Horticultural Crops Production Level- IV

Based on March 2019, Version 2 Occupational standards

Module Title: - Implementing Sustainable Practices in the Organic Farm Based Business

LG Code: AGR HCP4 M13 LO (1-4) LG (62-65)

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GREEN FLOWER FOUNDATION

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LG #62	LO #1- Access the farm businesses guidelines and principles for social, financial and environmental sustainability

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying environmental regulations, organic farming requirements and the organic farm plan
- Source and Interpreting environmental and sustainable organic farming information
- Identifying the impact of best practice guidelines
- Identifying key sustainability practices of organic farming
- Accessing business guidelines and farm practices

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify environmental regulations, organic farming requirements and the organic farm plan which apply to the farming enterprise.
- Source and interpret environmental and sustainable organic farming information and current best practice guidelines and principles.
- Identify the impact of best practice guidelines and principles on day to day farm operations and management.
- Identify ***key sustainability practices*** for an organic farming enterprise.
- Access business guidelines and farm practices which comply with sustainable organic farming guidelines and principles.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet 1- Identifying environmental regulations, organic farming requirements and the organic farm plan

1.1. Definition of Organic Farming

Organic farming is an alternative agricultural system which originated early in the 20th century in reaction to rapidly changing farming practices. Organic farming continues to be developed by various organic agriculture organizations today. It relies on fertilizers of organic origin such as compost manure, green manure, and bone meal and places emphasis on techniques such as crop rotation and companion planting. Biological pest control, mixed cropping and the fostering of insect predators are encouraged . In general, organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances.

Organic farming follows the principles and logic of a living organism, in which all elements (soil, plant, farm animals, insects, the farmer and local conditions) are closely linked to each other. This is accomplished by using, where possible, agronomic, biological and mechanical methods, following the principles of these interactions, using natural ecosystem as a model (Figure 1.1).

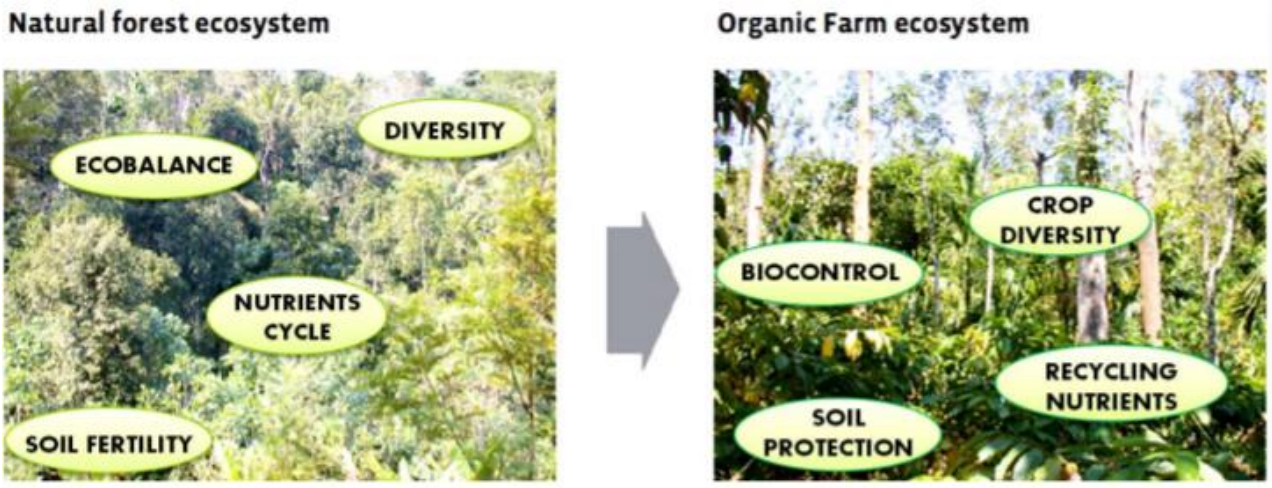

FIGURE 1-1 - USING NATURAL ECOSYSTEM AS A MODEL

1.2. Importance of Organic Farming

The goal of organic farming is to contribute to the enhancement of sustainability. But what does sustainability mean? In the context of agriculture, sustainability refers to the successful management of agricultural resources to satisfy human needs while at the same time maintaining or enhancing the quality of the environment and conserving natural resources for future generations. Sustainability in organic farming must therefore be seen in a holistic sense, which includes ecological, economic and social aspects.

1.2.1. Economic sustainability:

- The family savings or net worth is consistently going up
- The family debt is consistently going down
- The farm enterprises are consistently profitable from year to year
- Purchase of off-farm feed and fertilizer is decreasing
- Reliance on government payments is decreasing

1.2.2. Social sustainability

- The farm supports other businesses and
- families in the community
- Dollars circulate within the local economy
- The number of rural families is going up or holding steady
- Young people take over their parents' farms and continue farming
- College graduates return to the community after graduation

1.2.3. Environmental sustainability

- There is no bare ground
- Clean water flows in the farm's ditches and
- streams
- Wildlife is abundant
- Fish are prolific in streams that flow through the farm
- The farm landscape is diverse in vegetation

Sustainable agriculture depends on a whole-system approach whose overall goal is the continuing health of the land and people. Therefore it concentrates on long term solutions to problems instead of short term treatment of symptoms.

Figure. 1.2. Components of Organic Farming

Organic agriculture: Key indicators and top countries

Indicator	World	Top countries
Countries with organic activities[1]	2017: 181 countries	
Organic agricultural land	2017: 69.8 million hectares (1999: 11 million hectares)	Australia (35.6 million hectares) Argentina (3.4 million hectares) China (3.0 million hectares)
Organic share of total agricultural land	2017: 1.4 %	Liechtenstein (37.9 %) Samoa (37.6 %) Austria (24.0 %)
Wild collection and further non-agricultural areas	2017: 42.4 million hectares (1999: 4.1 million hectares)	Finland (11.6 million hectares) Zambia (6.0 million hectares) Tanzania (2.4 million hectares)
Producers	2017: 2.9 million producers (1999: 200'000 producers)	India (835'000) Uganda (210'352) Mexico (210'000)
Organic market	2017: 97 billion US dollars*[2] (approx. 90 billion euros) (2000: 17.9 billion US dollars)	US (45.2 billion US dollars; 40 billion euros) Germany (11.3 billion US dollars; 10 billion euros) France (8.9 billion US dollars; 7.9 billion euros)
Per capita consumption	2017: 12.8 US dollars (10.8 euros)	Switzerland (325 US dollars; 288 euros) Denmark (315 US dollars; 278 euros) Sweden (268 US dollars; 237 euros)
Number of countries with organic regulations	2017: 93 countries	
Number of affiliates of IFOAM – Organics International	2018: 726 affiliates from 110 countries	Germany - 76 affiliates India - 47 affiliates China - 45 affiliates United States - 43 affiliates

Table.1.1.Organic farming in the world

1.3. Organic farm business

Organic business is Commercial operations of a specific entity involved in the production, processing or trade of organic products. Sales of organic products are steadily increasing, so organic production is low in middle income countries. For good reason: for farmers it is an opportunity to improve their livelihoods and at the same time manage their land in a more sustainable way. It enables them to access promising local and international markets and to gain a better income.

1.4. Organic business in Value chain

Value chain is a chain of activities through which the product gains in value on its downstream journey from production to final consumption.

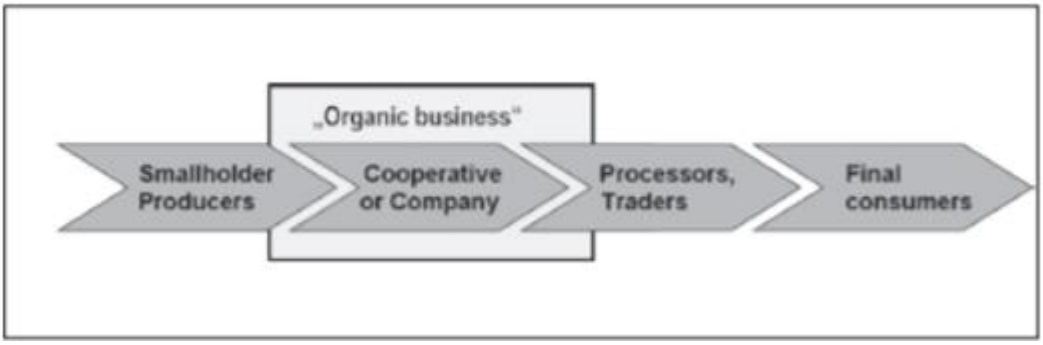

Figure 1.3. The organic business in the value chain.

1.5. Experience of successful organic fruit producer

- Pineapple processing and export in Uganda: An individual entrepreneur, who contracts 200 farmers producing organic pineapple, exports fresh pineapples and runs a solar, based drying plant. He sells the fresh pineapple to Europe and sometimes to Kenya, and the dried fruit to Europe and on local urban markets.

- Organically grown food tastes better than that conventionally grown. The tastiness of fruit and vegetables is directly related to its sugar content, which in turn is a function of the quality of nutrition that the plant itself has enjoyed. This quality of fruit and vegetable can be empirically measured by subjecting its juice to brix analysis, which is a measure of its specific gravity (density). The brix score is widely used in testing fruit and vegetables for their quality prior to export. Organically grown plants are nourished naturally, rendering the structural and metabolic integrity of their cellular structure superior to those conventionally grown. As a result, organically grown foods can be stored longer and do not show the latter's susceptibility to rapid mold and rotting.

1.6. Organic farm plan

Prior to the conversion of a farm or a processing plant it is of utmost importance to acquire sufficient information about all certification requirements. This can be done best by selecting a qualified certification body with the objective to develop a conversion plan for the operation. Furthermore, prior to the first inspection it has to be clarified which information is needed by the certification body and/or which records have to be taken constantly (e.g. Bought-in of raw materials and production means, sales documentation etc.).Planning usually begins with a problem or an opportunity, or both. Transition may require that you make significant changes in the way you farm, but it also brings the promise of marketing opportunities and potential health, conservation or financial rewards. It is also important to identify other structural changes that you would like to make to the farm business as you plan your transition to organic, such as changes in labor and management or the addition or elimination of enterprises. It is known as “critical planning issues.” Begin by asking yourself why it is important to you to farm organically. The steps include:

- Organize a Planning Team
- ✓ A planning team is an advisory board of sorts—a group of trusted individuals who can help guide you through major changes, such as the transition from conventional to organic production. Planning teams often include family members, business partners, farmer mentors, entrepreneurs, potential buyers and others who can help you brainstorm strategies, identify challenges, network and generally provide feedback as you work through ideas. In many cases, planning team members may serve as more than advisors—they may represent the key decision-makers for your business (e.g., a spouse).Business Overview

• Farm Business History

• Land and Other Resources

• Current Operations

• Current Marketing

• Current Human Resources

Farm and business history—recording business strategies that have been successful, describing how you have managed risk during difficult times or how you have responded when plans did not unfold as expected. You also will document resources (including people skills) that will be available to the business as you transition, and prepare financial documents that will help when assessing the feasibility of transition strategies.

Farm Business History

You have several options for documenting your farm's history: photos, a timeline and text. However you approach this, do so with the intention of communicating to someone who is unfamiliar with your farm business. Begin documenting your farm business history by reflecting on past successes (and, yes, perhaps some challenges or failures too). What would you want someone to know about the farm and your management practices, past productivity and marketing of crops, livestock, or products and services? Has the farm changed in size or in management since you acquired the land that you now farm? How have you managed risk? In other words, what has led you to this point? Be sure to describe successes and lessons learned over the years.

Current situation: document your current operational, marketing, human resource and financial situation. This can be a time-consuming task, but it is critical when mapping out strategies to get you from here (pre-transition) to there (certification). Your resource inventory should include marketing resources (infrastructure, contracts, competitiveness), physical resources (buildings, equipment, fields, livestock), human resources (labor, knowledge, skills) and financial resources (income, cash flow, working capital, financing).

Operations: It is important to document current physical resources and management practices. Doing so will make it easier to identify available operational assets and resources needed to make a successful transition. Physical resources include land, buildings and other structures, as well as machinery, equipment, water supplies, breeding livestock and poultry. The quantity and quality of tangible assets that you control can significantly affect future opportunities. Begin documenting your current resources by drawing a map or obtaining an aerial photograph of your fields and buildings.

Planning increases efficiency.

- ✓ Planning reduces risks.
- ✓ Planning utilizes with maximum efficiency the available time and resources in organic farm.

  The plan will includes:
- ✓ Start time
- ✓ Farming Location
- ✓ Official Name
- ✓ Maintained by
- ✓ Product of cultivation: Vegetables and Fruits
- ✓ Certify By: ISO (International Organization for Standardization);
- ✓ Trade License collected by
- ✓ Cultivation area
- ✓ Short term plan
- ✓ Long term plan

1.7. Environmental regulations and Organic farming requirements

The government of Ethiopia issued a new policy guideline on Rural Development in World Summit on Sustainable Development, Johannes-burg, South Africa, and 26th August - 4th September 2002. It included the rehabilitation as an essential factor for increasing soil productivity.

1.8. Environmental benefits of organic agriculture

Organic agriculture uses an individualized approach to land management that emphasizes preservation of a land's natural ecosystem, while consuming less energy and reducing the risks of pollution common to conventional agriculture. Organic agriculture, therefore, seeks to offer a responsible alternative to conventional practices in the face of ever-growing concerns over climate change and environmental degradation. Soil erosion is a main cause of loss of yield capacity and fertility.

Long term comparisons between conventional and organic farms have found that organic methods improve the fertility and overall health of the soil. Organically managed soils also demonstrate better moisture-retention capacity than those of conventional farms, which is important in arid climates and to reduce the risk of desertification. Soil conservation is therefore one of the key concepts in organic agriculture. Soil fertility is actually a cornerstone of organic farming by necessity because farmers cannot use synthetic products to restore degraded lands. They rely instead on maintaining and building soil fertility through multi-cropping systems, crop rotations, organic fertilizers, and minimum tillage. Organic farming has the ability to increase organic content in the soil, enhancing its capacity to retain water and circulate pollutants. Organic methods also counter soil erosion because they use natural pesticides and maintain a permanent soil cover, restoring even degraded soils quickly. Although there is little scientific evidence demonstrating that organic agriculture can reverse desertification, there are several practical examples of organic agriculture systems returning degraded lands back to fertility. This suggests that organic farming may prove to be an effective means to counter desertification.

Farms become and stay environmentally sustainable by imitating natural systems—creating a farm landscape that mimics as closely as possible the complexity of healthy ecosystems. Nature tends to function in cycles, so that waste from one process or system becomes input for another. Industrial agriculture, in contrast, tends to function in a linear fashion similar to a factory: inputs go in one end, and products and waste come out the other. The wastes of industrial agriculture (non-point-source pollution) include suspended soil, nitrates, and phosphates in stream water, and nitrates and pesticides in ground water. It is a premise of sustainable agriculture that a farm is a nature-based system, not a factory.

1.9. Organic farming requirements

Organic farming should meet the following requirements:

- adherence to general principles of organic farming;

- rejection from synthetic mineral fertilizers, pesticides, height hormones (stimulators), synthetic food additives used in the production process of food products, chemical means causing ecological danger in the disinfection of buildings where warehouses and cattle are kept except the means allowed for application in organic farming;
- use of seeds and sewing materials certified as organic product in organic lands;
- prevent the use of chemicals causing ecological danger in vet medicine;
- rejection from genetically modified organisms and their derivatives in the production of organic farming and food products;
- use of natural food additives allowed only in international and national standards in the processing of organic farming and food products;
- conformity of processing conditions of organic farming and food products to international sanitary-hygiene rules, fulfillment of norms and requirements of hygiene standards;
- In case of mandatory use of chemical-synthetic (artificial) substances for prevention purposes, as well as, against the plant and animal diseases, pests and weeds in organic farming subjects, the removal of those subjects from the list of organic farming subjects and ensuring their restoration after the period specified in the Article 10 of this Law;
- stop the circulation of produced, processed and stored agricultural products as organic and food products in organic farming subjects in case of the mandatory use of chemical-synthetic (artificial) means.

Codex codes of practice fall into two major categories: The codes of hygienic practice which define the production, processing, manufacturing, transport and storage practices for individual foods or groups of foods that are considered essential to ensure the safety and suitability of food for consumption. For example, for food hygiene, the basic text is the Codex General Principles of Food Hygiene, which introduces the use of the Hazard Analysis and Critical Control Point (HACCP) food safety management system – an approach for identifying and providing options to deal with hazards that is fundamental to modern food safety work.

Self-check -1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Define the following terms (6 points)

A. Organic farming

B. Sustainability

C. Ecological sustainability

D. Economic sustainability

E. Social sustainability

F. Organic business

Test II : Short Answer Questions (8 points)

1. What does it mean by Environmentally sound Agriculture ? (3 points)
2. When can you say organic agriculture techniques are ecologically sustainable?(5)
3. Mention at least 5 farming requirements(5 points)

Note: **Satisfactory rating - 14 points** **Unsatisfactory - below 14 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet 2- Source and Interpreting environmental and sustainable organic farming information

2.1. Source of sustainable organic farming Information

The procedure of conversion of a farm commonly consists of three steps. In a first step, it is recommended to collect information on appropriate organic farming practices. In a second step, the most promising organic practices should be tried out on selected plots or fields to get familiar with. In a third step, only organic procedures should be implemented in the entire farm. Support from an experienced extension officer or a farmer is usually very helpful to give guidance in the process.

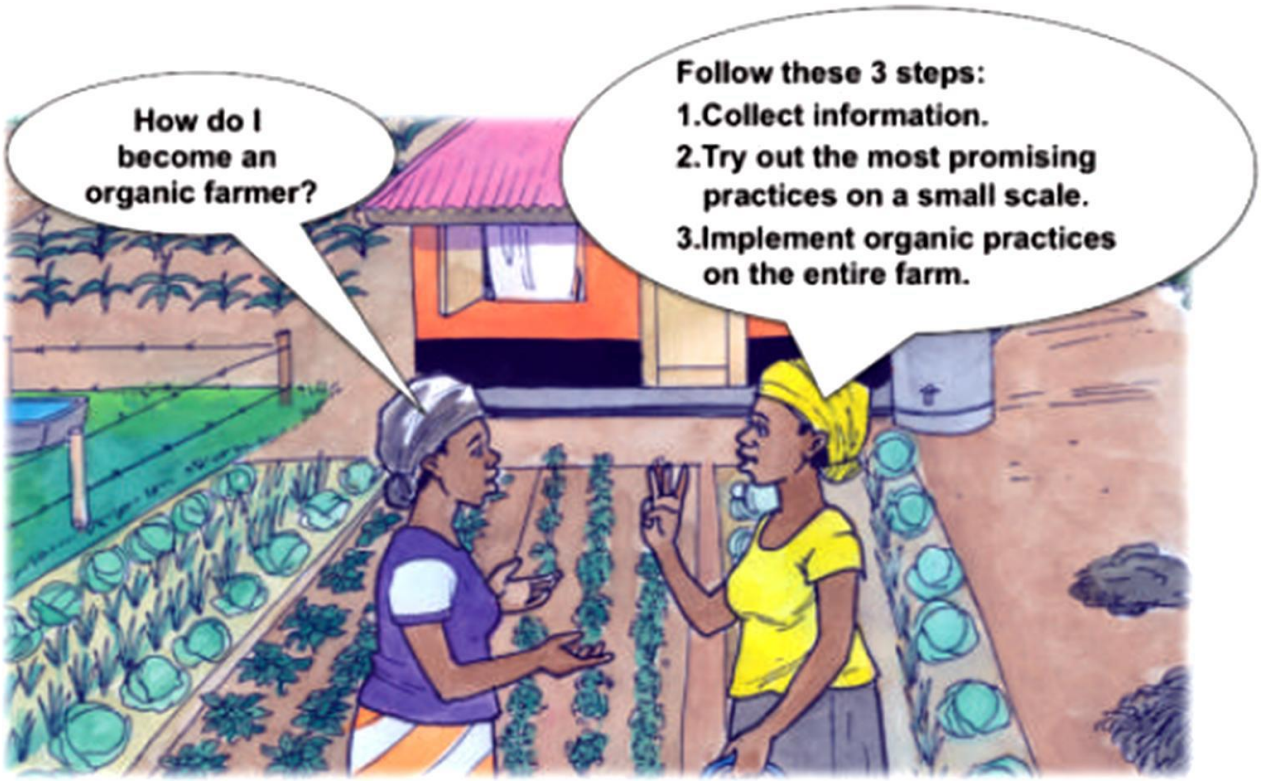

Figure. 2.1.Steps of organic information collection

Step 1.Good information first

Successful organic farming requires considerable knowledge on the functioning and the possibilities of management of natural processes. Interest in learning about the

possibilities to support natural processes to sustain and improve harvests is essential for successful organic farming. Farmers who are interested in adopting organic farming practices are recommended to get in contact with farmers in the area (Figure 2.1), who already practice organic farming to learn from them. Some farmers may be good at making compost, some at growing green manures, and some at making plant or manure tea. Learning from experienced farmers allows to get first-hand experience under local conditions, and thus to learn about the advantages and potential challenges related to implementing organic methods (Figure 2.2).

Figure. 2.2 . Information source on organic agriculture

Basically, farmers who are interested in converting their farm to organic agriculture need to know:

- How to improve soil fertility.
- How to keep crops healthy.
- How to best increase diversity in the farm.
- How to keep livestock healthy.

- How to give value to organic products and how to successfully sell them.

Step 2: Getting familiar with organic practices

After having collected information about the requirements, the potentials and the main practices related to conversion, farmers should start to learn from their own experience on their farms. To minimize risks of crop failure and losses of animals, and avoid frustrating overload, farmers are recommended to implement organic practices step-by-step to a limited extent, selecting specific practices at a time and testing them on selected plots or selected animals only. But which practices should one choose to start with? As would seem natural, farmers should start by applying practices that are of low risk and investment, require little specific knowledge, limited additional labour, and with high short term impact.

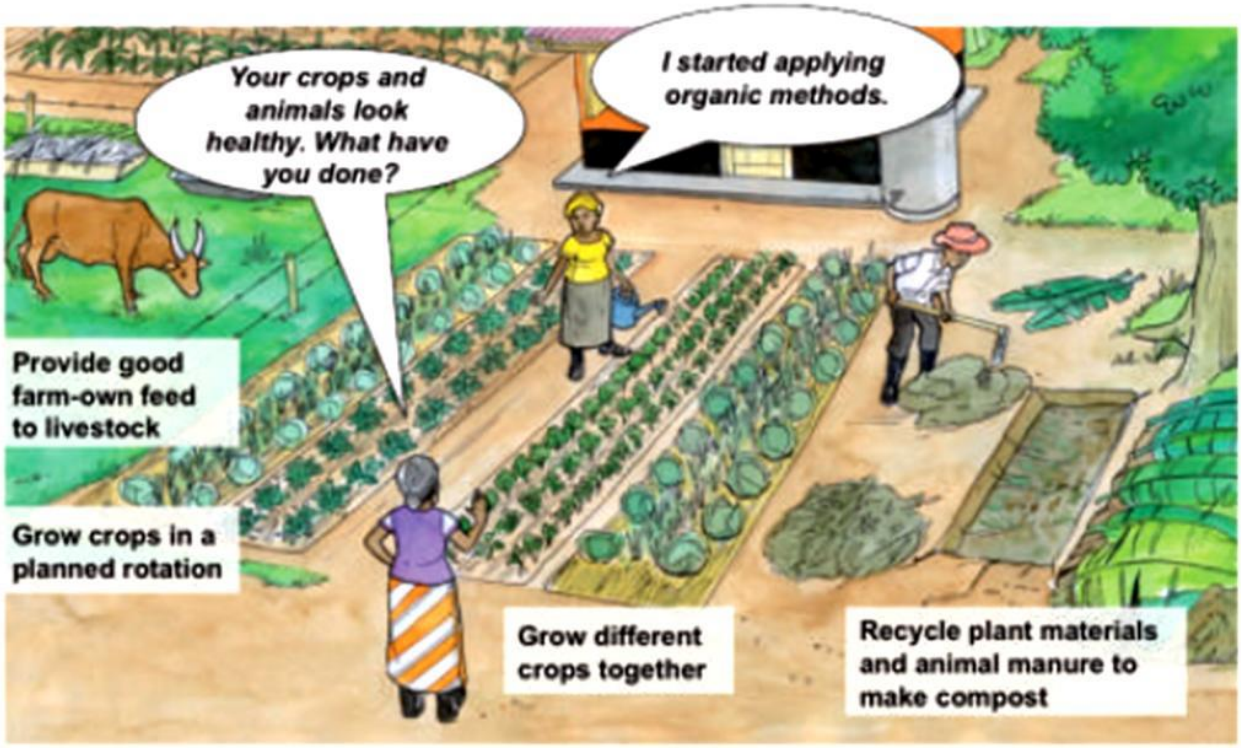

Figure. 2.3. Organic practices

Figure.2.4. Farm own sources Organic matter

Step 3: Full conversion to organic farmer

3.1. Steps to a Successful Organic Transition

The transition from conventional to organic farming requires numerous changes. One of the biggest changes is in the mindset of the farmer. Conventional approaches often involve the use of quick-fix remedies that, unfortunately, rarely address the cause of the problem. Transitioning farmers generally spend too much time worrying about replacing synthetic input with allowable organic product instead of considering management practices based on preventative strategies. Here are a few steps new entrants should follow when making the transition to organic farming:

A) Understand the basics of organic agriculture and the organic farming standards

Since organic production systems are knowledge based, new entrants and transitional producers must become familiar with sound and sustainable agricultural practices. Transitional producers should be prepared to read appropriate information, conduct their own trials and participate in formal and informal training events. As mentioned, switching from conventional to organic farming is more than substituting synthetic materials to

organic allowed materials. Organic farming is a holistic system that relies on sound practices focused on preventative strategies. Since there are often few organic remedies available to organic producers for certain problems, prevention is the key element in organic production.

B) Identify resources that will help you

Existing organic farmers are generally very helpful in sharing valuable technical information. A good mentor should be able to provide transitional producers with knowledge, practical experience and suggest appropriate reading materials. Mentors are able to identify some of the most important challenges transitional farmers will be confronted with. Mentors may also help source production materials that are otherwise difficult to find. Producers should also contact agrologists, veterinarians and other agricultural and financial consultants, in order to learn ways to improve their current farming practices.

C) Plan your transition carefully

Develop a transitional plan with clear and realistic goals. The plan should clearly identify various steps to be taken in making the transition to organic and be sure to include realistic timeframes. Identify your strengths and weaknesses. Consider ways to address any weaknesses, while building on strengths. The business side of the transitional plan should contain a multiple year budget and an effective/realistic marketing strategy. Make sure your list of expenses is comprehensive. Include all prerequisites to begin the transition; such as, mechanical weeding equipment, specialized composting equipment and applicators, additional handling equipment dedicated to the organic products, and processing equipment. Although the demand for organic products is continually growing, growers need to make sure they have a reliable market for the organic products they plan to produce.

Careful planning is very important. During the early part of the transitional period, yields are often depressed and premium prices for certified organic products are generally not

yet obtainable. Use realistic yields and prices when evaluating the feasibility of your project.

In some instances, it is preferable to continue using conventional measures early on in the transitional process in order to avoid dramatic yield reduction which could jeopardize the financial well-being of the operation. Farmers who are planning to convert their production operation should consider certifying their fields first.

Although organic certifiers generally want to see the entire farm become organic, certifiers generally allow new entrants several years of transition time before the whole farm is fully certified. The producer must be aware of the conversion requirements (beside all detailed standards for production) at first. For example the EEC-regulation for organic agriculture (EEC) 2092/91 requires a conversion period for all permanent crops of 36 months and for all annual crops a conversion period of 24 months (products can be sold as „organic in conversion "after 12 months of organic production, however, for most of the products it is very difficult or nearly impossible to sell „products in conversion“). This conversion requirement is therefore very important for the short- and midterm planning of any farm operation.

Parallel production is the simultaneous production, processing or handling of organic and nonorganic crops, livestock and other products of a similar nature. Although this type of activity is highly discouraged by certifiers, some allow it, especially during the transition period. If permitted to practice parallel production, producers must be prepared to deal with significant record keeping in order to ensure traceability and organic integrity.

D) Understand your soils and ways to improve them

Since soil is the heart of the organic farming system, it is crucial that new entrants understand the various characteristics and limitations of the soils found on their farm. Soil suitability may vary significantly from one field to the next. Fields with good drainage, good level of fertility and organic matter, adequate pH, biological health, high legume content, and with less weed and pest pressure, are excellent assets. Often these fields are the first ones ready for transition and certification.

Many tools exist to assess soils. Soil chemical, physical and biological analyses, soil survey and legume composition field assessments, and field yield histories are very important and should be considered early in the transition. Unhealthy soils require particular attention.

If farmers plan to grow crops without raising any livestock, it may be necessary for them to source allowable soil amendments such as composted manure, limestone, rock dust, and supplementary sources of nitrogen, phosphorus, potassium and micro-nutrients. Even with the best of crop rotations that include green manure crops like legumes (nitrogen fixing crops), transitional growers will be challenged if they want to obtain optimal yields without additional livestock manure, compost and/or other off-farm soil inputs. When these inputs are scarce or expensive, producers may benefit from integrating livestock on their farm.

Let's not forget, under organic production, farmers must be able to recycle nutrients through proper nutrient management practices: recycling through good manure and compost utilization, crop rotations, cover crops (green manure, catch, and nitrogen fixing crops), and by reducing nutrient losses due to leaching, over-fertilization, as well as poor manure and compost management (storage, handling, and spreading).

E) Identify the crops or livestock suited for your situation

Before growing a crop or raising any livestock, consider the following: degree of difficulty to grow or raise the product organically, land and soil suitability, climate suitability, level of demand for the product, marketing challenges, capital required, current prices for conventional, transitional and organic products, and profitability over additional workload.

F) Design good crop rotations

Once the crops are chosen, carefully plan the crop rotation(s) and select the most suitable cover crops (green manure, winter cover crops, catch crops, smother crops, etc.). Crop rotations are extremely important management tools in organic farming. They can interrupt pest life cycles, suppress weeds, provide and recycle fertility, and improve soil

structure and tilth. Some rotational crops may also be cash crops, generating supplemental income.

On some farms, land base availability may be a limiting factor when planning your crop rotations. The transitional plan should, therefore, include crop rotation strategies. Responding to external forces such as new market opportunities may also have a significant impact on crop rotations, so farmers need to consider the effect that growing new crops has on their crop rotations and land base availability.

G) Identify pest challenges and methods of control

It is important to know the crop's most common pests, their life cycles and adequate control measures. For instance, Colorado potato beetle may be a pest of significant importance when growing potatoes; cucumber beetles in cucurbitaceous crops (cucumber, squash, and melons); flea beetle in many seedlings crops; clipper weevil and Tarnish Plant Bug in strawberry crops.

There are several measures available to reduce pest pressure: crop rotation, variety selection, sanitation, floating row covers, catch crops, flamers, introduction of beneficial insects, bio pesticides, and inorganic pesticides. Transitional growers should be prepared to use and experiment with some of these options. When considering a new type of production, discuss pest issues with your agrologists, IPM specialists and/or other existing organic producers to optimize your chances of success.

H) Be ready to conduct your own on-farm trials

Successful organic farmers continuously try new and/or innovative management practices. Practices such as cover cropping, inter-planting, and use of various soil and pest control materials need to be evaluated regularly by organic farmers. Be prepared to try new approaches.

I) Be ready to keep good records

Record keeping is one of the most important requirements to maintain organic integrity. Farmers are expected to keep detailed production, processing and marketing information. This information includes everything that enters and exits the farm. Third party, independent inspectors require farmers to present the above mentioned documentation when inspecting the farm operation. Once the record-keeping requirements are understood and the reporting procedure established, paperwork becomes routine.

J) Avoid these common mistakes

- Underestimating the need for good transitional and marketing plans.
- Underestimating the need to fully understand the Organic Standard. Organic producers must understand the standard in order to know what is permitted and prohibited.
- Failing to think prevention. Transitional farmers should consider improving their crop rotation, soil and crop management skills, livestock management practices (feeding program, heard health program, grazing system, housing facilities, and husbandry).

Particulars	Conventional farming	Organic farming
Application of compost / FYM	√	√
Judicious application of inorganic fertilizers	√	×
Biofertilizers	√	√
Pesticide applications	√	×
Fungicide applications	√	×

Table.2.1.Conventional VS Organic farming

Farming organically also means continuously learning from personal observation, from outside experiences, sharing experiences with other organic farmers and implementing new information on your farm, making it increasingly more sustainable.

2.2. Mitigating contamination risk

a) Pesticides:

Organic farmers are responsible to protect the organic fields from being sprayed with synthetic pesticides (Figure 3-5). Even if the neighbour is not farming organically, an organic farmer can grow organic foods and fibers'. To avoid pesticide drift from neighbouring fields onto the crops, organic farmers should safeguard the organic fields by using any of the following measures:

- Planting of **natural hedges** on the boundary to neighbouring fields can avoid the risk of pesticide spray drift through wind or run-off water. The wider the border area around the fields, the better.
- to avoid runoff from upstream fields, organic farmers should divert the water away or talk to the farmers upstream about how to work together to minimize the risk of contamination through water. Organic farmers, who are interested in saving nature, should share their knowledge and experiences with neighbours with the aim of helping them to either adopt organic farming practices or to minimize the risk of contaminating nature.

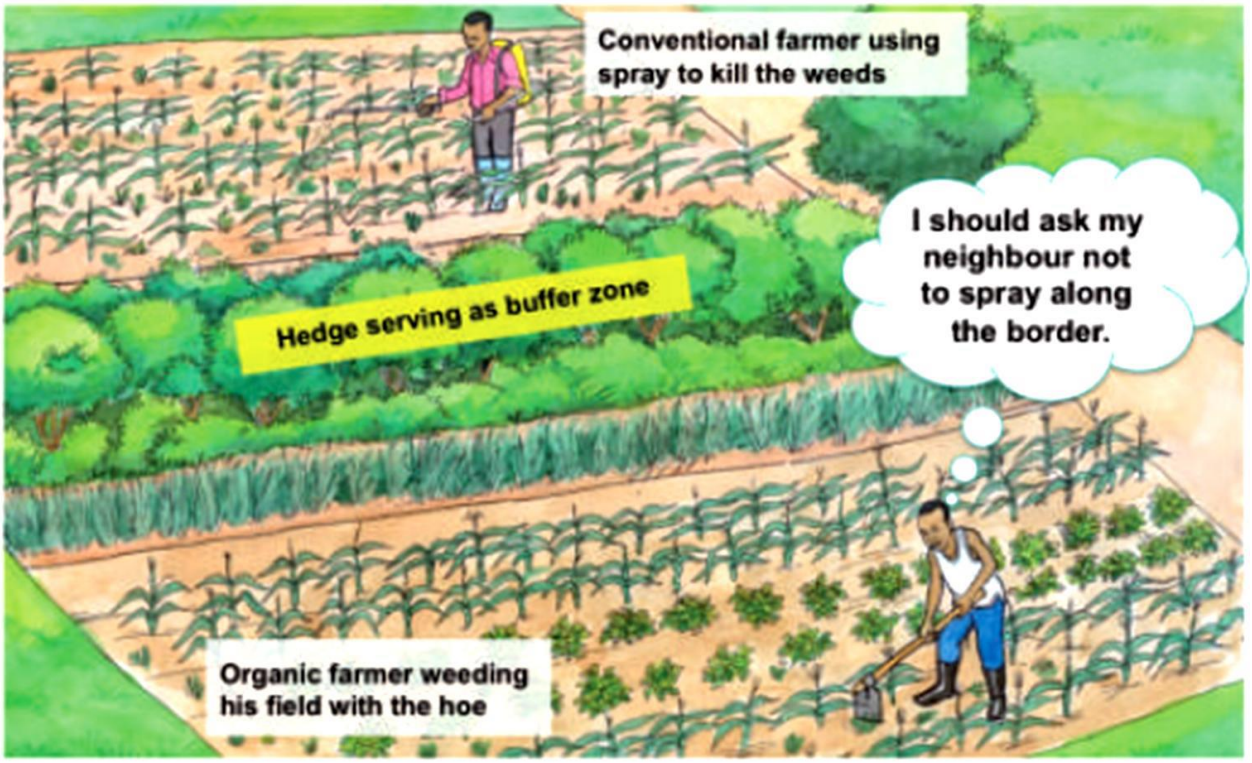

Figure. 2.5.Pesticide drift protection

The IFOAM Community of Best Practice Standards describes 'state of the art' organic farming, processing and trading, covering aspects of sustainability including environmental, social, economical and cultural dimensions. This recognition acknowledges that organic standards are developing, following the principle of constant improvement. Some organic standards cover more aspects and set more rigorous requirements than others. Standard holders may obtain this additional recognition by IFOAM, based on an assessment of their standard against the Best Practice module developed by IFOAM.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the correct answers from the given alternatives (4 points)

1. Farmers who are interested in converting their farm to organic agriculture need to know:

a. How to improve soil fertility.

b. How to keep crops healthy.

c. How to best increase diversity in the farm.

d. How to keep livestock healthy.

e. How to give value to organic products and how to successfully sell them.

f. all

2. Which one of the following is false about organic farm practices?

a. Mulching b. Crop rotation c. Chemical application d. Organic pest management

Test II .Short Answer Questions (6 points)

1. Mention the sources of information for sustainable organic farming

2. How to protect crops from pesticide drift?

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Operation sheet 2. Prepare organic farm transition plan

Objective: to develop a conversion plan for the horticultural crops production.

Steps :

1. Organize planning team

2. Record farm Business strategies(risk management, replanning , photos, timeline and text, challenges, success and lesson learned over the year).

3. Document resources(people skill , land , buildings, machinery, equipments, etc.)

4. Prepare financial documents

5. Document current operations(your current operational, marketing, human resource and financial situation.

3. Allocate multiple year budget

4. Allocate realistic timeframes

LAP TEST -2	Performance Test

Name……. ID……..…….. Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1 month . The task is expected from each student to do it.

Task-1 Perform organic farm transition plan

Information Sheet 3- Identifying the impact of best practice guidelines

3.1. Organic best practice

Best practices are to be understood as those activities that lead to achieving the objectives described by the sustainability dimensions(complementary and interactive dimensions: social, ecological, economic, cultural and accountability). Best practice implicitly embodies an attitude of continual improvement.

A. Social Dimension: People live in equality and equity; a rights-based approach. Description: All persons are born with rights, deserving equal and mutual respect. These include the right to safety, freedom from discrimination, access to opportunities for learning, self-determination, and right livelihood.

1. Equity and gender Values and Guidelines

• All persons deserve equal consideration.

• Women and men have equally important and necessary viewpoints, skills, and approaches to addressing the needs of society.

• Maximizing human potential leads to thriving operations and communities. Members of a community should have appropriate opportunities for making decisions about their current and future lives and to seek satisfaction with their own well-being and be motivated to contribute to the well-being of others.

Practice Examples

• A strict equity and non-discrimination policy and practice applies to all stakeholders. There is no gender bias concerning hiring, remuneration, access to resources and education, and career opportunities.

• Vulnerable groups, such as women, minorities, and disadvantaged staff are proactively supported. Value chain actors hire persons in their communities with physical and/or mental handicaps for appropriate jobs.

2. Right livelihood Values and Guidelines

• An adequate wage level ensures the ability to earn a livelihood, including sufficient pension and social security in order to prevent poverty.

• In addition to having basic needs met to maintain good health, well-being implies that employers, workers and their families can develop new skills, knowledge, and abilities. A more educated, satisfied, and prosperous work force and local community are more likely to enjoy loyalty, innovation, and a thriving local culture. These features of community help make farming life more attractive and thereby stabilize the population and work to keep residents from leaving in search of a better life.

Practice Examples

• Prices reflect the real cost of the entire process of sustaining a regenerative ecological system, including supporting a right livelihood for farmers and farm workers and their families consistent

• Employers on all supply chain levels pay wages that are adequate for a decent standard of living and the social security of all employees.

• Employees who reside on the farm or enterprise location are provided with housing that meets the objectives of the sustainability dimensions described.

• If employees participate in profit-sharing or price-division schemes, the benefits they receive are proportionate to the risks they assume.

• Employees are given incentives and rewards for bringing improvements to the operation.

• Employees are able to earn or contribute to pension or retirement plans, or awarded such benefits for long-term dedicated service.

Employees are offered job-related education that provides potential for enrichment of their work and/or advancement in their position.

3. Labor rights Values and Guidelines

• The more people in any given community or work environment are satisfied with their positions, the more stable the operation is and the more likely it can be successful.

• All workers should have the freedom to associate and organize themselves peaceably in whatever manner they see fit, within relevant legal frameworks.

• Employees have the obligation to work to the best of their abilities.

• Generally speaking, the more employees a given operation has, the greater the need to devote resources to ensuring that labor and human rights are respected. Smallholders who must hire farm labor are nonetheless expected to exercise appropriate practices.

• Each and every link in a sustainable value chain should be responsible for respecting the rights of all persons involved in its respective operations.

Practice Examples

• Operators respect the rights of indigenous peoples, meaning they do not use or exploit land whose inhabitants or farmers have been or are being impoverished, dispossessed, colonized, expelled, exiled, or killed. All land gets used under conditions of free and prior informed consent of the original inhabitants. Note: Over the course of history many societies have transgressed these principles. Our intention is to make sure that these transgressions never again happen.

• Operations clearly agree to terms of employment with every employee.

• Forced or involuntary labor is not used in any manner in the value chain. Enterprises do not use child labor. Children's work is only allowed if: Such work is not dangerous or hazardous to their health and safety; Such work does not jeopardize the children's educational, moral, social, and physical development; and o Children are supervised by adults and have authorization from a legal guardian.

• All value chain operations have and enforce a policy on social justice that includes basic human rights, fair and decent working conditions, and other benefits. They exclude from their transactions any operations that violate any of the precepts described in this section on Human Rights.

Note: Smaller operations can address such practices in a more informal manner, but should nonetheless be transparent about what they do.

• The owners and managers of operations positively and actively encourage the collective organization of their employees or contracted smallholders.

• Operations strive for stability in their employment practices, offering more permanent contracts to employees in order to provide more secure livelihoods for them. Regular/contracted employment is generally preferable to temporary employment.

4. Safety and Hygiene Values and Guidelines

• The health and safety of people is of primary importance to individuals, their families, and their communities. A stable, healthy work force is good for business and good for the local economy and community. Safe conditions reduce health care costs.

• A substantially reduced health risk exists for workers on organic farms, due to nonuse of toxic agro-chemicals.

Practice Examples

• All workplaces provide the people there with potable drinking water, clean conditions for eating, and appropriate sanitary facilities.

• Workers are trained about hazards inherent in their work environment. All working people are provided with adequate protection from noise, dust, sunlight, undue hazards related to machinery and equipment, and exposure to chemicals and waste.

• When no national legislation is in place, a given operation provides all employees and their families with an equal health care package.

B. Ecological Dimension:

Common resources are used sustainably.

Description: Common resources are those resources that all peoples of the planet need and share for their survival. These include soil, water, air, animals, biodiversity, and mineral resources. Objectives: Foster regenerative systems by improving soil quality through increasing nutrient cycling and capture; eliminate dependency on non-renewable resources; avoid pollution and human-induced climate change; respect animal welfare; and enhance the diversity within farms and their surroundings.

1. Water – Quality and Quantity Values and Guidelines

• All material life on Earth is based on water. The quality and quantity of water is a determining factor for the support the life forms in any given environment.

• Pollution of water is a threat to the functioning of healthy organisms, ecosystems, and communities.

• The total impact on water use of a given product requires each link of the value chain (including farms) to be responsible for understanding its own water use, sources, quantity withdrawn, allocation, and condition and quantity of the water after use.

• The overall health of the watershed should be taken into consideration by being aware that multiple individual operations, each with insignificant environmental impact, may

collectively have cumulative detrimental effects. Examples of such impacts include but are not limited to the depletion of aquifers, rivers, or other water supplies, and the cumulative impacts on water quality from multiple farming, processing, and/or aquaculture operations in the same area.

Practice Examples

• Operators assess their water use to determine whether their practices deplete or degrade water resources, and then plan how to improve efficiency. If water resources are depleted or degraded, operators take corrective actions.

• Water use is as efficient as possible by careful timing of use, system design (including water harvesting and cropping patterns), appropriate use of technology (including irrigation and processing equipment characteristics), reducing losses to leakage and waste, and recycling it through the system when feasible.

• All users of water in any given locality are mindful of the needs of other users of those supplies. Access to such resources is not unfairly prejudiced. Overall community well-being is not unduly compromised by the disproportionate use of or impact on quality of water resources by particular parties or operations.

• Sustainable freshwater withdrawal and use does not impair the functioning of natural water cycles and ecosystems. When returning water to the source, the water stays close to ambient water temperature. Farmers and other value chain actors in their regions therefore manage the water they use so that it supports the best practices for conservation, genetic diversity and quality, and soil building as described in this document. All three of these aspects are considered.

• Operators do not pollute water supplies with fertilizers or other chemicals, and prevent contamination from animal manures and other sources of pathogens. They are aware of all the materials they use and how these may end up in the water, and take steps to mitigate negative effects.

• Crops and livestock are selected and managed for their ecological compatibility to the climate where they will be raised, to avoid long-term depletion of water supplies, degradation of water quality, and/or damage to soil health.

• Watercourses are important pass ways for a wide range of species. Constructions of pumps, dams etc. do not block migration or transport route.

2. Soil and Fertility Values and Guidelines

• Soil is the basis of agriculture. Building soil of high quality is therefore critical to a sustainable system.

Biological activity is a primary indicator of soil quality and health. High-quality, fertile soils are living systems with an overall capacity to act as the foundation of a regenerative ecological system. The more that soil biological activity is encouraged, the greater the potential it has for being productive.

• Eliminating toxic plant protection materials and techniques preserves soil and water quality, does not interfere with soil biological activity, and does not detract from the health of people and animals.

• Healthy soils are the foundation for healthy plants. Healthy plants are adapted to and thrive in their environment, are more tolerant to attacks by pests and diseases, and, in agricultural terms, also provide good nutritive value. Healthy crops and land use provide a home for wild biodiversity that play a role in the equilibrium of the farm by feeding on potential pests.

• Increased organic matter is a basis of carbon sequestration and helps counter the effects of climate change.

• Soils with high organic matter and good texture (including non-compaction) hold water better than low-organic matter soils, allowing for reduced need for irrigation, greater ability to capture dew, and increased ability to absorb water and avert flooding. High quality soils also allow crop roots to penetrate deeper and wider, thereby enhancing efficiency of crop water and nutrient uptake.

• Recognizing the natural resources available in a specified tract of land, and farming within those limits makes for more realistic expectations of productivity and profit. Minimizing use of off-farm inputs minimizes the negative (global and local) environmental impacts of extracting, producing, manufacturing, and/or transporting them. It also minimizes the eutrophication of soils, air, and water.

• Cropping plans, crop and variety selection, and crop rotations adapted to local agro environmental and socio-economic conditions serve the long-term agronomic needs of farming enterprises and ecosystem services simultaneously.

Practice Examples

• Soil is protected from loss due to erosion and incidental or deliberate exposure to the elements (sun, wind, water, fire, and animal traffic). Soil is kept covered by living plants and mulch to the greatest extent feasible.

• The organic matter content of the soil is increased. Farmers enhance biological activity of the soil and are aware of activities that disrupt its biological activity. They are careful with heavy equipment that might impact soils unnecessarily, and avoid frequent tillage. Whenever possible, perennial crops and agro-forestry types of agriculture are promoted.

• Farms obtain their soil fertility primarily from the farm itself, by the choice of crops grown in rotation, recycling of crop and other plant residues, the use of nitrogen fixing and cover crops, and animal manure. Nutrients in farming systems are cycled in a way that maximizes efficiency, minimizes waste and loss, and optimizes the use of resources produced on-farm in closed-loop systems. If sources of fertility are off farm, the sources are known, with local and organic sources preferred. Manure from intensive conventional animal production is not used.

Farmers make due consideration of the advantages of incorporating composted plant and animal manures into the soil, such as pathogen reduction, prevention of nutrient leaching and promotion of residual nutrients in the soil.

• Farmers make efforts to understand the nutrient cycling in their soils. Skillful application of trace elements can improve uptake of macro-elements.

• Farmers primarily rely on interrelated cultural practices including crop rotations, natural enemies, and biodiversity management to control pests, diseases, and weeds. Natural and least-toxic crop protection materials are preferred; synthetic and toxic pesticides are avoided.

• The water-holding capacity of soils is increased. Retention of soil moisture mitigates the need for added water via irrigation, which in turn helps guard against deposition of salts in the soil from the evaporative results of irrigation and helps assure the long-term productivity of the soil.

• To enable better planning to guard against problems of salinization, the salt content of irrigation water is taken into consideration.

3. Biodiversity Values and Guidelines

Agriculture originates and functions in the natural environment. Nature is the home for many beneficial organisms that contribute to maintaining equilibrium on the farm and an ongoing source of inspiration and knowledge. The resilience, creativity, and power of the natural environment surpass human abilities and control. Restoration or recovery of thriving ecosystems takes more time than it takes us to destroy them. It is our responsibility and in our interests to preserve these resources.

• The non-use of synthetic herbicides, pesticides, and fungicides as well as fast-acting mineral fertilizers (which upset biological equilibrium) is a major reason for the higher diversity characteristic of organic farms, but these factors alone are not sufficient to secure high level of functional and wild biodiversity.

The International Federation of Organic Agriculture Movements (IFOAM) have published and continuously update the IFOAM Basic Standards for Organic Agriculture and Processing. These standards have been adopted worldwide as the framework of guidelines for organic agriculture. The principle aims of organic agriculture as expressed in the most recent revision (IFOAM, 1996) are presented below:

- to produce food of high nutritional quality in sufficient quantities
- to interact in a constructive and life-enhancing way with natural systems and cycles
- to encourage and enhance biological cycles within the farming system, involving microorganisms, soil flora and fauna and plants and animals
- to maintain and increase long term fertility of soils
- to promote the healthy use and proper care of water, water resources and all life therein
- to help in the conservation of soil and water
- to use, as far as possible, renewable resources in locally organized agricultural systems
- to work, as far as possible, within a closed system with regard to organic matter and nutrient elements

- to work, as far as possible, with materials and substances which can be reused or recycled, either on the farm or elsewhere
- to give all livestock conditions of life which allow them to perform the basic aspects of their innate behavior
- to minimize all forms of pollution that may result from agricultural practice
- to maintain the genetic diversity of the agricultural system and its surroundings, including the protection of plant and wildlife habitats
- to allow everyone involved in organic production and processing a quality of life conforming to the UN Human Rights charter, to cover their basic needs and obtain an adequate return and satisfaction from their work
- to consider the wider social and ecological impact of the farming system
- to produce non-food products out of renewable resources, which are fully biodegradable
- to encourage organic farming associations to function along democratic lines and the principle of division of powers
- to progress towards an entire organic production chain, which is both socially just and ecologically responsible

- The organic agriculture (cultivation as well as processing) is regulated by a complex set of standards in the meantime. At international level the basic standards for organic agriculture defined by IFOAM (International Federation of Organic Agriculture Movements) are most relevant. These basic standards are defining not only the principle requirements for the production of organic foodstuff but also minimal requirements for the inspection and certification of organic producers. Furthermore, the basic standards of IFOAM are the obligatory basis for detailed production standards set by private certification bodies, who are evaluated on behalf of IFOAM within the frame of the IFOAM Accreditation Programme

- Out of the IFOAM Basic Standards also official regulations for the organic industry were developed in different countries for instance in the European

Union (EECregulation for organic agriculture (EEC) 2092/91), in Turkey, in Argentina and in Japan. Furthermore, the Codex Alimentarius also took the IFOAM Basic standards for defining minimal requirements for the organic plant cultivation (animal husbandry will follow).

- Finally decisive for producers are to follow the legal requirements for organic agriculture as far as they are existing in the country of production and/or in the country of importation.

Self-check -3	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Give Short answer (6)

1. What does it mean Best practice in organic farming?
2. Select one dimension of sustainability and discuss its best practices and its guidelines.

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 4- Identifying key sustainability practices of organic farming

4.1. ***key sustainability practices*** for an organic farming enterprise(sustainability indicators)

4.1.1. purchase of inputs

- use of seeds and sewing materials certified as organic product in organic lands;
- rejection from genetically modified organisms and their derivatives in the production of organic farming and food products;
- rejection from synthetic mineral fertilizers, pesticides, height hormones (stimulators), synthetic food additives used in the production process of food products, chemical means causing ecological danger in the disinfection of buildings where warehouses and cattle are kept except the means allowed for application in organic farming

4.1. 2. Selecting profitable enterprises to ensure economic sustainability

- Economic sustainability increasingly depends on selecting profitable enterprises, sound financial planning, proactive marketing, risk management, and good overall management. Every farm needs a marketing plan of some type. Marketing can take many forms, ranging from passive marketing in the commodity chain to marketing a retail product directly to consumers. Which marketing method you choose will have a profound effect on the price your product commands. Doing some market research is essential in order to understand your market, competition, and consumer trends, and to project potential sales volume and prices. Specialty and direct markets such as organic, and other "green" markets yield more income but require more marketing by the producer. Direct marketing is not for everyone.

- Decisions made on the farm have effects in the local community. For example, the decision to expand your operation requires the acquisition of your neighbor's farm. To have your neighbor's farm, you must make the decision

that your neighbor's farm is more important to you than your neighbor. Other examples of social decisions include: buying supplies locally rather than ordering from out of state, Figure out ways to connect local consumers with your farm, taking a consumer-oriented approach to production and management practices where both the farmer and consumer win, and finding opportunities to ensure that neighboring communities can learn about sustainable food production.

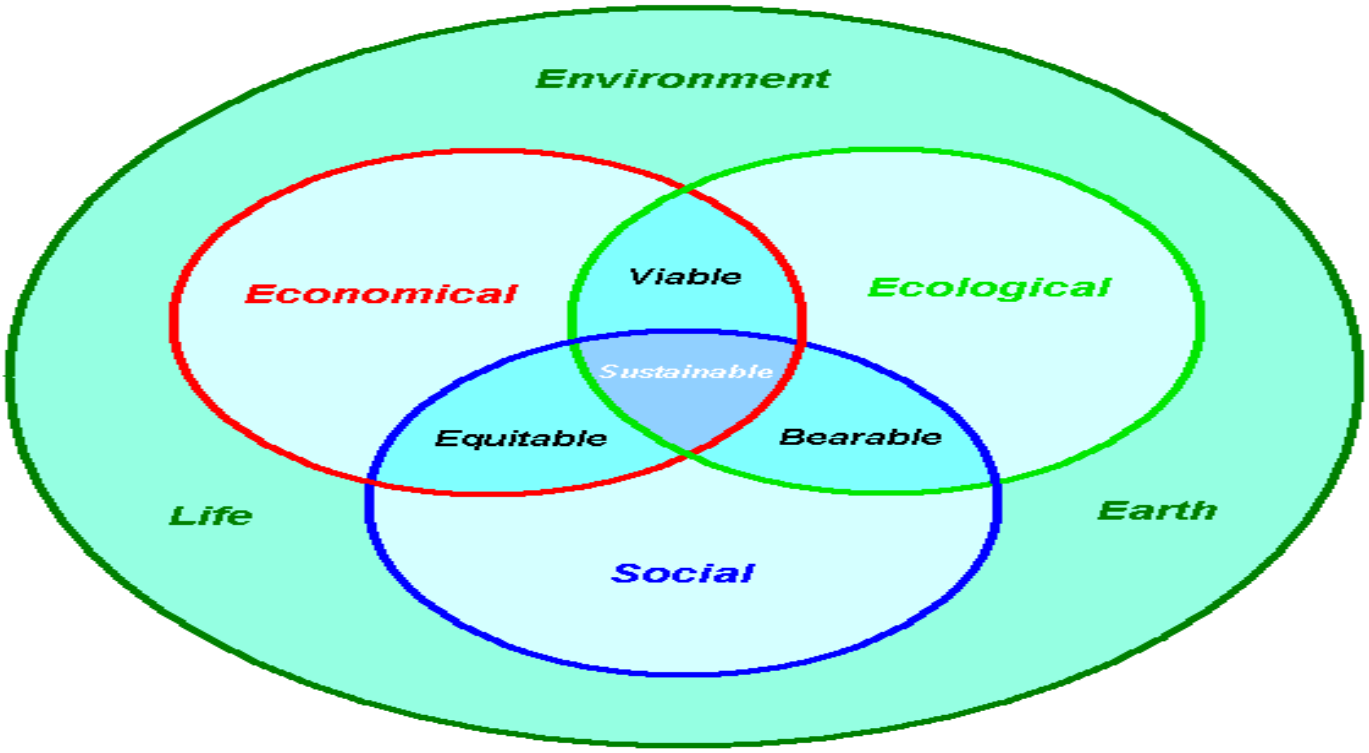

Figure.4.1. Components sustainability

4.1.3. Production practices

- **Crop rotation**

Crop rotation means changing the type of crops grown in the field each season or each year .It is a critical feature of all organic cropping system, because it provides the principal

mechanisms for building healthy soils, a major way to control pests, weeds, and to maintain soil organic matter . In more details, crop rotation brings the following benefits :

- ✓ It improves soil structure: some crops have strong, deep roots. They can break up hardpans, and tap moisture and nutrients from deep in the soil. Others have many fine, shallow roots. They tap nutrients near the surface and bind the soil. They form many tiny holes so that air and water can get into the soil.
- ✓ It increases soil fertility: legumes (such as groundnuts and beans) fix nitrogen in the soil. When their green parts and roots rot, this nitrogen can be used by other crops such as maize. The result is higher, more stable yields, without the need to apply expensive inorganic fertilizer.
- ✓ It helps control weeds, pests and diseases: planting the same crop season after season encourages certain weeds, insects and diseases. Planting different crops breaks their life cycle and prevents them from multiplying.
- ✓ It produces different types of output: growing a mix of grain, beans, vegetables and fodder means a more varied diet and more types of produce to sell.
- ✓ In some ways, crop rotation takes the place of ploughing the soil: it helps aerate the soil, recycles nutrients, and helps control weeds, pests and diseases. Intercropping, strip cropping and relay cropping bring many of the same advantages as rotation.

Criteria for crop rotation

a) Crop selection

Before selecting the crops, it is necessary to answer the following question:

- ✓ What to produce? Crops produce many different things: food, fodder, firewood, fence poles, thatch and medicines. Farmers grow some crops (such as cotton) only for cash. For other crops, such as cereals or vegetables, you may be able to sell what you do not use yourself. If your objective is marketing, make sure that there is a market of your main output or rotation crop.

- ✓ Will it grow well? This depends on many factors: the amount of rain or moisture in the soil, the season (some crops and varieties do not grow well at certain times of year), the soil fertility, among others.
- ✓ What are the roots like? Tall cereals (millet, maize, sorghum, etc.), finger millets and some legumes (e.g., pigeonpea and sunn hemp) have strong roots that penetrate deep into the soil – up to 1,2 m for tall cereals. Their roots improve the soil structure and porosity, so are a good choice if the soil is compacted.

- ✓ Does it improve the soil fertility? Legumes improve the soil fertility by fixing nitrogen from the air. They use part of it for their own needs, and leave the rest in the soil. Cereals and other plants can use this nitrogen if they are intercropped with the legume, or if they are grown as the next crop in the rotation.
- ✓ Does it cover the soil well? Tall cereals do not cover the soil well because they have upright leaves and they are planted far apart. Short grasses (Brachiaria, Cenchrus, Andropogon) and many legumes (lablab, groundnut, cowpea, beans) cover the ground very quickly after they are planted. When their main use is indeed to provide cover, we call them cover crops. If their main use is to provide food, we call them food legumes (beans, groundnuts).
- ✓ Does it work with other crops? Try to find combinations of crops that complement each other well The principles, defined in a participatory and democratic process, by the International Federation of Organic Agriculture Movements (IFOAM) – Organics International, outline the basis on which organic farming should grow and develop further – all around the world. The principles consistently serve as a source of inspiration for the organic movement and its continuous development.

- **Mulching** - Covering the soil with dead plant material is an easy way to control weeds and protect the soil in annual crops. This practice can be implemented into most existing cropping systems. The main question may be, however, where to get appropriate plant material from.
- **Intercropping** - Growing two annual crops together, commonly a leguminous crop like beans or a green manure crop in alternating rows with maize or another cereal crop or vegetable is a common practice in organic farming to diversify production

and maximize benefits from the land. In intercropping, special attention must be paid to avoid competition between the crops for light, nutrients and water. This requires knowledge on arrangements, which promote growth of at least one of the crops.

- **Composting** - Application of compost to the fields can have a major impact on crop growth and yields. To start compost production, farmers will need enough plant materials and animal manures, if such are available. In case such materials are scarce, farmers would first have to start producing plant materials on the farm by sowing fast growing leguminous plants that build a lot of biomass, and by introducing some livestock on the farm for manure production, if this proves appropriate. To get familiar with the process of making compost, farmers should be instructed by an experienced person. Proper compost production requires some knowledge and experience and additional labor, but is low in investments.

- **Green manuring** - The practice of growing a leguminous plant species for biomass production and incorporation into the soil may be new to most farmers. Nevertheless, this practice can greatly contribute to improvement of soil fertility. Green manures can be grown as improved fallows, as seasonal green manures in rotation with other crops, or in strips between crops. Proper green manuring first requires information on appropriate species.
- **Organic pest management** – Careful associations and management of plants and animals in order to prevent pest and disease outbreaks. Initially, bio-control agents may be applied but organic pest management is best achieved through ecological approaches that establish a pest/predator balance. While the choice of resistant varieties of crops is paramount, other prevention methods include: choosing sowing times that prevent pest outbreaks; improving soil health to resist soil pathogens; rotating crops; encouraging natural biological agents for control of disease, insects and weeds; using physical barriers for protection from insects, birds and animals; modifying habitat to encourage pollinators and natural enemies; and trapping pests in pheromone attractants.

- A**ppropriate seeds and planting material** - Use of healthy seeds and planting materials, and robust and/or improved cultivars can make a big change in crop production. This practice may require some information on selection of seeds and planting materials including availability of improved varieties and seed treatments. Generally, locally-adapted seeds are preferred because of their resilience to local conditions.
- **Planting of leguminous trees** - In perennial crop plantations such as banana, coffee or cocoa, planting of leguminous trees such as *gliricidia, calliandra*, and *sesbania* may improve the growing conditions of the fruit crop by providing shade, mulching material and nitrogen through nitrogen fixation. In addition, some leguminous trees provide good fodder for livestock. This practice requires some knowledge on shade and space requirements of the tree crops and thus on ideal planting patterns for the leguminous trees.

- **Growing farm-own animal feeds** - To improve available feeds for the livestock, farmers may grow grasses and leguminous fodder crops around, between other crops or in rotation. As animal feed must be of organic origin, feed sources are best addressed by considering farm grown feed.

- **Terraces and soil bunds** - Construction of terraces and soil bunds along the curves of hills is a key measure for soil conservation. This practice builds the foundation of further improvement to soil fertility on slopes. It is of high relevance, but requires much labor and some specific knowledge for appropriate implementation.

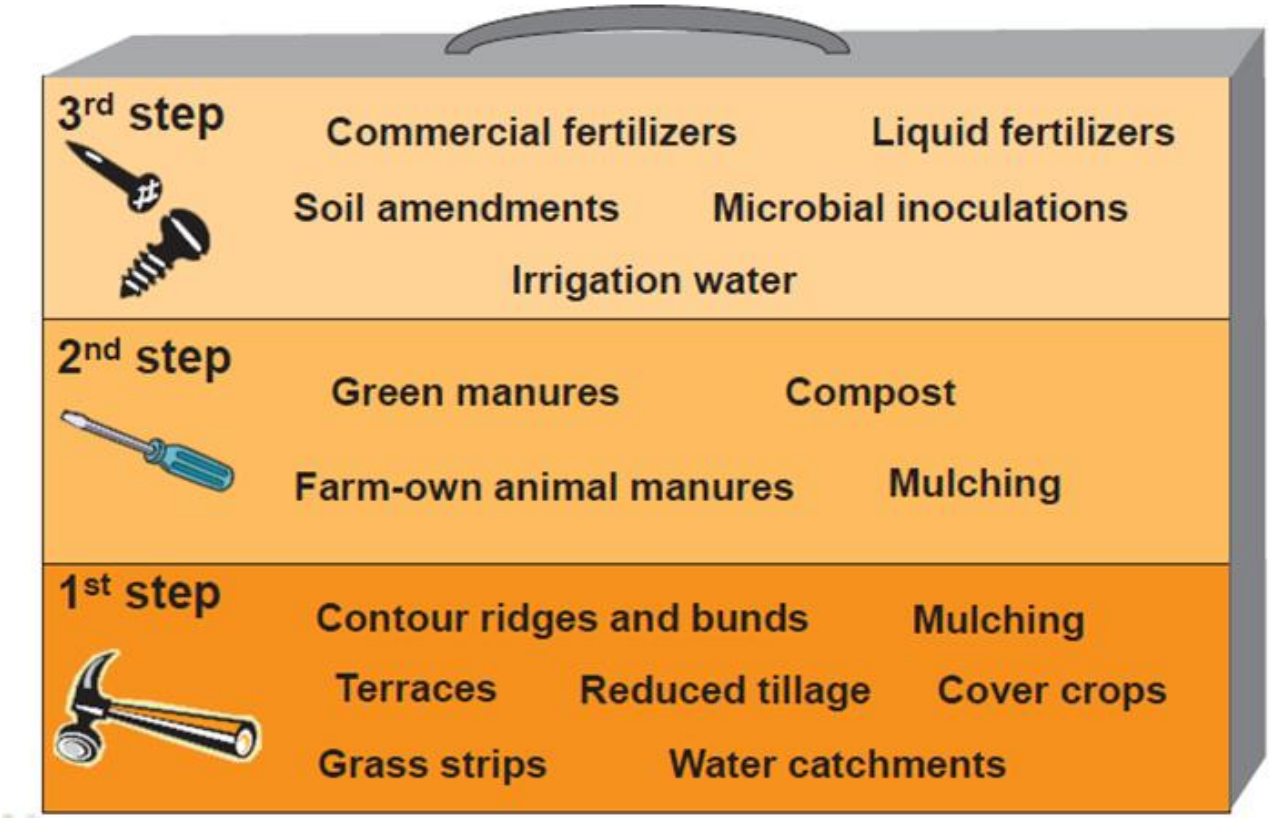

Figure.4.3. Soil fertility management tool

Figure 4.4. Soil fertility steps

4.1.4. Marketing and supply chain selection

Every farm needs a marketing plan of some type. Marketing can take many forms, ranging from passive marketing in the commodity chain to marketing a retail product directly to consumers. Which marketing method you choose will have a profound effect on the price your product commands. Doing some market research is essential in order to understand your market, competition, and consumer trends, and to project potential sales volume and prices. Specialty and direct markets such as organic, GMO-free, and other "green" markets yield more income but require more marketing by the producer.

4.1.5. Land management strategy

Land management has a significant impact on the environment. Conventional agriculture prioritizes high yields and does little to harmoniously interact with and preserve its immediate environment. These practices can result in widespread environmental degradation, commonly resulting in soil erosion, water, soil and air pollution, biodiversity loss, and desertification. They also contribute to global warming – agriculture today accounts for more than thirteen percent of global anthropogenic greenhouse gas emissions.

Self-check -4	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer(6)

1. Identify key sustainability practices of organic farming

a. input supply b. enterprise selection c. production practice d. all

2.Which one of the following is false about organic farm practices

a. Mulching b. Crop rotation c. Chemical application d. Organic pest management

Test II .Short Answer Questions(6 points)

1. Select one production practice and discuss its role in organic farming sustainability improvement

Note: **Satisfactory rating - 12 points** **Unsatisfactory - below 12 points**

You can ask your teacher for the copy of the correct answers.

Test II. Give Short answer (4)

1. What are the four main areas of EU policy framework for supporting organic sector development?

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 5- Accessing business guidelines and farm practices

5.1. Organic production Guidelines

According with the Guidelines of Organically Food Produce of the Codex Alimentarius (2007), an organic production system is designed to:

- Enhance biological diversity within the whole system;
- Increase soil biological activity;
- Maintain long-term soil fertility;
- Recycle wastes of plant and animal origin in order to return nutrients to the soil, thus minimizing the use of non-renewable resources;
- Rely on renewable resources in locally organized agricultural systems;
- Promote the healthy use of soil, water and air as well as minimize all forms of pollution that may result from agricultural practices;
- Promote the careful processing methods agricultural products in order to maintain the organic integrity and vital qualities of the product at all stages;
- Become established on any existing farm through a period of conversion, the appropriate length of which is determined by site-specific factors such as the history of the land, and type of crops and livestock to be produced.

In addition, the International Federation of Organic Agriculture Movements (IFOAM), a nongovernmental organization internationally networking and promoting organic agriculture, has established guidelines that have been widely adopted by the organic community for organic production and processing.

Figure. 4.2 EU Policy framework for supporting organic sector development

As illustrated above the EU policy framework for supporting organic sector development consists of four main areas:

Legally defined production and labeling rules: Based on the EU organic regulations and a widely recognized common logo

Supporting farmers financially: Compensation is provided for the costs of managing farmland under organic production with benefits for the environment and animal welfare as well as additional environmental and land management actions through the Common Agricultural Policy (CAP)

Production and supply chain development: Measures are available to support training and advice, farm diversification, including processing, supply chain development, consumer promotion, education, technology development, research and extension for organic farming and processing through the CAP and other horizontal policies

Recognition of contribution to wider policy goals: The organic sector can support EU strategies on biodiversity, and soil, Directives on water, sustainable pesticide use, air

quality, legislation on climate action, programmes promoting healthy eating and education on sustainable production methods in schools, and green public procurement for food and catering services organic agriculture plays a key role in sustainable development, food security, poverty reduction, environmental security, climate change adaptation, human health, preservation of indigenous knowledge, plant varieties and animal breeds as well as socio-cultural development. The adoption of organic agriculture practices significantly increases yields and improves livelihoods and food security in Africa. Based on locally available renewable resources instead of purchased chemical inputs (over 90 percent of which are imported in sub-Saharan Africa), organic producers are less vulnerable to international input price volatility. Moreover, organic agriculture is climate-smart agriculture, as it produces lower emissions and also provides much greater resilience in times of climate extremes such as drought and heavy rains.

Self-check -5	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I .Short Answer Questions(8 points)

1. Explain four main areas of EU policy framework for supporting organic sector development .

Note: **Satisfactory rating - 8 points** **Unsatisfactory - below 8 points**

You can ask your teacher for the copy of the correct answers.

LG #63	LO #2- Implement established farm business guidelines and principles

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Implementing strategies of organic farming
- Identifying continuous improvement opportunities
- Implementing agreed improvements to the farm businesses

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Implement strategies to effectively integrate sustainability principles and practices into the organic farm system.
- Identify continuous improvement opportunities and document identified changes to businesses guidelines and principles.
- Implement agreed improvements to the farm businesses guidelines and principles.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information sheet 1. Implementing strategies of organic farming

In many traditional agricultural systems a diversity of crops in time or space can be found. Knowing that different plants have different requirements for nutrients, a good crop planning and management is required in order to optimize the use of nutrient in the soil. Crop rotation, intercropping, cover crops and green manures represent the main alternatives to the farmers to manage soil health and fertility.

According with IFOAM (2002), the organic agriculture practices are based on the following principles:

- Principle of health: the role of organic agriculture, whether in farming, processing, distribution, or consumption, is to sustain and enhance the health of ecosystems and organisms from the smallest in the soil to human beings. In view of this, it should avoid the use of fertilizers, pesticides, animal drugs and food additives that may have adverse health effects.

- Principle of ecology: organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustaining them. Organic management must be adapted to local conditions, ecology, culture and scale. The reduction of inputs by reuse, recycle and the efficient management of materials and energy will contribute to improve environmental quality and will conserve resources.

- Principle of fairness: This principle emphasizes that those involved in organic agriculture should conduct human relationships in a manner that ensures fairness at all levels and to all parties – farmers, workers, processors, distributors, traders and consumers. It also insists that animals should be provided with the conditions and opportunities of life according with their physiology, natural behaviour and well-being. Natural and environmental resources that are used for production and consumption should be managed in a socially and ecologically fair way and should

be held in trust for future generations. Fairness requires systems of production, distribution and trade that are open and equitable and account for real environmental and social costs.

- Principle of Care: This principle states that precaution and responsibility are the key concerns in management, development and technology choices in organic agriculture. Science is necessary to ensure that organic agriculture is healthy, safe and ecologically sound. However, it must consider valid solutions from practical experiences, accumulated traditional and indigenous knowledge and prevent significant risks by adopting appropriate technologies and rejecting unpredictable ones, such as genetic engineering.

Figure1. 2. Principles of organic farming

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions(8)

1. Briefly explain the principles of organic farming

Note: **Satisfactory rating - 8 points** **Unsatisfactory - below 8 points**

You can ask your teacher for the copy of the correct answers.

LG #64	LO#3 Monitor farm business sustainability initiatives for effectiveness and compliance

Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Monitoring and evaluating the effectiveness and compliance of sustainability practices
- Evaluating and reporting changing trends and techniques of sustainable organic farming

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, **you will be able to**:

- Monitor and evaluate the effectiveness and compliance of sustainability practices in terms of environmental, social and financial goals.
- Evaluate and report changing trends and techniques relevant to sustainable organic farming for continuous improvement

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information Sheet 1- Monitor and evaluate the effectiveness and compliance of sustainability practices

1.1. Monitoring and evaluation of sustainable practices

A successful transition to sustainable farming depends on the farmer's careful monitoring both of progress towards the goal and of the overall health of the system. It is useful to assume that your plan will not work and develop a system for determining (as soon as possible) if it isn't working. For example, if the goal includes increased biodiversity, the farmer needs to know—quickly —if the grazing or cropping system being used is actually increasing the number of plant species per acre. Monitoring is particularly important in sustainable agriculture, which relies on natural systems to replace some of the work done by input products like fertilizer and pesticides.

The ability to evaluate and replan is vital to the farmer who wishes to farm more sustainably. When part of the plan is not working as intended, it becomes necessary to replan. The concept of planning-monitoring-controlling-re planning is a key characteristic of Holistic Management and is referred to as the feedback loop. The transition toward more sustainable farming requires not only planning and decision making skills but access to appropriate and helpful information. Fortunately, increased interest in sustainable agriculture has stimulated greater investment in research and education. As a result, much more usable information is available today than ever before, accessible through various means.

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions(4)

1. Why monitoring and evaluation is important for organic farming?

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 2- Evaluate and report changing trends and techniques

The conversion from a conventional to an organic system requires a transitory period, where the organic practices are applied progressively following an organized plan. During this period it is important to analyze carefully the actual situation of the farm and identify the actions to be taken . The analysis of the farm must include (Figure 2-1):

1. Farm characteristics: size, plots and crops distribution, which kind of crops, trees, animals are integrated in the farm system.
2. Soil Analysis: an evaluation of the soil structure, nutrient levels, organic matter content, erosion level, and/or the soil have been contaminated.
3. Climate: rainfall distribution and quantity, temperatures, frost risks, humidity.
4. Organic matter sources and management (manures).
5. Presence of animal housing systems and/or machinery.
6. Limiting factors such as capital, labour, market access, among others.

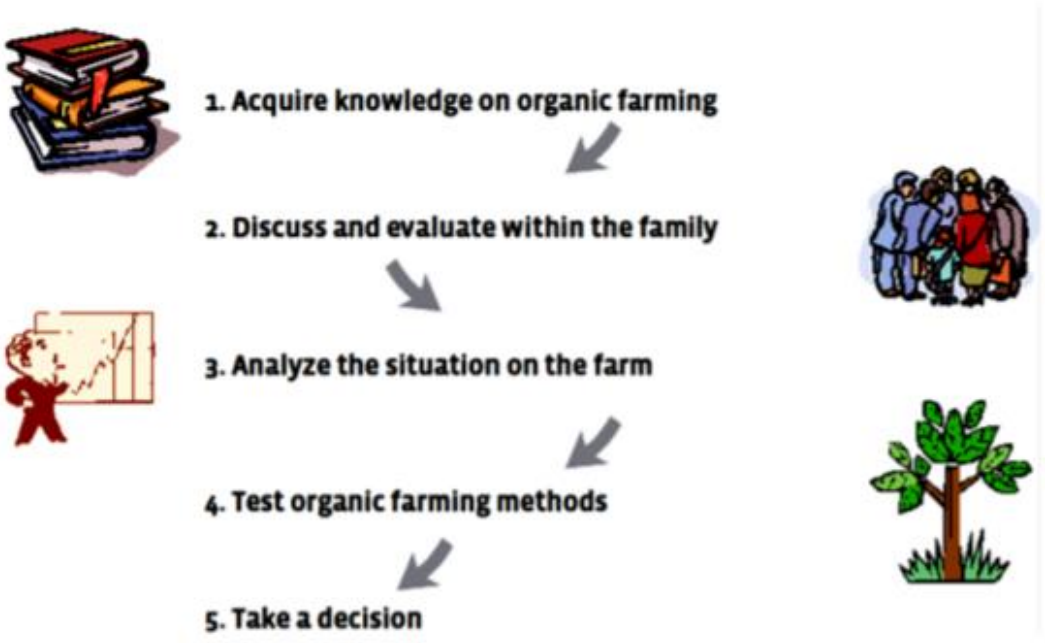

FIGURE 2-1 - PREPARING FOR THE CONVERSION

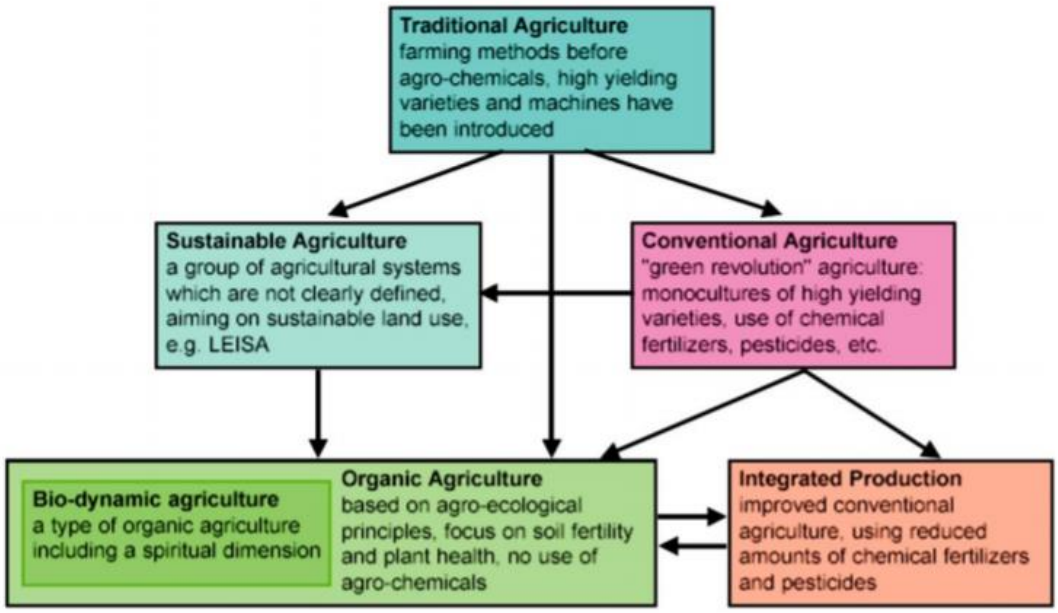

Figure 2.2. Definition of some farming systems:

Figure 2.3. Conversion of a high external input farm

Potential challenges in conversion of such farms (Figure 2-3)

- Establishing a diverse and balanced farming system with a natural ability to regulate itself usually takes several years.
- Major efforts may be necessary to restore natural soil fertility by providing a considerable amount of organic matter to the soil.
- Abandoning high input external fertilizers results in yield depression in the first years of conversion, before soil fertility is re-established and yields rise again.
- New approaches and practices usually involve a lot of learning and intensive observation of crop development, and dynamics of pests, diseases and natural enemies.

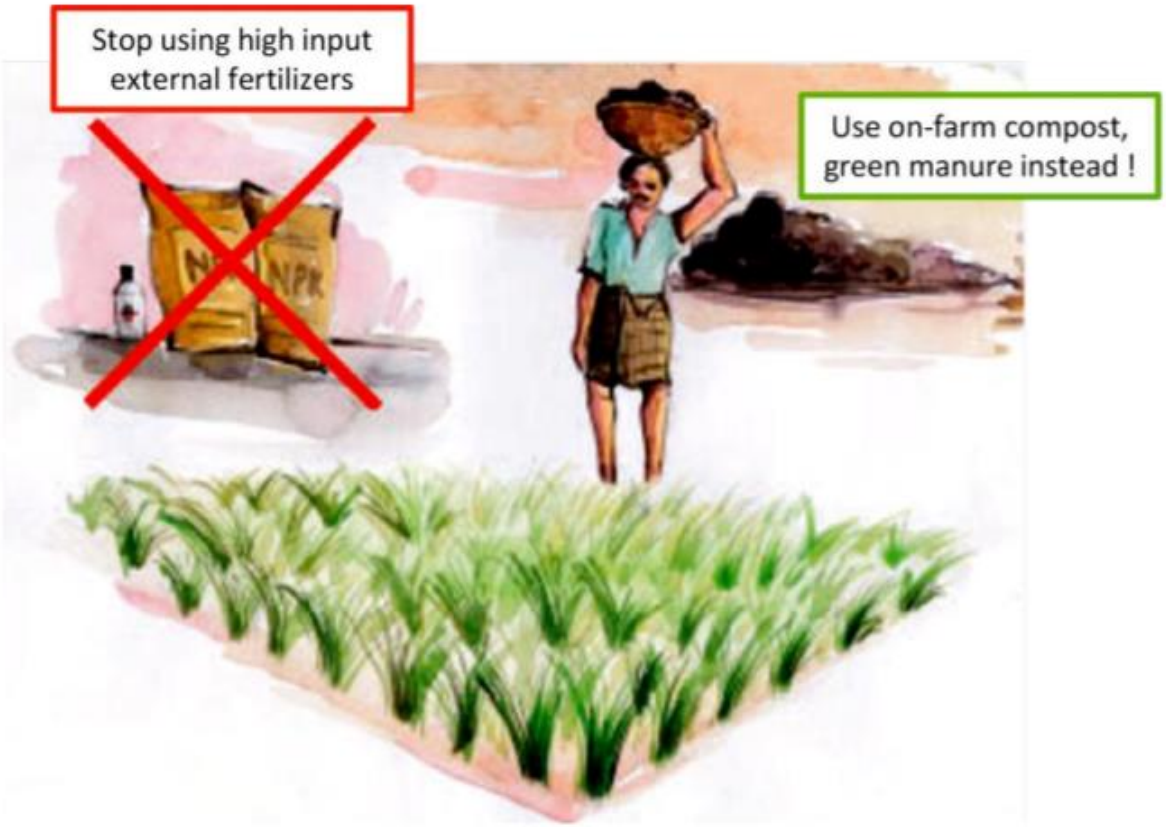

Figure 2.4 - minimizing external input

The conversion process can be achieved, if the following practices are implemented:

- Diversify the farming system: Select appropriate annual crops for the area and rotate them in a planned sequence. Include legume crops such as beans or leguminous feed crops in the rotation to provide nitrogen to the subsequent crops. Plant hedges and flower strips to encourage natural enemies and to control pests.

• Start recycling valuable farm by-products. Establish on-farm compost production based on harvest residues and manure, if available, and mix the compost with the topsoil. This will bring stable organic matter into the soil and improve its structure and its capacity to feed the plants and store water. Green manures can provide plenty of plant material to feed soil organisms and build up soil fertility (Figure 2-4).

• Introduce farm animals into the system. Farm animals provide valuable manure and diversify farm income through additional animal products.

• Grow cover crops. Cover crops or lay out mulches in perennial crops provide protection to the soil.

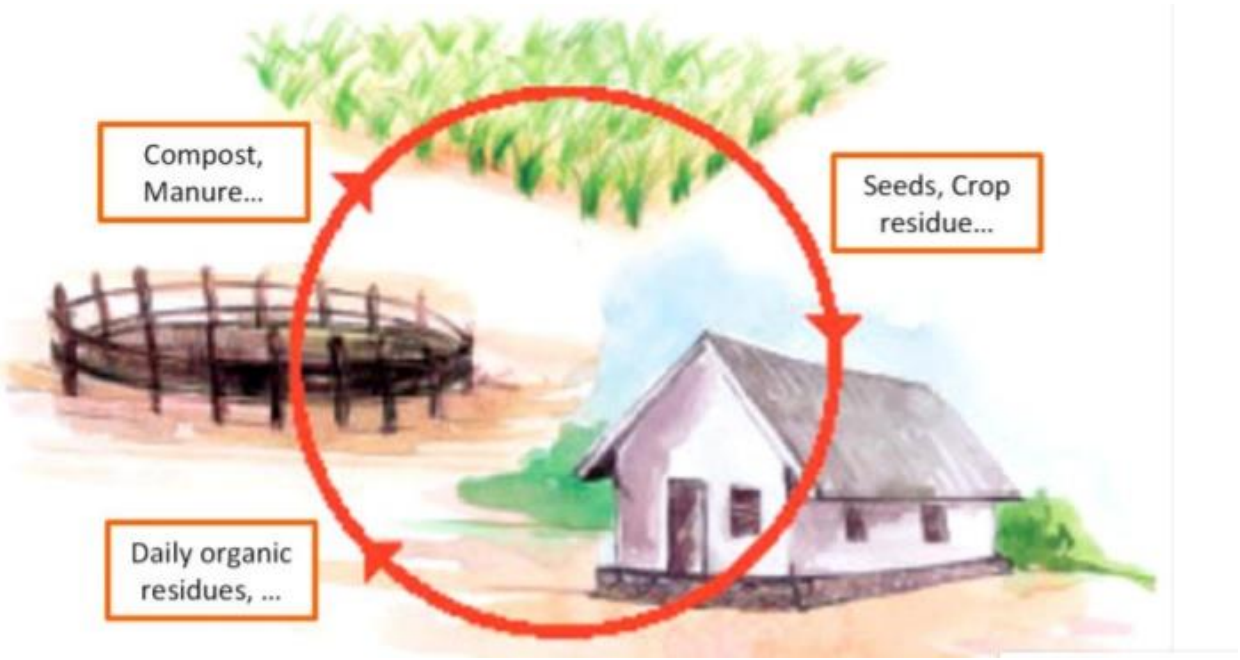

Figure.2.5. Composting

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions(3)

1. During the conversion process of organic farming what are the processes that should be implemented

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

LG #65	LO#4 Engage farm business stakeholders in sustainability practices

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Communicating sustainability strategies to stakeholders and relevant staff
- Monitoring stakeholder compliance with organic sustainability strategies
- Identifying and documenting identified continuous improvement initiatives.
- Encouraging and assisting stakeholders to implement improvements

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**:

- Communicate sustainability strategies to ***stakeholders and relevant staff***.
- Monitor stakeholder compliance with organic sustainability strategies along the entire supply chain.
- Identify and document identified continuous improvement initiatives.
- Encourage and assist stakeholders to implement improvements to the system.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

Information sheet 1- Communicate sustainability strategies to stakeholders and relevant staff.

1.1. sustainability strategies

Stakeholder engagement can be seen as the firm's ability to establish collaborative relationships with a wide variety of stakeholders(customers, employees at all levels of the organization, government, investors, local community, other organizations suppliers personnel within the organization, technical specialists, It includes a set of initiatives or practices that organizations develop to positively engage their stakeholders in their organizational activities and can inspire and reward fundamental changes to core operations of the firm that are beneficial to society and the environment).

To develop a dialogue with different stakeholders' groups, companies worldwide have disseminated social and sustainability reports to communicate their corporate social responsibility practices **.**In addition to financial reports, which are a source of interest mainly to shareholders, sustainability reports communicate and disseminate information about corporate actions with respect to the interests of both stakeholders and society.

Benchmarking against Peer companies may have already begun addressing supply chain sustainability. Benchmarking against peers, customers, suppliers and even companies from other sectors may provide a more sophisticated understanding of the business value as well as ideas to incorporate into the design of the company's supply chain sustainability programme. Companies should seek to understand peers':

- Business case for supply chain sustainability
- Understanding of human rights, labour, environment and governance risks, opportunities and impacts and the resulting supply chain focus
- Internal structure for managing supply chain sustainability
- Codes of conduct, and the topics included
- Use of their code of conduct
- Approach and programmes to engage with suppliers
- Metrics to evaluate the success of their programme

- Reporting practices

Collaboration with suppliers on sustainability issues can foster product innovation. Companies embarking on such initiatives have added new features and performance characteristics to existing products and even generated new products. For example, sustainable products may result in reduced negative environmental impacts than traditional products or have improved end of life collection and disposal options. It is also possible for the sustainability of products to be a differentiating factor and to lead to increased sales for some companies.

Self-Check – 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: True or false (2)

1. Stakeholder engagement can be seen as the firm's ability to establish collaborative relationships with a wide variety of stakeholders

2. Companies should seek to understand peers about business case for supply chain sustainability ,understanding of human rights, labour, environment and governance risks.

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

You can ask your teachers for the correct answers

Information Sheet 2- Monitor stakeholder compliance with organic sustainability strategies along the entire supply chain.

Supply chain sustainability" is the management of environmental, social and economic impacts, and the encouragement of good governance practices, throughout the lifecycles of goods and services. Supply chain sustainability management is key to maintaining the integrity of a brand, ensuring business continuity and managing operational costs .Sustainability-driven productivity ,a focus on sustainability-driven productivity in the supply chain can reduce the farm's procurement costs while also reducing the environmental footprint of the supply chain, such as energy, water, and use of natural and synthetic materials. This may also reduce the harm to worker health and safety, and improve worker motivation, productivity and cost efficiency..

Other benefits include:

- Increased understanding of key processes in the supply chain, including natural resource management and extraction, logistics and manufacturing, enables better management and stewardship of resources
- More efficiently designed processes and systems which reduce required inputs and lower costs

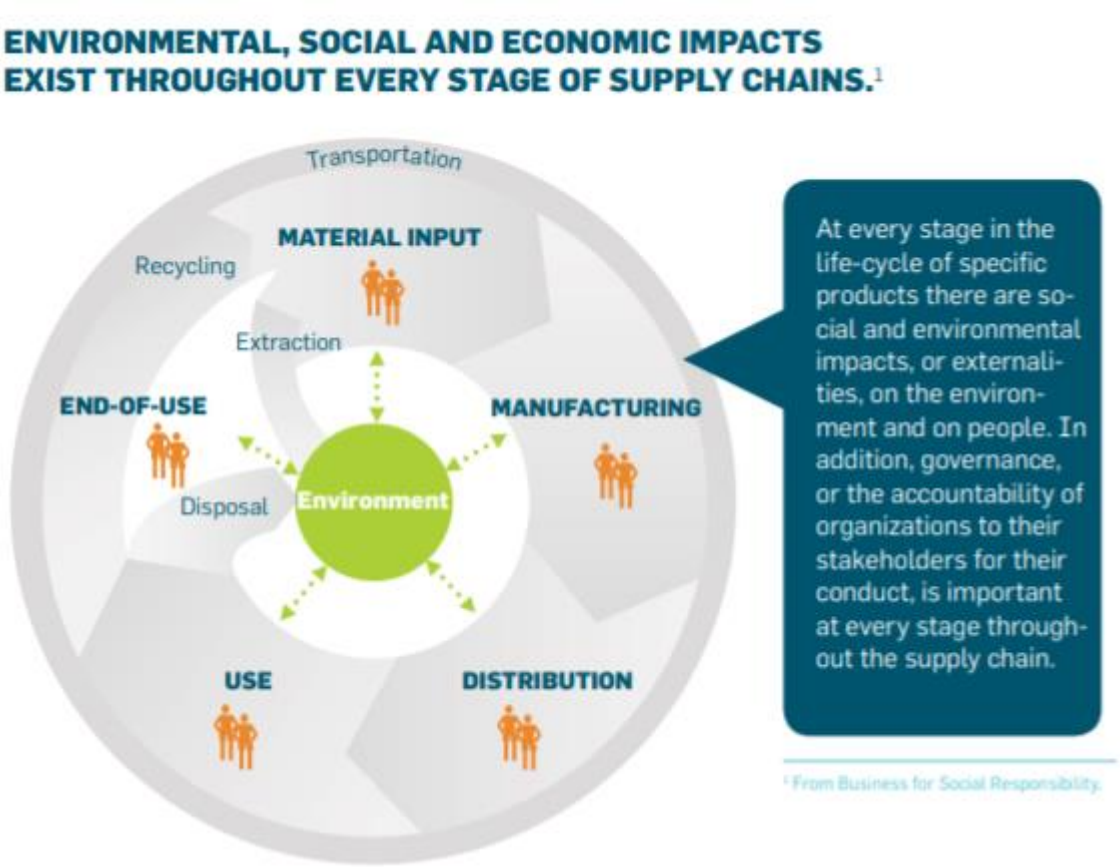

Figure.2.1.Supply chain

Increasingly, customer and investor expectations and overall society are driving companies toward more responsible supply chain management. Strong management of social and environmental issues helps companies avoid and address adverse impacts to stakeholders, which can in turn help ensure that companies maintain their social license to operate by taking into consideration risks to surrounding communities. Effectively managing social and environmental risks can also help companies avoid potentially costly operational delays from conflicts with local communities, and can help companies avoid reputational risks.

Self-Check – 2	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short answer (2)

1. What is supply chain sustainability?
2. What is the importance of Supply chain sustainability?

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet 3- - Identifying and documenting identified continuous improvement initiatives

According to the Second African Organic Conference (AOC2) held in Lusaka, Zambia, 2-4 May 2012, on the theme “Mainstreaming Organic Agriculture in the African Development Agenda” They highlighted the importance of the six pillars of the African Organic Action Plan:

1. Research, training and extension: to conduct participatory, interdisciplinary, multi-cultural research that informs stakeholder training and offers appropriate knowledge and skills and innovative solutions to the community.
2. Information and communication: to develop information and communication strategies to sensitize the stakeholders and the general public on the value and practices of ecological organic agriculture.
3. Value chain and market development: to increase trade in organic products from Africa on domestic, regional and export markets.
4. Networking and partnership: to strengthen synergies among stakeholders and beneficiaries to support ecological organic agriculture through networks and partnerships.
5. Supportive policies and programmes: to support the development and implementation of enabling policies and programmes.
6. Institutional capacity development: to establish, develop and support ecological organic agriculture institutions in Africa

Standards, regulations and certification

Certification of organic production involves verifying that producers employ organic techniques and follow organic principles (by not using pesticides or fertilizers, for example). Potentially, any party (business, farm, processor, etc.) directly involved in food production can be certified. The process varies from country to country and standard to standard, but some general aspects of certification procedures include:

- on-site inspections of facilities: physical tours, interviews and perhaps testing of soils and water;

- documentation related to farm history, including proof that farmland has been free from chemical inputs for three years or more (depending on the crop), proof of seed sources, pest control activities and storage locations;
    - record keeping of these same activities throughout of the year;
    - fees, initial and sometimes annually, for inspections and maintaining certification.

Certification regulates the organic market, ensuring that organic products are produced according to certain environmental, social and health principles. Organic labels and marks present and communicate the application of these principles to consumers. This facilitates the sale of organic products and serves as a key market mechanism; it induces consumers to pay the premium price for organically produced goods. Certification is also a way of protecting organic farmers from dishonest competition on the part of other farmers (conventional) who may claim that their products are organic in order to take advantage of premium prices and consumer preferences. Thus, certification is a necessary step for organic farming, guaranteeing quality, protecting the sector and marketing organic products.

Self-Check – 3.	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test 1.Short answer (6)

1. What is the importance of certification for organic farm products

2. Why we keep records in organic farming?

Note: **Satisfactory rating - 6 points** **Unsatisfactory - below 6 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet 4- Encouraging and assisting stakeholders to implement improvements

4.1. Assistance in capacity building

FAO intends to provide countries with specific assistance for the development of appropriate national legislation, certification capabilities, research and extension facilities, as well as to promote the exchange of experiences between countries.

- **Institutional support, policy advice and field projects.** A large number of requests have been received for FAO to assist in building capacities for the production, certification and marketing of organic agriculture products. Hence, one Technical Cooperation Programme is in the pipeline to provide institutional support and advice on organic agriculture.
- **Training.** FAO sent a trainer to the summer course of the 1999-2000 EC Programme on Ecological Agriculture with students from the main European agriculture universities. FAO participated in developing CIHEAM's Post-Graduate Course on Mediterranean Organic Agriculture that started in November 2000.
- **Research.** FAO's Regional Office for Europe coordinates a Working Group on Organic Farming Research. The Network held two technical workshops on research methodologies unique to organic agriculture - in Switzerland (October 1998) and in Italy (September 1999). Efforts lead to collaboration with major EC-financed initiatives, regional training seminars, technical publications and the development of open-information fora.

4.2. Standards and certification

Countries seek assistance in deciphering the multitude of rules that various traders expect their suppliers to follow. Increasing international trade in organic products has placed FAO at the forefront of efforts to achieve greater harmony in organic standards. The Codex Alimentarius Commission has endorsed Guidelines on the Production,

Processing, Marketing and Labelling of Organically Produced Foods for crops and livestock.

4.3. Provision of technical and economic information

FAO intends to help developing countries gain access to international markets by providing technical information on production requirements and trade information on market opportunities. This is done through **studies,** among others. Several studies have been completed, namely:

- Evaluating the Potential Contribution of Organic Agriculture to Sustainability Goals;
- The Market for Organic and Fair Trade Bananas;
- Opportunities and Constraints of Organic Agriculture: a Socio-Ecological Analysis;
- Food Safety and Quality as Affected by Organic Farming;
- Factors Influencing Organic Agriculture Policies with a Focus on Developing countries;
- The Use of Spices and Medicinals as Bioactive Protectants for Grains;
- World Markets for Organic fruit and Vegetables; and
- Cost-Benefit Analysis of Organic versus Conventional Citrus Production.

Self-Check – 4.	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test 1.Short answer (3)

1. What is the role of stakeholders in organic farming improvement?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

You can ask your teacher for the copy of the correct answers.

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