato beetle predators



Citrus mealybug predators



Bag Kořnil predators

Figure 7. Predators



*Beauveria bassiana*



*Metarhizium anisopliae*



*Bacillus thuringiensis*

Figure 8. Entomopathogenic

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## **5. ORGANIC ANIMAL PRODUCTION**

### **5.1. Definition of Organic Livestock Production**

June 10, 2005 date and 25 841 numbered Official Gazette of Organic Agriculture Principles and Organic Regulation on the Implementation of Animal Production to produce animals using the breeding animals or semen, animal products from human food and animal and plant nutrition products production, the industrial area of agricultural raw material and scientific research on organic raw material supply, each step of which is controlled by the body authorized by the regulations and is defined as a certified production facilities.

### **5.2. Establishment of Organic Livestock Production Business**

Entrepreneurs wishing to organic livestock production primarily Ministry of Food, Agriculture and Organic Farming Committee (JTC) by reference to any authorized organization to petition for a work permit and will request that the necessary studies to evaluate organic products will achieve the function.

### **5.3. Organic Livestock Breeding**

The main rules of the organic livestock production are set out in Article 15 of the Organic Farming Regulations as follows:

1. Organic aquaculture species and local conditions are taken into consideration in the election race, attention is paid to the selection of disease resistant species and breeds.
2. Brought from organic business and fully fed with organic feed, genetically modified, environment, climate conditions and disease-resistant animals used for breeding.
3. insemination is of course essential to organic farming methods. Embryo transfer can be made. Artificial insemination, obtained with natural methods of breeding animals and can be stored with semen.
4. Animals in the business to make organic farming, pastures, should have access to open-air promenade or open space.
5. All animals in the same organic livestock production unit, are grown according to Organic Farming Regulations. According to the regulation which are not grown in the same species of animal, at the same time with animals raised on pasture bulundurulamaz in accordance with the provisions of the Regulation.
6. Organic Farming Regulation at different times of the animals reared in accordance with Regulation conventionally bred animals provided that the fulfillment of the mentioned issues can be grazed on common land.
7. Organic animal husbandry and animal production will be taken to the pasture land and a 2-year transition period.
8. Animal and animal product transition; 1 year for meat production in cattle, sheep and goats for 6 months, and animals bred for milk production is 6 months. For the first time creating a lot of animals raised organically are not enough, conventionally bred animals can also be used in organic farming to organic farming complying with the instructions provided in the Regulations.
9. Lot of facilities while the company re-made organic beef fattening; first fattening calves in accordance with the provisions of the Regulation if no conditions of business can be made from organic farming with conventional farming business.
10. Herd upgrading and / or renewal each year if no animals produced organically for more than 10% of adult cattle, while sheep and goats are female and 20%, with the approval of the authorized agencies can be of organic non-production sites. 40% of the herd with the approval

of authorized institutions in some cases the rate specified in the Regulations, these rates may be increased.

11. Breeding males, according to the cultivation and subsequent Regulations, provided they can be from non-organic feed business.
12. If the animals are obtained from farms to organic animal production, animal health rules to be observed. Depending on the specific conditions and quarantine period is done by checking tests.
13. Enterprises engaged in organic animal husbandry and livestock production must keep all records related to treatment with regular input and output of animals.

#### **5.4. Feeds and Syndication**

Organically produced feed should be used in animal feed, vegetable baits should preferably be produced in the company. Rangeland and pastures should be disposed of chemical pesticides and fertilizers. There are problems in providing a sufficient amount of the organic feed is allowed to use a limited proportion of conventional feed. Each year the allowed rate of conventional feed ingredients located in the Regulation. According to the regulation in question must comply with the following conditions:

- Organic farming of genetically modified (GMO) used chemically treated baits and baits.
- animal fats and animal by-products not attend rations.
- To accelerate growth in animals to improve feed efficiency and hormone-like substances used antibiotics.
- Egg and egg yolk in poultry or enhancing the quality of regulatory methods used unnatural synthetic substances. The use of vitamins and minerals must comply with the rules of the Regulation.
- Only allow the additives to help in the preparation of the fermentation of organic silo feed forage should be used.

#### **5.5. Transport and Slaughter**

Transport of animals in a way that creates less stress on the animal tranquilizer should be done as soon as possible and should not be used during transport. Road transport in 8 hours feeding, watering and resting to be treated in a way that does not cause stress to break verilmelidir. kasaplık animals during slaughter, conventional and organic where possible in separate abattoirs, slaughterhouses and slaughters should be used. If after the slaughter of animals raised conventionally this is not possible, abattoirs, slaughterhouses and slaughters after cleaning with the regulations set forth in this article, it can be made part of organic animals.

### **6. ORGANIC PRODUCTS MARKETING**

The world organic market has grown very fast in 2000 for \$ 18 billion organic market value doubled in 2006 and reached 38.6 billion dollars. (Wilde et al. 2008). The world's largest organic producer, although demand is assessed in terms of Australia's largest and most sophisticated market for organic products is Europe. Major manufacturer and exporter in Asia, Australia and Europe and are defined as areas where more intensified demand for organic products in North America (Wilde et al., 2008).

The organic production in Turkey is relatively new, the first purpose of export and domestic prices of organic products are more expensive due to the production of organic market is flourishing. However, based on the rise over the years to be organic export of organic production in the domestic market in Turkey it is a sign that not as much as in developed countries, albeit slowly increasing the consumption of organic products. Reasons for the high demand for organic products in developed countries, consumers have a high level of income, food security and further development of the awareness of and

sensitivity to the environment, safe food of high quality food that they turn up. Furthermore, the EU policies as well as in promoting the consumption demand is also affecting the production of organic products. In some countries, a certain ratio of the product in school meals applications such as organic must be available.

Organic products, low volume production, with positive effects on health and the environment and yield loss occurs depends on the quality of the value added by manufacturers to provide high income. This katmadeğer from the start of organic production must be fulfilled in order to obtain until it reaches the final consumer, there are some conditions. Organic products from the production of the harvest and post-harvest realized until our table storage, packaging, and issues to be considered during the labeling rules to be followed are as follows:

### **Harvest**

- Cool hours of the making of the harvest,
- Keeping on the collected product,
- To prevent water loss and premature deterioration, sun protection, the transport containers, masking,
- Do not make the cooling as soon as the pre-harvested crop,
- After harvest, bruises and injured in pile of extracting,
- Use of clean transport and packing containers for shipping,
- It must in no way be confused with other products of the most important organic product.

### **Processing and Packaging**

- It is subject to significant losses in the absence of food packaging. Shelf life of the product also depends on the properties of packaging materials and storage. "Organic Agriculture and the Regulation on the Implementation of Principles" as stated;
- Organic products during the processing of organic products, organic non-interference with other products, measures should be taken to prevent contamination.
- Organic products should ambalajlanırk the organic nature of corruption.
- ionic radiation-irradiation method is not applied in organic products.
- Organic products must be produced from genetically modified organisms or use of the products derived from these organisms.
- Only substances in the list of regulations given in the appendix must be used during the processing of organic products.
- Packaging is a kind of silent salesman. There may be distorted image of the product inside the packaging is damaged.

### **Labeling**

- Label each food item offered for sale must be considered.
- The food label information should be expressed in accurate and understandable manner.
- Label information should be Turkish. Turkish as well as could be internationally recognized languages.
- The label printed on the packaging must be firmly glued or pinned.
- In addition, there should not be covered by compulsory articles picture.

Once these conditions are fulfilled the specified final stage of the sale of organic product marketing. Due to the nature of the product and demand marketing channels and sales are limited organic shapes. The following roads are used in the sale of organic products in Turkey:

- Organic produce aisle in the supermarket,
- Direct sales, delivery address,

- Only buy organic products market in the neighborhood,
- Food processing companies (frozen, dried, baby food, etc.)
- In export products to the exporters / processors firm wholesale sales are made  
Called natural product shops, specialty shops,

As mentioned earlier, in line with the demands of foreign countries it is carried out for more export organic production in developing countries such as Turkey, then exporting company or other organization in the country, are continued with them with product designing solutions contract manufacturing method. Vertical merger in organic agriculture has an important place in the whole world. Contract manufacturing, cooperatives (production, processing, sale) is a vertical merger, applications such companies in the event of a vertical merger contract manufacturing method of a common production method in organic farming. The advantages of farmers in contract manufacturing, The product has warranty sales.

- There is a kind and in cash to help ease.
- New technology is available in a shorter time.
- Uncertainties in production planning decreases.
- Production and yield plus is provided.

However, this advantage in terms of farmers as well as contract manufacturing are also some disadvantages. These,

- Lack of knowledge of the product price in advance,
- Organic production in the capital of the absence of manufacturer's limited alternative (product to be a single buyer)
- Determination by the primary receiver,
- Product purchases can not be resolved at the time when the problems encountered,

The problems related to the marketing of organic products in Turkey can be summarized as follow

- Lack of technical knowledge (production, processing, production methods)
- Supply, demand, competition, consumer preferences, etc. lack of market knowledge on the subject,
- complexity of the certification process,
- Which products will be grown, which markets and the lack of information on how to use the distribution network,
- Capital, organizations and small farmers because of problems stemming from lack of information.

A general indication of the marketing distribution channels of organic agriculture and food product in Turkey is presented in

A general indication of the marketing distribution channels of organic agriculture and food product in Turkey is presented in figure 9



Figure 9. Distribution Channels Marketing of Organic Products in Turkey

Company organization to make organic agriculture producers, exporters and / or handler shall apply to companies or directly control and certification organization. Manufacturers, apply themselves to go to a control and certification organization for organic agriculture to make, it can produce inspection and certification by paying their fees. But in this case, it is known that increased costs can be found in the manufacturer and are forced to find markets for their products.

Organic products in Turkey is below what can be done to organize and develop the market (Fireproof, 2005):

- To create a database of healthy organic products
- To determine the product will have a say and to encourage the production,
- Organic agriculture is long-term thinking and planning,
- Exporters and attaches importance to the training of marketers,
- the development of the target countries, to monitor income and consumer groups,
- To create an effective marketing network,
- in the future it would be important not to overlook the finished products trade in organic products,
- laboratories accredited to perform control of organic products,
- Develop policies to encourage the consumption of organic products covered healthy eating.

## 7. QUESTIONS

1. Why is it important organic farming? (A)
  - a) **the nature and terms of agricultural production to protect their raw materials**
  - b) to make a lot of money
  - c) is the Fashion
  - d) for a system that pollute the soil and water
  
2. Among the reasons for the demand of organic farming in the world are which of the following? (B)
  - a) During production of producer willingness to work in a healthy environment
  - b) **International economic agreements**
  - c) To ensure efficiency plus
  - d) To increase agricultural production
  
3. Which it is not the passive methods of plant protection in organic farming of the following? (D)
  - a) implement a planned rotation
  - b) take care to choose the place of production
  - c) to use clean production material
  - d) **To combat Medicated**
  
4. Which is not to combat harmful cultural methods of the following? (C)
  - a) Tillage
  - b) healthy plant growth
  - c) **Medicated fight**
  - d) Pruning
  
5. Which of the following is not in accordance with the rules of organic animal feed? (D)
  - a) The animals must be the equivalent of drinking water to the people of hatred
  - b) From 2 weeks after eating in front of young animals should be used to enable high-quality hay and concentrate feed.
  - c) pasture and grazing lands should be disposed of chemical pesticides and fertilizers.
  - d) animal rations can participate in the reaction products.
  
6. Which of the following characteristics of organic products? (A)
  - a) **residual materials comprising**
  - b) it is safe and environmentally sensitive
  - c) sold very cheaply
  - d) there is anywhere and at any time
  
7. Market research will not be asked which of the following? (C)
  - a) Where sales are made?
  - b) Where is the consumer product?
  - c) **where production to getting inputs?**
  - d) when we buy the product
  
8. Which of the following use is prohibited in organic farming? (A)
  - a) **Synthetic Chemical Fertilizers**
  - b) Mushroom Production Surplus
  - c) Seaweed products
  - d) The manure

9. Which of the following is produced by ecological agriculture issued counted among the top 5 items?

**(C)**

- a) Raisin
- b) Dried Figs
- c) Beans
- d) Dried Apricots

10. Which of the following can not be considered among the fundamental objectives of organic farming?

**(C)**

- a) protection of natural resources
- b) restoring the damaged ecological balance
- c) termination of the toxic residues and chemical pollution
- d) growing plants resistant to pests and diseases

11. Which of the following "International Association of Organic Agriculture Movements is the short name? **(B)**

- a) ETO
- b) IFAOM
- c) UETHF
- d) ECOCERT

12. Which of the following does not include the organic agricultural production system? **(C)**

- a) use of chemical inputs in production
- b) Uncontrolled and to obtain non-certified agricultural products
- c) The use of hormones and pesticides
- d) improper practices to lose balance in the ecosystem

13. Which of the following is not one of biological control agents? **(D)**

- a) parasitoids
- b) Predators
- c) Entomopathogenic
- d) Organic fertilizers

14. What features are incorrect labeling of organic products. **(A)**

- a) Label on every food item offered for sale is not mandatory.
- b) The food label information should be expressed in accurate and understandable manner.
- c) Label information should be Turkish. Turkish as well as could be internationally recognized languages.
- d) The label printed on the packaging must be firmly glued and pinned.

15. Which of the following is not one of the beneficial microorganisms used in biological control? **(C)**

- a) Trichoderma spp
- b) mycorrhizal spp.
- c) *Cydia pomonella*
- d) Bacillus subtilis

16. Which of the following is not the purpose of organic farming? **(C)**

- a) Increase the plant resistance
- b) Organic and Green Manure
- c) Obtaining plants resistant weeds

d) Some increase in production

17. Food, organic farming regulation by the Ministry of Agriculture and Livestock to determine which of the following in order not prepared? **(B)**

- a) To re-establish the broken ecological balance
- b) To obtain a large amount of poor quality and product
- c) develop the organic products trade
- d) correct processing of organic products, packaging, storage

18. Which of the following is not one of the advantages of fighting Pheromone? **(A)**

- a) Pheromone scents are not attractive and appealing
- b) Pheromones are completely non-toxic-nontoxic substances.
- c) According to medicines it is very short and safe procedure.
- d) A method according to several control methods are inexpensive.

19. Which of the following is not one of cultural control methods against diseases and pests? **(D)**

- a) Fertilization
- b) the plants and weeds on the Elimination of Waste
- c) Plant Species and Varieties Resistant Cultivate
- d) Solarization

20. Which are following banned for use in organic agriculture ? **(C )**

- a) Synthetic Chemical Fertilizers
- b) plant and hormones used in animal husbandry
- c) use of manure
- d) the use of growth regulators

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