Regenevate
Farm Standard
Implementation Guide

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1.1	31.05.2023	All sections	Text content and visuals have been modified.
2.0	27.05.2025	All sections	Adjustments have been made in accordance with the changes to the standard.

More information can be found at **regenevate.org**

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INTRODUCTION

Regenevate Farm Standard Implementation Guide has been prepared for individuals and legal entities engaged in plant production.

The purpose of the guide is to support the widespread adoption of regenerative agriculture practices that contribute to the protection and improvement of soil, water, biodiversity, and overall ecosystem health in agricultural lands, while also providing operators with sustainable methods that will yield long-term economic efficiency and climate resilience.

The guide provides operators with the essential information and application methods needed to adapt these approaches to their specific production conditions.

Regenerative agriculture is a holistic production approach that prioritises soil health, works in harmony with natural processes, and aims to enhance the ecological capacity of the land where production takes place. This guide provides an overview of the definition, principles, and benefits of regenerative agriculture; however, information focused on practical implementation is prioritised.
The scope of the guide includes the following topics:

- Basic principles of regenerative agriculture,
- Practical applications for improving soil health,
- Strategies for supporting plant diversity, microbial life, and natural cycles,
- Methods for water management, carbon sequestration, and increasing climate resilience,
- Transition processes and planning guidelines suitable for operators at different scales.

This guide aims not only to promote a change in production techniques, but also a transformation in the way we view the soil, nature and the role of the operator. A regenerative approach does not merely protect nature; it also increases soil fertility, reduces input costs, improves product quality, and contributes to the operator's long-term economic sustainability.

Who is this guide intended for?

It has been prepared for small, medium and large-scale plant producers, agricultural companies, cooperatives, operator associations, technical personnel and consultants working in field applications.

Based on scientific principles but prioritising practical applicability, this resource is not an academic publication; it is designed to be a simple, understandable and practical guide.

The Basic Principles of Regenerative Agriculture

Regenerative agriculture is a holistic approach that works in harmony with nature and aims to increase the ecological capacity of production areas. This approach not only aims to protect existing resources, but also actively improves soil, water, biodiversity and climate.

The principles below form the basis of regenerative agriculture practices:

• Prioritising soil health: Soil is at the heart of regenerative agriculture. The aim is to preserve soil structure, support microbial life, increase organic matter content and ensure long-term sustainability by maintaining a healthy root system.

• Supporting biodiversity: Creating production systems diversified with different plant species, soil microorganisms, and wildlife makes production areas more resilient while preserving the balance of nature. Crop rotation, polyculture practices, and the protection of natural habitats serve this purpose.

• Improving water management: The efficient and balanced use of water resources is essential. Methods such as rainwater harvesting, reducing surface runoff, and protecting soil cover are used to increase soil water retention capacity, prevent erosion, and support the water cycle.

• Contributing to the carbon cycle: Agricultural land has great potential in terms of carbon sequestration. Carbon is returned to the soil through organic matter enhancement, minimum tillage and the continuity of living roots. This contributes to reducing greenhouse gas emissions and combating climate change.

These principles form the foundation of regenerative production systems and provide a guiding framework for both environmental and economic sustainability.

Scope of the Guide; The guide aims to contribute to the creation of an environmentally conscious and sustainable production model by transforming agricultural production processes. Regenerative agriculture practices not only offer environmental benefits but also support the long-term health of the agricultural economy. The guide provides users with the necessary information and tools to ensure the environmental, economic, and social success of these practices.

Transition Plan to Regenerative Agriculture: Basic Principles and Implementation Phases

It is extremely important that an operator's transition plan is prepared completely and accurately in order to transition to sustainable farming practices.

Some key points to consider in this context are listed below:

- **Assessment of the Current Situation:** The current environmental and economic status of the agricultural area should be comprehensively analysed, taking into account key indicators such as soil health, biodiversity, water management and carbon emissions.
- **Improvements to Soil Health:** It is important to apply methods such as organic matter addition, compost use, and appropriate soil cultivation techniques.
- **Increasing Biodiversity:** In regenerative agriculture, it is important to increase plant diversity, protect animal species, and strengthen local ecosystems in order to increase soil fertility and support biodiversity.
- **Gradual Transition Process:** Regenerative agriculture practices should be implemented gradually rather than abruptly. Starting with less effective changes at first, more comprehensive transformations can be achieved over time. This process can be adapted to the specific conditions of the agricultural area.
- **Resource Management:** Strategies should be developed to ensure more efficient use of resources such as soil, water and energy. Steps can be taken to manage water resources, improve irrigation techniques and increase energy efficiency.
- **Education and Capacity Development:** Training programmes should be organised to ensure that farmers and other stakeholders understand and adopt the basic principles of regenerative agriculture. These programmes are of great importance in providing technical knowledge and contributing to the dissemination of agricultural innovations.
- **Continuous Monitoring and Evaluation:** Regular monitoring of soil health, biodiversity, and other environmental indicators should be conducted before and throughout the implementation process. This data can be used to evaluate the success of the practices and make improvements.
- **Policy and Support Systems:** State and local governments can develop policies that encourage sustainable agricultural practices. Financial incentives, tax breaks, and other forms of support can facilitate the transition process.
- **Cooperative and Community-Based Models:** Farmers and agricultural stakeholders can establish cooperatives or local communities to promote the sharing of experience and knowledge. These structures contribute to the widespread adoption of regenerative agriculture practices while ensuring the efficient use of resources.

Analysis of the Current Situation Prior to Transition to Regenerative Agriculture:

Previous Applications:

Fertiliser Use: The types of fertilisers used by the operator in the past (organic, chemical, plant-based), their quantities and application frequency should be specified in detail.

Pesticide Use: The types of pesticides used, their quantities, application frequency, target pests, and the environmental impacts of these chemicals should be evaluated

Soil Preparation: The soil preparation methods used, the number of soil preparations, the equipment used, and the effects of these processes on soil structure should be reviewed.

Current Agricultural Practices:

Plant and Agricultural Systems: If cover crops, intercropping or similar practices are used, these should be described in detail. In addition, existing crop rotation systems should be specified.

Biodiversity: The current state of biodiversity, afforestation efforts, green areas and other activities aimed at increasing biological diversity should be reported.

Geographical and Climatic Conditions:

The plan should be prepared taking into account the geographical features (soil structure, topography, etc.) and climatic conditions (rainfall, temperature, wind, etc.) of the area where the operator operates.

Soil Structure and Quality:

Factors such as soil pH, organic matter content, nutrient levels (nitrogen, phosphorus, potassium, etc.) and water holding capacity should be examined.

Water Source and Quality:

The condition of water sources, water quality (pH, mineral content, pollutants, etc.), and potential issues related to water supply play a significant role in the preparation of the plan.

Financial Status and Resources:

The financial resources, machinery, equipment, and other infrastructure elements available to the operator should be considered, and the costs and resource requirements for transitioning to sustainable practices should be thoroughly addressed.

Goals and Plans:

Enhancement Plans: Developments that need to be made to increase agricultural productivity and environmental improvements should be identified (e.g., increasing the use of organic fertilisers, measures to improve soil fertility, etc.).

Reduction Plans: Concrete targets should be set for sustainable practices such as reducing the use of chemical fertilisers and pesticides, and minimising soil tillage activities.

Other Certifications and Transition Information:

If the operator is transferring from another Certification Body, previous practices and conditions must be reported in relation to the transfer process and compliance with the new certification must be ensured. This information is of great importance in ensuring the operator's transition to the Regenevate Plant Production Land Standard and monitoring progress.

1. SOUL PROCESSING

Soil structure consists of a mixture of sand, clay and silt. A sound soil structure allows air and water to move properly within the soil, which is necessary for root development.

In regenerative agriculture, excessive soil tillage and fertiliser use should be avoided to improve soil structure. Instead, soil structure is preserved through minimal tillage and the use of natural fertilisers. This method lays the foundation for healthier soils and stronger plants.

Improving Soil Health

Improving soil health is one of the most important components of regenerative agriculture. To increase soil productivity and biodiversity, it is essential to improve soil health and function. This process requires balancing the physical, chemical, and biological properties of the soil.

The Regenevate Plant Production Farm Standard mandates soil analysis and testing to improve soil health. These tests are used to determine the condition of soil components and monitor them over time.

Soil Health Improvement Activities
Conservation Tillage Methods

In these methods, which are applied to reduce water and wind erosion, at least 30% of the soil surface is left covered with plant residues from the previous crop after sowing. Ploughing is not used in protective soil management. This system provides weed control and seedbed preparation while significantly reducing the number of passes made in the field compared to traditional methods. The basic principle is to work the soil without turning it over, thereby preserving its structure.

- **Reduced Tillage:**

This method involves less energy consumption than conventional tillage, reduces the number of passes over the soil, and includes operations that do not disturb the soil. Instead of intensive operations such as deep ploughing, primary tillage involves the use of harrows or disc implements, while secondary tillage involves the use of cultivators or disc equipment.

Benefits:

- The structure, porosity and water permeability of the soil are preserved without being damaged.
- Limited soil aeration reduces carbon loss.
- The habitat of earthworms, microorganisms and fungi living in the soil is not damaged.
- Surface runoff and transport risk are reduced as the surface vegetation cover is preserved.
- Production costs decrease as fewer machines are required.
- The soil's water-holding capacity increases, enhancing its resilience to stress conditions such as drought and excessive rainfall.

How to apply?

A harrow, disc harrow, surface cultivator or direct seeding machine is used. The timing of soil preparation should be carefully determined according to the moisture content of the soil; excessively dry or excessively wet soils should not be worked.

- ### Mulch Tillage:

A farming method in which organic materials such as straw, leaves, plant debris, woody materials or compost are spread on the soil surface, resulting in minimal soil disturbance. In this method, the soil is either not tilled at all (no-till) or only very superficially and to a limited extent (minimum tillage).

Benefits:

- Increases biological diversity by nourishing microorganisms in the soil.
- Prevents surface erosion caused by wind and rain.
- Maintains soil moisture balance by reducing evaporation.
- Over time, decomposing mulch enriches the soil with carbon and nutrients.
- Limits light penetration, inhibiting the growth of weeds.
- Creates a cooler microclimate in summer and a warmer one in winter, supporting root development.
- Reduces input requirements, lowering production costs.

How to apply?

Post-harvest plant residues (e.g. wheat straw), green manure crops, corn stalks, woody materials or compost are used as mulch. Instead of traditional ploughing, surface cultivation tools such as harrows or discs are used to minimise soil disturbance. This mulching process is carried out before sowing or during the plant growth period.

- ### No-till Farming (Zero tillage/Direct Seeding/No-till practices):

It is a production method in which processes such as ploughing, mixing or turning the soil are not carried out before sowing. In this method, the natural structure of the soil is left intact and the seeds are placed directly into the soil using special sowing machines.

Benefits:

- Since production is carried out without tilling the soil, the soil structure is preserved and soil organisms such as microorganisms, fungi, and earthworms are not harmed.
- Atmospheric carbon emissions are reduced because the soil is not disturbed.
- Water absorption increases and evaporation decreases because the soil's pore structure is preserved.
- Soil erosion caused by water and wind is prevented as the soil surface remains covered.
- The amount of organic matter in the topsoil increases, improving soil structure.
- Reduced field traffic eliminates issues such as soil compaction.
- The formation of a crust on the surface is prevented, facilitating plant emergence and reducing surface runoff.
- Production costs decrease as fuel, labour, and equipment requirements are reduced.
- As soil health is maintained, natural ecological cycles that support productivity are strengthened.

How to apply?

No-till planting machines pass through plant residues on the soil surface, opening the soil with minimal intervention and placing the seed directly into the soil. A surface cover is provided using mulch or cover crops to prevent the soil from being exposed.

- **Strip tillage:**

It is a soil preparation method that involves working only the narrow strips where seeds will be sown, rather than the entire field surface. The rest of the field is left unworked and is usually covered with plant residues or cover crops, thus protecting the soil naturally.

Benefits:

- Since most of the soil is left uncultivated, microbial life in the soil is sustainable.
- Uncultivated areas form a natural protective layer on the soil surface, protecting the soil from erosion and other environmental effects.
- Plant residues in these areas help maintain soil moisture balance by reducing water evaporation.
- Since only narrow strips are cultivated, these areas provide an appropriate environment for seeds to germinate healthily and roots to develop.
- Since only 30-50% of the field is cultivated, significant savings are achieved in fuel, labour, and equipment use.
- It provides a phased adaptation process for farmers who wish to transition to completely uncultivated farming.

How to apply?

The special strip-till method is a planting technique in which strips 15-30 cm wide are worked and 60-75 cm row spacing is left. With special equipment, the soil is worked only in these strips, organic matter is mixed in, and fertilisation is carried out in some machines. Seeding is done only in the worked strips; the remaining areas are covered with mulch or cover crops.

- **Ridge Tillage:**

Ridge planting is a suitable method for poorly drained soils. Initially, ridges are formed using traditional soil cultivation methods; in subsequent years, these ridges are maintained and direct planting is carried out alternately using special machines.

Benefits:

- Reduces surface runoff after rainfall, preventing water accumulation in the root zone.
- Faster warming of ridges in spring accelerates germination.
- Raised and well-drained soil allows roots to develop deeper and healthier.
- Ridges and channels between them facilitate mechanical weed control.

How to apply?

The soil can be worked with tools such as a harrow, disc harrow, cutting disc or row cleaner, leaving plant residues between the ridges. Unlike traditional methods, no additional soil cultivation is carried out between harvest and sowing unless deemed necessary; only fertilisation may be applied.

BENEFITS OF REDUCED SOIL TILLAGE FOR OPERATORS

Soil cultivation is one of the most energy- and labour-intensive activities in agriculture. Reduced tillage methods (or no-till) can offer farmers a number of advantages:

Reduced Labour Costs: Reduced soil cultivation significantly reduces soil cultivation activities, thereby reducing labour requirements. This allows for greater production with less labour.

Reduced Energy Costs: Traditional soil preparation methods result in high energy consumption (e.g., use of tractors and processing machinery). Reduced soil preparation reduces this energy consumption and, consequently, costs.

Soil Structure Preservation: Reduced soil tillage prevents soil erosion and helps preserve the natural structure of the soil, thereby creating more productive soil conditions in the long term.

Reduced Carbon Emissions: This method prevents the release of carbon stored in the soil and reduces agricultural carbon emissions.

Improved Water Management: Plant residues on the soil surface increase moisture retention capacity, allowing water to remain in the soil for longer. As a result, irrigation needs decrease and crop resilience increases during dry periods.

Reduced Machine and Equipment Costs: Less land cultivation reduces machine wear and tear, lowers maintenance and repair costs, and extends the life of machinery.

Time Savings: Less time is spent on field preparation, giving farmers more time to focus on other agricultural activities and making seasonal preparations more efficient.

Increased Long-Term Productivity A healthy soil structure supports root development and allows plants to access nutrients more easily. This can increase crop yield and quality in the long term.

Increased Resistance to Diseases and Pests: Increased soil vitality strengthens the natural biological balance, which can help suppress pests and diseases.

Opportunity to Benefit from Government Support: Support and grant programmes that encourage environmentally friendly agricultural practices provide advantages, especially for farmers who use reduced tillage.

These benefits provide important reasons for operators to transition to sustainable farming practices. However, effective implementation requires planning. This is where the reduced tillage plan comes into play.

Soil Tillage Reduction Plan: What is Expected From Operators

A soil cultivation reduction plan is a guide that helps operators evaluate their current soil cultivation methods and determine how they can transition to more sustainable alternatives. This plan should include the following elements:

Current Situation Assessment:

The operator should report on the current soil cultivation methods (e.g., plough, disc harrow, etc.) and the frequency of their use. In addition, the equipment used and labour costs should be determined.

Reduction Targets:

The specific aspects of soil cultivation activities that will be reduced must be identified. For example, targets such as reducing the number of soil cultivation operations, transitioning to no-till methods, or implementing minimum soil cultivation practices can be set.

Application Methods:

Decisions must be made regarding how new methods will be implemented:

- Reduced tillage,
- Mulch tillage,
- No-till, zero-tillage, slot-plant,
- Strip tillage,
- Ridge tillage

Additionally, any changes to equipment or the adoption of new technologies must also be determined.

Time Schedule and Monitoring:

The timing and methods for implementing the soil cultivation reduction plan should be determined. In addition, a monitoring system should be established to track the effects of these processes.

REQUIREMENTS FOR SOIL ANALYSIS

Soil analysis should be carried out at least once every three years. The main indicators to be monitored during this three-year period are listed below:

First Year or Up to 1 Year, Required Indicators:	Indicators that need to be monitored every three years:	One indicator is required every three years:
pH	pH	Activated Carbon-PoxC
EC	EC	Water Holding Capacity
Organic Carbon/Soil Organic Matter (SOC/SOM)	Soil Organic Carbon/Soil Organic Matter (SOC/SOM)	Cation Exchange Capacity
Soil Texture	Aggregate stability	Total Soil Nitrogen
-	Soil infiltration rate	Extractable Micronutrients
Available macro and micro nutrients	TTotal Microbial Biomass	-

Achieved in the first year or within one year, required indicators

Soil pH: The pH level in the soil affects the availability of nutrients to plants. Therefore, pH measurement is a fundamental step in monitoring soil health.

Electrical Conductivity (EC): Indicates the salinity level of the soil. High EC values can cause stress due to salt accumulation and negatively affect plant growth.

Soil Organic Carbon (SOC) / Organic Matter (SOM): Organic matter supports biological activity in the soil and increases its water-holding capacity. Therefore, it plays a critical role in maintaining soil health.

Soil Texture: The proportions of sand, silt, and clay determine the physical properties of the soil, particularly water movement and root development. Textural structure is a fundamental indicator of soil health.

Macro and Micro Nutrients: Evaluates the adequacy of essential nutrients (nitrogen, phosphorus, potassium, zinc, iron, etc.) in the soil for plant growth.

Indicators that need to be monitored every 3 years:

Active Carbon (PoxC): Indicates the biological activity of the soil and its capacity to process organic matter; it is an important indicator of microbial activity.

Water Holding Capacity: Indicates the extent to which the soil can store water and is critical for effective irrigation management.

Aggregate Stability: Indicates the soil structure's ability to maintain its integrity without disintegrating, especially when exposed to water; reflects soil structural health.

Soil Infiltration Rate: Measures how quickly water penetrates the soil surface; higher values indicate effective water movement into the soil.
Total Soil Nitrogen: The total nitrogen content in the soil is considered a fundamental element for plant nutrition and productivity.

One indicator is required every three years:

Cation Exchange Capacity (CEC): Indicates the soil's ability to retain nutrients. A high CEC ensures that nutrients remain in the soil for longer periods.
Extractable Micronutrients: Determines the levels of micronutrients that can be extracted from the soil in a soluble form; used to identify micronutrient deficiencies.
Total Microbial Biomass: Represents the total mass of microorganisms in the soil. This value reflects the biological activity and ecosystem health of the soil.
The criteria to be considered when taking soil samples are listed below:

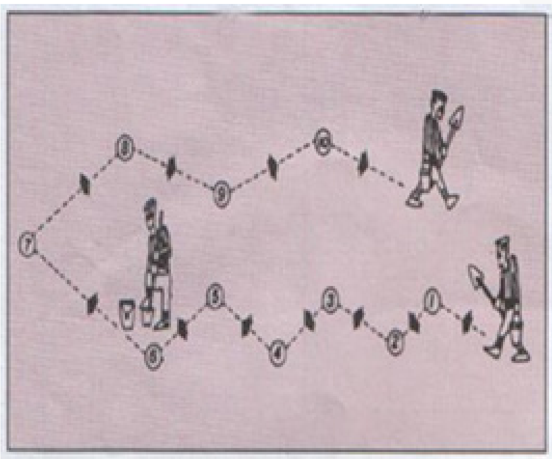
SOIL SAMPLING

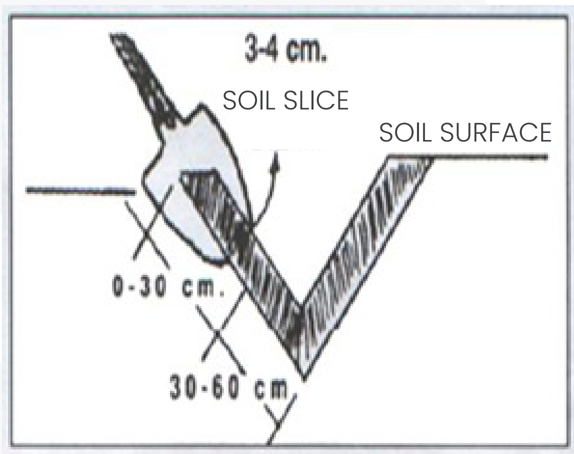
To determine soil fertility and nutrient requirements, soil samples are taken from different depths depending on the type of plant being grown. For annual crops, this depth is generally 0-30 cm depending on the root structure, while for perennial crops, samples can be taken from depths of 0-20 cm, 20-40 cm, or 40-60 cm depending on the age and type of the plant.

In fields of up to approximately 40 decares where a single crop is grown, if the field structure is homogeneous, samples are taken from 8-10 different points, mixed, and an average soil sample of 1 kg is obtained. In areas larger than 40 decares, the land is divided into sections, and separate samples are taken from each section.
If the land has different characteristics, such as rocky, sloping, eroded, or divided into areas where different crops are grown, separate samples should be taken from each different area.

How to Take a Soil Sample?

A W-shaped path is traced within the parcel, and 'V' shaped holes are dug with a shovel. Soil samples are taken from these holes in 3-4 cm thick slices, at the depth of the plough. The samples are placed in a clean bucket. Alternatively, soil samples can also be taken with a soil auger.





Samples taken from 8-10 locations are thoroughly mixed on a clean cloth or in a bag, and then approximately 1 kg of this mixture is placed in a plastic bag and labelled.

Where should soil samples not be taken from?

Soil samples should be taken from appropriate locations that best represent the field. Samples should not be taken from roadside areas, areas under trees, areas near water channels, areas where manure piles are located, areas where animals use as resting places, areas where straw, roots, or weeds are burned, or from mounds or depressions.

Soil samples should not be taken when the soil is muddy or frozen. In general, soil samples should be taken 1.5–2 months before sowing or fertilisation, taking into account seasonal conditions. Each sampling should be carried out in the same field or area.

Soil analysis results should be recorded digitally or manually. Each analysis must include the sampling date, soil type, method used, and sampling details. These records are important for tracking changes in soil health over time.

Soil analysis results and field observations should be evaluated together. Necessary improvement steps should be determined by considering the soil's nutrient content, pH level, and organic matter ratio. Fertilisation, irrigation, and soil management methods should be planned appropriately based on the obtained data.

Soil Biodiversity

Soil biodiversity refers to the diversity of life beneath the ground, ranging from the genetic level to species, the communities formed by these species, and from microhabitats to large landscapes. These organisms interact with the ecological systems to which they belong. A healthy soil ecosystem depends on the preservation of this diversity. Soil biodiversity not only enhances soil health and productivity but also provides environmental benefits by functioning in harmony with other living organisms.

Monitoring Biodiversity

Soil biodiversity plays a decisive role in soil health. The diversity of microorganisms, insects and other living species in the soil is one of the most important indicators of healthy soil.

- **Microorganism Monitoring:** Microorganisms in the soil break down organic matter and contribute to the nutrient cycle. The diversity of these organisms should be monitored to assess soil health.
- **Earthworms:** Earthworms aerate the soil and improve its structure. The number and presence of these organisms provide information about the biological condition of the soil.
- **Microbiological Analysis:** By analysing the microbiological structure of the soil, it is possible to determine which microorganisms are dominant and the level of soil health.
- **Biological Activities:** The level of life in the soil, i.e. biological activities (such as organic matter decomposition and gas exchange), are fundamental indicators of soil health and biodiversity.

Strategies for Increasing Soil Biodiversity:

- **Use of Different Plant and Root Structures:** Planting different plant species enriches the soil with different organic materials, thereby promoting microorganism diversity.
- **Use of Organic Matter and Compost:** Organic materials, especially compost, provide a suitable environment for the development of soil organisms and increase biodiversity.
- **Conservative Soil Management:** Intensive soil management can negatively affect soil organisms. Therefore, biodiversity can be supported by maintaining natural balance through less soil management.

Soil analyses are essential tools for assessing soil health and taking corrective measures when necessary. Regular soil analyses enable the monitoring of changes in soil. Additionally, soil biodiversity is one of the cornerstones of ecosystem sustainability. The diversity of microorganisms and other living organisms in the soil is essential for productive and healthy soils. Therefore, monitoring and protecting biodiversity is of great importance for sustainable agricultural practices.

2. LIVING ROOTS AND SOIL COVER

A. ACTIVITY PLAN

Living roots and cover crops provide many benefits in agriculture, such as protecting soil health, increasing biodiversity, and using water resources more effectively. Therefore, the inclusion of these plants in agricultural practices is one of the fundamental elements of sustainable agriculture. The action plan should include the following headings:

The Purposes of Roots and Cover Plants:

- **Erosion Prevention:** Plant roots hold the soil in place, reducing erosion.
- **Improving Soil Health:** Cover crops improve soil structure by increasing organic matter.
- **Water Management:** These plants can reduce the need for irrigation by increasing the soil's water retention capacity.
- **Supporting Biodiversity:** Cover crops create habitats for various insects and microorganisms, enriching the ecosystem.

Planning Stages:

- **Soil Analysis:** Soil structure, pH and nutrient status should be analysed to select suitable plants.
- **Plant Selection:** Cover crops should be selected according to climate and soil conditions (e.g. deep-rooted plants for dry areas).
- **Increasing Biodiversity:** Using multiple cover crop species provides natural resistance to pests and diseases.
- **Proper Timing:** Cover crops should be planned to avoid overlapping with main crops and planted at the appropriate time.

B. COVER CROP ENHANCEMENT AND SELECTION PLAN

The effective selection and propagation of cover crops contributes significantly to the development of sustainable agriculture. The following steps should be followed in this process:

Choosing a Ground Cover Plant:

- **Climate Suitability:** The plant should be suitable for the climate conditions of the region; for example, drought-tolerant species should be preferred in arid areas.
- **Soil Characteristics:** The plant should be compatible with the soil structure and contribute to the nutrient cycle. (Such as nitrogen-fixing plants.)
- **Ecosystem Support:** The use of different species maintains the balance in the ecosystem and helps control pests.

Propagation and Maintenance:

- **Planting Methods:** Plants can be planted directly; sometimes soil preparation may be required. Planting depth should be determined based on the type of seed and soil structure.
- **Maintenance and Monitoring:** Plant growth should be monitored, and their effects on the soil should be regularly observed.

Effects on Soil and Ecosystems:

- **Increase in Organic Matter:** Cover crops increase productivity by adding more organic matter to the soil.
- **Biological Control of Pests:** Reduces the need for chemical control by supporting natural enemies.
- **Improvement in Soil Quality:** Plants aerate the soil and prevent erosion with their roots.

Intercropping and Green Manure Methods

Intercropping

Intercropping with crops planted alongside the main crop or before harvest is an effective method for improving soil health and increasing yield.

Objectives:

- **Soil Protection:** Covers the soil surface to prevent erosion and increase organic matter content in the soil.
- **Improved Water Use:** Improves water infiltration into the soil and reduces evaporation.
- **Ecosystem Diversity:** Different plants increase biodiversity and create natural barriers against pests.

Plant Selection:

- **For the summer season:** Drought-tolerant plants (e.g., beans, chickpeas) can be planted.
- **For the winter season:** Cold-tolerant green manure crops (e.g., legumes, oilseeds) can be preferred.
- **Optimal Planting Time:** Crops that develop quickly should be chosen so that their growth period does not overlap with the main crop's growth period.

Green Manure

This method involves planting certain plants and then mixing them into the soil after they have grown. The aim is to enrich the soil with nutrients and organic matter.

Objectives:

- **Increase in Organic Matter:** Plants added through green manure increase organic matter when mixed into the soil, thereby improving soil fertility.
- **Nitrogen Fixation:** Green manure plants such as legumes take nitrogen from the atmosphere and add it to the soil. This improves soil nutrient balance and reduces the need for fertiliser.
- **Erosion Prevention:** Green manure plants cover the soil surface, preventing wind and water erosion.
- **Pest Control:** Some green manure plants inhibit the development of harmful organisms, providing biological control.

Suitable Plants:

Legumes: Plants such as vetch, beans and clover provide nitrogen and contribute to soil nutrient balance.

Grains: Plants such as sweet corn and wheat improve soil structure.

Other types: Plants such as oats and mustard grow quickly and contribute to the soil.

Planting and Mixing Time

Planting: Usually carried out after the autumn harvest.

Mixing into the soil: Should be done before flowering or seed formation begins so that nutrients can be absorbed by the soil in the most efficient way.

Soil Health and Its Effects and Advantages on Ecosystems

- Intercropping and green manuring methods increase the organic matter in the soil, thereby improving its water retention capacity.
- Plants covering the soil surface reduce evaporation, providing significant advantages, especially in regions with limited water availability.
- Carbohydrates and nutrients released into the soil through plants support the development of microorganisms.
- Increased biodiversity promotes the production of natural antibiotics, making plants more resistant to diseases.
- Healthy soil and resilient plants reduce the need for chemical pesticides, providing cost advantages to farmers.
- Soil with high water retention capacity maintains productivity even during dry periods.
- Nitrogen-fixing plants reduce the need for fertilisers, providing both economic and environmental benefits to farmers.

3. CROP ROTATION

Crop rotation is the practice of growing different crops in the same field over time, and it is one of the cornerstones of sustainable agriculture. This method both preserves soil health and increases productivity. An effective rotation plan should take into account both soil structure and ecosystem balance.

Objectives of Rotation:

Soil Structure Improvement

- The root structures of plants vary; some grow deep, while others remain near the surface. This diversity facilitates soil aeration and loosening.
- Deep-rooted plants work the lower layers, while surface roots aerate the upper layers.
- This diversity increases organic matter accumulation and contributes to the soil gaining a sponge-like structure.

Prevention of Soil Compaction

- Planting the same crop continuously and using mechanised farming can cause soil compaction.
- Crop rotation reduces this pressure and preserves the natural structure of the soil.

Balancing Nutrients

- Different plants have different nutritional needs. For example, legumes bind nitrogen from the air and add it to the soil.
- Through rotation, some plants consume nutrients while others contribute to the soil. This balance can reduce the need for external fertilisers.

Prevention of Erosion

- A single type of vegetation can leave some areas of soil vulnerable.
- Different plants increase root density and improve soil retention, thereby reducing wind and water erosion.

Pest Control, Disease Control and Weed Control

- Continuous cultivation of the same plant leads to an increase in certain pests and diseases.
- Changing plant species interrupts the life cycle of pests.
- Some plants produce natural compounds that suppress the growth of weeds (allelopathy effect).

Improving Water Management

- Different plants use water in different ways.
- This diversity helps balance moisture in the soil and reduces the risk of drought.
- Deep roots reach groundwater, while surface roots benefit from rainfall

Increasing Biodiversity

- Monoculture production (single-crop farming) reduces diversity in the ecosystem. Rotation allows different species to thrive.
- Rotation enriches the habitats of soil organisms (earthworms, beneficial microorganisms), thereby strengthening the ecosystem.

Rotation Application Methods:

- **Appropriate Plant Selection:** Plants to be included in the rotation should be suitable for the soil characteristics and climate. Legumes, cereals, and root crops can be grown in rotation together.
- **Timing (Period):** The same crop should not be planted every year but rather every few years. This prevents soil exhaustion.
- **Intercropping:** Intercrops planted between main crops should be selected from plants that support soil health (e.g., plants that cover the soil surface).

Supporting Biodiversity:

When different plant species are included in the rotation plan, biological diversity increases both in the soil and in the agricultural area. This diversity contributes to the formation of natural defence mechanisms against pests and makes the ecosystem more resilient.

Scheduling and Tracking:

For rotation to be effective, planting and harvesting times should be well planned and arranged so that they do not interfere with each other. In addition, soil analyses should be carried out after each rotation cycle to monitor the effect of the system and make adjustments if necessary.

4. REDUCTION IN THE USE OF SYNTHETIC FERTILISERS

Fertilisation is one of the basic agricultural methods used to ensure healthy plant growth and maintain the balance of nutrients in the soil. This section will detail natural fertilisation techniques, types of organic fertilisers, reducing the use of chemical fertilisers, and the transition process to natural fertilisation.

1.Organic Matter-Based Fertilisation Methods

1.1 Compost: A rich natural fertiliser obtained through the fermentation of plant and animal waste. It increases the organic matter content of the soil, improves water retention capacity, and supports microbial diversity.

1.2 Worm Castings (Vermicompost): Obtained from organic waste broken down by worms. Increases soil microorganisms and accelerates nutrient uptake. Provides long-term nutrients.

1.3 Farm Manure (Barn Manure): Obtained from animal droppings, it contains organic matter and microorganisms. Its use is recommended after fermentation.

1.4 Bokashi Fertiliser: A Japanese-origin fertiliser obtained through anaerobic fermentation. It revitalises soil biology.

2. Plant-Based Fertilisation Methods

2.1 Green Manure: Fertilisation using plants such as legumes. Adds nitrogen to the soil and increases organic matter.

2.2 Cover Crops: Supports the nitrogen cycle through plants that cover the soil. Provides erosion control and soil protection.

2.3 Fermented Plant Extracts: Liquid fertilisers are prepared from plants such as nettles. They enhance plant health.

3. Microbial Fertilisation Methods

3.1 Microbial Fertilisers (Biological Fertilisers): These are bacteria and fungi that improve the nutrient cycle in the soil. They increase the availability of plant nutrients.
Examples: Rhizobium, Azotobacter, Mycorrhizal fungi

4. Natural Fertilisation Methods Using Minerals

4.1 Rock Flour (Mineral Fertilisers): Obtained by grinding rocks such as basalt and granite. Provides mineral supplementation.

4.2 Biochar: Formed by the controlled burning of organic waste. Increases water retention capacity and microbial activity.

5. Liquid Fertilisation Methods

5.1 Compost Tea: Obtained by soaking compost in water. Applied by spraying onto plants and soil.

6. Certified Organic Fertilisers

6.1 Certified Organic Fertilisers: These are environmentally friendly fertilisers that comply with organic farming standards. They do not contain synthetic substances and support sustainable farming. They improve soil health and product quality.

Synthetic Fertiliser Reduction and Transition to Natural Fertilisation Plan

Reducing the use of synthetic fertilisers and transitioning to natural fertilisation methods is an important step towards environmental sustainability. However, this transition must be carefully planned.

Operators should plan the transition to natural fertilisation methods in stages. In the first phase, reducing the use of synthetic fertilisers by a certain percentage and increasing the proportion of natural fertilisers will be the most efficient approach.

During the transition process, the current nutrient status of the soil should be continuously monitored and analysed. These analyses help determine which nutrients are deficient and which natural fertilisers will be most effective.

i. Use of Natural Fertilisation Methods

a. Organic Matter-Based Fertilisation Methods

Compost: Obtained through the natural decomposition (fermentation) process of plant and animal waste. It increases the organic matter content of the soil, improves water retention capacity, and promotes the growth of beneficial microorganisms.

Worm Castings (Vermicompost): Formed by the processing of organic waste by worms. Provides plants with a long-lasting, balanced source of nutrients. The solid form can be mixed directly into the soil, while the liquid form can be sprayed onto leaves or soil.

Farm Manure: Consists of the excrement of large and small livestock and poultry. It must be properly fermented and matured before use. It enriches the soil with both organic matter and beneficial microorganisms.

Bokashi Fertiliser: A Japanese-origin organic fertiliser produced through anaerobic (oxygen-free) fermentation. It quickly revitalises the soil and increases microbial diversity. Available in both solid and liquid forms.

B. PLANT-BASED FERTILISATION METHODS

Green Manure: A method that uses legume species with nitrogen-fixing properties. These plants are grown and then incorporated into the soil without being cut. This provides the soil with both organic matter and nitrogen.

Cover Crops: These are plants grown in addition to the main crop to cover the soil. They prevent nutrients from leaching out of the soil, improve soil structure, and provide natural nitrogen.

Fermented Plant Extracts: Plants such as nettle and horsetail are fermented and converted into liquid fertiliser. These extracts enhance nutrient uptake in plants while also strengthening their resistance to diseases. They can be applied with irrigation water or sprayed onto leaves.

C. MICROBIAL FERTILISATION METHODS

Microbial Fertilisers (Biological Fertilisers): These are types of fertilisers that contain mycorrhizal fungi and nitrogen-fixing bacteria (e.g. Rhizobium, Azotobacter) that form a symbiotic relationship with plant roots. These organisms help plants to absorb nitrogen and phosphorus from the soil more efficiently. They can be applied to seeds before planting or directly to the soil.

D. NATURAL MINERAL FERTILISATION METHODS

Rock Dust (Rock Flour): Obtained by grinding basalt, granite or other volcanic rocks, this material is used to remedy mineral deficiencies in the soil. It is particularly effective in supplementing minerals such as magnesium, potassium and phosphorus. It is usually applied by sprinkling it on the soil surface.

Biochar: Obtained by burning organic materials in an oxygen-free environment. It increases the water retention capacity of the soil, supports microbial activity and helps nutrients remain in the soil for longer periods of time.

E. LIQUID FERTILISATION METHODS

Compost Tea: A liquid fertiliser obtained by fermenting compost in water. It enables plants to quickly absorb nutrients and supports the growth of beneficial microorganisms in the soil. It can be integrated into irrigation systems or applied directly to leaves by spraying.

F. ORGANIC CERTIFIED FERTILISERS

Produced in accordance with organic farming standards. Contains no synthetic chemicals and is prepared using environmentally friendly production methods. Certification ensures that natural fertilisation is carried out in a controlled and reliable manner.

Reducing the Use of Synthetic Fertilisers:

Gradually reducing the use of synthetic fertilisers will help meet plants' nutritional needs through natural fertilisers. This transition may take several years, so patience and care are essential.

In addition to organic fertilisers, changes can be made to plant nutrition methods. For example, plants' needs can be met using biological fertilisers, microorganisms, and natural nutrient sources.

Monitoring and Evaluation of Results:

During the transition to natural fertilisation methods, soil health and productivity must be continuously monitored and measured. Factors such as soil nutrient content, pH level and organic matter content should be observed, and necessary adjustments made.

The impact of fertilisation management changes on productivity and costs should also be monitored. This data helps operators and farmers better determine future fertilisation strategies.

5. REDUCTION IN THE USE OF SYNTHETIC PESTICIDES

The controlled use of pesticides is of great importance in supporting sustainability in agriculture and minimising negative impacts on the environment. The Integrated Pest Management (IPM) approach prioritises natural and biological control methods while reducing the use of chemical pesticides to the lowest possible level. Below are the main topics related to pesticide management and the strategies that can be implemented.

A. INTEGRATED PEST MANAGEMENT (IPM) PLAN

Integrated Pest Management (IPM) is an environmentally sensitive, economical and effective approach to pest control. This system involves the balanced use of biological, physical, cultural and chemical methods to control pests. The main objective of IPM is to support sustainable agriculture by minimising the use of chemical pesticides.

Key Steps of the EZY Plan:

Identification of Pests: The first stage of EZY involves the accurate identification of pests in the field or greenhouse. The biological characteristics, life cycles and damage potential of pests must be assessed.

Pest Monitoring and Observation: The presence, density, and activity of pests should be regularly monitored. Traps, visual observations, and field tests can be used for this purpose. These monitoring activities determine the timing of measures to be taken against pests.

Use of Natural Enemies: Using natural enemies (predatory insects, parasitoids, pathogens) against pests can reduce pesticide use. This strategy increases biodiversity and maintains balance in the ecosystem.

Cultural Methods: Pests can be controlled by changing planting methods, using resistant plant varieties, or altering soil management practices. These methods control pests by altering their habitats.

Chemical Control: EZY uses chemical control only when necessary and at the minimum level required to control pests. Chemical control is typically applied in a targeted and controlled manner when other methods are ineffective.

Protective and Preventive Measures: Preventive measures such as healthy agricultural practices, soil health management, and proper irrigation techniques should be implemented to prevent the spread of pests.

B. PUBLISHED LISTS OF INTERNATIONALLY BANNED PESTICIDES

Many countries and international organisations recommend banning certain pesticides used in agriculture because they are harmful to the environment and human health. These lists specify which pesticides are banned or restricted.

International Pesticide Bans:

• **Stockholm Convention:** This convention regulates persistent organic pollutants (POPs) and has led to the ban or restriction of many pesticides worldwide. It emphasises that pesticides used in agriculture must not harm human health or the environment.

• **Rotterdam Convention:** This convention is implemented to regulate the international trade of chemical substances and restrict the export of hazardous substances. It ensures that agricultural pesticides are kept under control.

• **EU REACH Regulation:** The European Union limits the use of chemical substances harmful to the environment and human health under the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) regulation. This regulation prohibits the use of banned pesticides and requires a risk assessment for each pesticide.

• **FAO and WHO Recommendations:** The Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO) promote the safe use of pesticides and recommend regulations for the prohibition of harmful chemicals.

Lists of banned or restricted pesticides are updated and published by organic certification bodies that follow international agricultural standards and local regulations. Operators seeking to transition to organic farming practices should follow these lists to avoid using unsuitable products.

C. SYNTHETIC PESTICIDE REDUCTION PLAN

Reducing the use of synthetic pesticides is an important goal for sustainable agriculture practices. This plan aims to minimise the negative effects of pesticides on the environment and protect human health.

Synthetic Pesticide Reduction Strategies:

Use of Alternative Products: Instead of synthetic pesticides, alternative products such as biological control agents (parasitoids, predators, fungi), plant-based pesticides, or physical barriers can be used. These products reduce the chemical impact in pest control.

Monitoring and Timing: Monitoring should be carried out to effectively control pests, and pesticide applications should only be made when pest populations are high. This prevents unnecessary pesticide use.

Pesticide Application Technologies: Pestisit uygulama teknolojilerinin iyileştirilmesi, hedefe yönelik ve daha az pestisit kullanımı sağlar. Yüksek verimli püskürtme sistemleri ve hassas tarım teknolojileri, pestisit kullanımını azaltmada etkili olabilir.

Education and Awareness: Farmers should be educated on the importance of reducing pesticide use and directed towards environmentally friendly alternatives. Additionally, the effective implementation of strategies such as IPM should be ensured.

Purchase and Registration of Synthetic Pesticides:

Recording and monitoring pesticide purchases ensures that pesticides are used correctly and regularly. Points to consider during the purchasing, storage and use process are as follows:

Pesticide Purchase Records: All pesticide purchases must be recorded, including the date of purchase, quantity, operator company, and type of product used. These records are useful for monitoring pesticide usage and preventing unnecessary use.

Pesticide Use Records: The timing, areas, and rates of pesticide application must be regularly recorded. These records ensure that pesticides are used effectively and prevent unnecessary use.

Pesticide Stock Records: The quantity of stored pesticides, their expiry dates, and storage conditions must also be recorded. These records ensure that old or excess stock is used in a timely manner.

D. PESTICIDE STORAGE CONDITIONS

The safe storage of pesticides is extremely important for both the environment and human health. Proper storage conditions preserve the effectiveness of pesticides and prevent hazards such as accidental spills or leaks.

Storage Conditions:

Cool, Dry, and Well-Ventilated Areas: Pesticides should be stored in cool, dry, and well-ventilated areas, protected from direct sunlight, moisture, and extreme temperatures.

Non-Reactive Surfaces: Pesticides should be placed on suitable floors and shelves to prevent interaction with flammable, explosive, or toxic substances. Avoid plastic or absorbent surfaces.

Labelling and Avoidance of Interaction: The storage area should be organised, and all pesticide labels should be clearly visible. In addition, each type of pesticide should be stored separately on a different shelf or in a separate area to prevent mixing.

Emergency Measures: Emergency equipment (absorbent materials, protective gloves, and masks) should be kept in storage areas in case of spills or leaks. Furthermore, the storage area should be a safe zone where pesticides are kept away from children and pets, who may be at risk.

6. IRRIGATION MANAGEMENT

Water management is critical for increasing agricultural productivity, minimising environmental impacts, and ensuring sustainable agricultural practices. In particular, irrigation water quality has a direct impact on plant health and productivity. Below is information on irrigation water quality and recommendations for sustainable water management.

Water Management Strategies

Effective water management ensures the efficient use of water resources and the protection of soil health. Water management strategies should aim to optimise irrigation water quality and promote efficient water use.

Water Efficiency: Irrigation water efficiency should be implemented to ensure that plants receive exactly the water they need and to prevent excessive water consumption. To this end, drip irrigation, underground irrigation and other irrigation techniques that ensure efficient water use may be preferred.

Watering Schedule: Watering should be done when plants need it. Watering early in the morning or in the evening prevents water evaporation and reduces water loss.

Monitoring and Management of Water Resources

a. **Measurement and recording of water quantity:** The amount of water used should be measured and recorded regularly in irrigation systems.

b. Use of smart irrigation systems: Smart irrigation methods should be adapted to fully meet the water needs of plants. These systems optimise irrigation duration and quantity through sensors and software to ensure efficient water use.

c. Monitoring of irrigation source use and proof of payment: Water use from irrigation sources should be monitored and recorded, especially when water is obtained commercially. If payment is required for water use from irrigation sources, documentation and proof of payment should be provided.

Rainwater Harvesting: Collecting and storing rainwater can reduce dependence on water sources by meeting part of the irrigation needs. Rainwater harvesting systems can be used as a low-cost and environmentally friendly alternative.

Waste Reduction and Recycling:

a. Composting Organic Waste: Agricultural waste can be composted and returned to the soil. This method can increase the nutrient value of the soil.

b. Plastic Waste and Alternatives: The use of biodegradable materials can be encouraged to reduce the amount of plastic used in agriculture.

Training and Awareness: Operators and agricultural workers should be educated on irrigation water management and informed about proper water use techniques.

7. SOIL AND WATER CONSERVATION MEASURES

Soil and water resources are among the most important components of sustainable agriculture. The protection of these resources is of great importance for the continuation of ecosystem health, increased productivity, and the achievement of environmental sustainability. Issues such as soil erosion, water loss, and water pollution can negatively impact the long-term productivity of agriculture. Therefore, taking measures to protect soil and water helps minimise environmental impacts in agriculture.

Below, you can find the general structure of a plan that defines and monitors soil and water conservation measures:

A. SOIL AND WATER CONSERVATION PLAN

A soil and water conservation plan includes strategies for protecting soil health and using water resources efficiently based on the current conditions and resource use of the agricultural enterprise. This plan includes elements such as preventing soil erosion, ensuring efficient use of water, and preventing pollution.

Soil Conservation Measures:

Preventing soil erosion is a critical step towards sustainable agriculture. Various measures can be taken to prevent soil loss and yield losses. In areas with high erosion risk, soil loss must be regularly monitored and mapped. In erosion-prone areas, appropriate protection methods can be applied to reduce this risk. Additionally, methods such as cover crops, intercropping, and mulching, which prevent erosion by covering the soil surface, can be effectively used. These methods play an important role in reducing erosion caused by wind and water.

On sloping terrain, horizontal water collection systems that ensure water is distributed evenly are recommended. Structures such as terracing or water walls prevent soil erosion and protect the soil.

Improving soil structure is also an important factor in preventing erosion. Increasing the organic matter content of the soil improves its water retention capacity and soil structure. Materials such as compost, organic fertilisers and green manure can be used for this purpose. Additionally, avoiding unnecessary interventions during soil preparation helps preserve the soil's natural structure. Reduced soil preparation methods allow the soil to retain water more effectively and reduce the risk of erosion.

Strengthening root systems in the soil contributes to the prevention of erosion. By using plants that form deep roots, the soil can be better aerated and its water retention capacity increases. This preserves soil fertility and reduces the risk of erosion.

Water Conservation Measures:

The conservation of water resources is extremely important for ensuring sustainability in agriculture. Various irrigation methods need to be improved in order to save water and increase its efficient use. Low-pressure systems such as drip irrigation minimise water loss by delivering water directly to the roots. This method ensures that water is used in the most efficient way possible. Additionally, installing rainwater harvesting systems allows natural rainfall to be used for irrigation, thereby protecting water resources and reducing operational costs. Irrigation timing is also a key factor in improving water efficiency. Irrigation schedules should be determined based on the water needs of plants, and soil moisture levels should be monitored to avoid over-irrigation.

Increasing the water retention capacity of the soil is another important step in water conservation. Soil mulching prevents water evaporation, allowing the soil to retain water for longer periods of time. It also maintains the soil's temperature balance and helps prevent erosion. Green manuring methods, particularly with plants that use nitrogen-fixing legumes, improve soil structure and increase the soil's water retention capacity. Increasing soil porosity can enhance water absorption. Adding organic matter and using appropriate soil preparation methods strengthen the soil's water retention capacity.

To prevent water pollution, the use of chemical fertilisers and pesticides must be restricted. These chemicals contaminate water sources and negatively impact the ecosystem when they mix with water. Using organic fertilisers and biological control methods can prevent this problem. Additionally, using biological filters and vegetation in areas that direct water flow helps clean the water. Plants absorb harmful chemicals in the water, contributing to its purification.

All these measures play a critical role in protecting water resources and increasing water efficiency in agricultural production.

B. MONITORING OF THE SOIL AND WATER CONSERVATION PLAN

The effectiveness of the soil and water conservation plan is ensured through continuous monitoring and evaluation processes. To monitor the success of the plan, operators must track progress using various methods. This monitoring process covers a wide range of areas, from soil health to the efficient use of water resources.

Firstly, monitoring soil health is of great importance. Periodic soil analyses should be conducted to regularly monitor the soil's organic matter content, pH value, nutrient levels, and water-holding capacity. These analyses help determine the soil's health and productivity. Additionally, monitoring areas at risk of erosion is a critical factor. Depending on local weather conditions and soil structure, areas at risk of erosion should be continuously monitored.

Water resource monitoring is also an important part of the plan. Irrigation water quantities and irrigation efficiency should be regularly observed and monitored. This process enables the development of strategies for water conservation. The effectiveness of rainwater harvesting systems should also be monitored. The efficiency of these systems should be continuously reviewed by assessing how much of the collected water is sufficient for irrigation.

Reviewing conservation practices is also important for the success of the plan. The effects of soil and water conservation measures should be evaluated at regular intervals. This evaluation helps to understand how effective the practices are. In addition, farmers and operators should provide feedback based on their observations, and conservation measures should be improved in line with this feedback.

This monitoring and evaluation process ensures continuous improvements in the protection of soil and water resources and supports agricultural sustainability.

8. PLAN FOR INCREASING AND PROTECTING BIODIVERSITY

Biodiversity is of great importance for the healthy functioning of ecosystems and the protection of human quality of life. Increasing biodiversity in agriculture is essential for protecting natural resources and sustainably improving agricultural productivity. Increased biodiversity improves soil health, facilitates pest control, and enhances ecosystem resilience. Below is a plan for increasing biodiversity in agriculture.

A. GENERAL PRINCIPLES FOR INCREASING BIODIVERSITY

Supporting Ecosystem Diversity: The protection and promotion of different ecosystems in agricultural areas is essential for increasing biodiversity. This may include natural habitats such as forests, meadows, wetlands, and corridors.

Avoiding Monoculture: Growing a single crop (monoculture) in agriculture can reduce biodiversity and disrupt ecosystem balance. Farmers should prefer diversified production systems instead of monoculture.

Use of Local Species: Local plant species and animal varieties are more compatible with the ecosystem and contribute to the conservation of biodiversity. Farmers can enhance ecosystem resilience by prioritising local species.

Natural Pest Control: Excessive use of pesticides can negatively impact biodiversity. Instead, biological control methods, such as supporting natural predators and beneficial insects, should be prioritised.

B. PRACTICES TO INCREASE BIODIVERSITY

1.Various Crop Rotations and Polyculture

Planting different crops instead of monoculture is an effective way to increase biodiversity in agricultural areas. Farmers can improve soil health and promote biodiversity through methods such as crop rotation and polyculture.

Product Rotation: Planting different products each year prevents pests and diseases that are specific to a single plant species from spreading in the soil.

Polyculture Practices: Growing different species together at the same time controls pests in the ecosystem through natural means and increases biodiversity in the soil.

2. Cover Crops and Intercropping

Cover crops and intercropping are important practices that promote biodiversity by maintaining soil health. These crops prevent soil erosion, provide natural fertiliser and support ecosystem diversity.

Cover Crops: Farmers can use cover crops during winter months to prevent soil loss and increase biodiversity.

Intercropping: Low-growing plants added between main crops improve soil health and increase diversity in the ecosystem.

3. Protection and Restoration of Natural Habitats

In agricultural areas, the protection of natural habitats (forests, wetlands, scrublands, etc.) and the creation of new habitats are of great importance for increasing biodiversity. These areas provide vital habitats for beneficial insects, birds and other wild animals.

Corridors: Corridors connected to natural vegetation that supports biodiversity should be established between agricultural areas. These corridors increase inter-ecosystem diversity and allow natural species to interact with each other.

4. Natural Pest Control

Reducing the use of chemical pesticides in agriculture and preferring natural methods to control pests supports biodiversity. Beneficial insects, useful microorganisms and birds help maintain ecosystem balance by controlling pest populations.

Biological Control Methods: By using natural enemies of harmful insects, such as ladybugs or parasitic insects, the use of pesticides is reduced, and this method increases ecosystem diversity.

5. Fertilisation Management

The use of natural fertilisers improves soil health and increases soil biodiversity. Excessive use of chemical fertilisers can harm organisms in the soil. Therefore, it is important to prefer the natural fertilisation methods recommended in the section on Reducing Synthetic Fertilisers.

6. Water Resources and Irrigation Management

The protection of water ecosystems plays an important role in increasing biodiversity. In agricultural areas, the efficient use of water resources and the protection of natural water systems are of great importance.

Irrigation Techniques: To make water use more efficient, effective methods such as drip irrigation or subsurface irrigation should be preferred. These methods ensure more efficient water use and prevent damage to water ecosystems.

C. MONITORING AND EVALUATION FOR BIODIVERSITY ENHANCEMENT

Practices aimed at increasing biodiversity require continuous monitoring and evaluation. Farmers can follow several important steps to monitor and improve biodiversity. First, specific indicators should be established to monitor biological diversity in agricultural areas. These indicators may include the diversity of plant and animal species, the presence of microorganisms, and soil health.

In addition, regular monitoring is also very important. Farmers can monitor changes in biodiversity by observing plant cover, animal populations, and soil health at regular intervals. Furthermore, analysing soil and water quality is also necessary for monitoring biodiversity. These analyses help make more informed decisions by evaluating the effects of fertilisers, water management, and other agricultural practices on biodiversity.

9. GREENHOUSE GAS EMISSION REDUCTION PLAN

Reducing greenhouse gas emissions is a critical step in combating global climate change. Although the agricultural sector is a significant source of greenhouse gas emissions, these emissions can be reduced through proper management and practices. Therefore, preparing a greenhouse gas emission reduction plan with a verification process encourages sustainable agricultural practices and contributes to reducing environmental impacts.

Below is a proposed plan for reducing greenhouse gas emissions:

A. PURPOSE AND SCOPE OF THE EMISSION REDUCTION PLAN

The purpose of the Emission Reduction Plan is to minimise environmental impacts by reducing greenhouse gas emissions from agricultural activities and to contribute to the fight against climate change.

This plan should include concrete steps to monitor, assess and reduce greenhouse gas emissions. In terms of scope, the emission reduction plan should be designed to cover all activities of the agricultural enterprise and include a detailed assessment of the impact of each agricultural activity, such as soil cultivation, fertilisation, irrigation, livestock farming and other agricultural activities, on greenhouse gas emissions.

B. EMISSION REDUCTION METHODS AND STRATEGIES

1.Soil Management and Soil Health

Reduced Soil Tillage:

Reducing soil tillage increases carbon sequestration in the soil, thereby reducing CO_2 emissions. By implementing reduced soil tillage methods (no-till, strip-till), soil surface degradation and carbon dioxide emissions can be prevented.

Use of Organic Matter:

By increasing the amount of organic matter, it is possible to improve the soil's carbon sequestration capacity. Compost, green manures, and organic fertilisers improve soil health and prevent the release of greenhouse gases.

2. Fertilisation Management

Reducing Synthetic Fertilisers:

Nitrogen fertilisers can lead to nitrous oxide (N_2O) emissions. Therefore, reducing the use of synthetic fertilisers is an important step in lowering emissions. The use of organic fertilisers, compost and biological fertilisers should be encouraged.

Targeted Fertilisation:

Fertilisation should be carried out at the right time and in the right amount. For this purpose, fertilisation should be carried out in accordance with the nutritional needs of the soil and plants, and excessive fertilisation should be prevented. This practice prevents the release of excess nitrogen into the atmosphere.

3. Irrigation Methods

Efficient Irrigation Systems:

Irrigation can increase methane (CH_4) and nitrous oxide (N_2O) emissions. Therefore, the use of efficient irrigation systems such as drip irrigation or subsurface irrigation ensures more efficient use of water and reduces emissions.

Water Pollution Control:

The mixing of irrigation water and fertilisers can increase greenhouse gas emissions. Therefore, proper water management and the protection of water sources are essential for reducing greenhouse gas emissions.

4. Livestock Farming and Methane Reduction

Better Feeding Methods:

To reduce methane emissions in livestock farming, the feeding regimen of animals should be optimised. High-quality feed and feeding methods can reduce methane production.

Methane Emission Control Systems:

Animals produce methane gas, particularly during digestion. To reduce these emissions, biological capture systems or technologies that limit methane emissions can be used.

5. Energy Efficiency and Renewable Energy Use

Renewable Energy Sources:

Reducing the use of fossil fuels in agriculture and utilizing renewable energy sources (solar energy, wind energy) can reduce greenhouse gas emissions. The use of renewable energy systems significantly reduces the carbon footprint of energy consumption.

Energy Efficiency Practices:

Ensuring energy efficiency in agricultural production processes helps reduce greenhouse gas emissions. Equipment and machinery that consume less energy should be used, and energy-saving technologies should be preferred.

6. APPLICATIONS THAT INCREASE BIODIVERSITY

Cover Crops and Intercropping:

Cover crops and intercropping, which protect the soil from erosion and sequester carbon, can reduce greenhouse gas emissions. These crops increase the soil's carbon sequestration capacity, thereby reducing the amount of carbon in the atmosphere.

Protection of Natural Habitats:

By increasing biodiversity in agricultural areas, it is possible to protect ecosystem health and carbon balance. Protecting natural vegetation increases carbon absorption and prevents the release of greenhouse gases.

C. MONITORING AND EVALUATION FOR THE EMISSION REDUCTION PLANE

Following the implementation of the emission reduction plan, monitoring greenhouse gas emissions is of great importance. This monitoring is necessary to assess how close the targets are being met and to take additional measures if necessary. Farmers should use appropriate monitoring tools and methods to monitor greenhouse gas emissions.

Additionally, regular data collection and reporting should be conducted to determine the effectiveness of the plan. In this context, carbon emissions data, types of fertilisers used, irrigation quantities, energy consumption, and livestock activity data should be recorded on a regular basis. At the end of the year, the success of the emission reduction plan should be evaluated, future targets should be set, and more effective strategies should be developed.

D. IMPLEMENTATION AND SUSTAINABILITY OF THE GREENHOUSE GAS EMISSION REDUCTION PLAN

For a greenhouse gas emission reduction plan to be sustainable, farmers must adopt it as a long-term strategy. Conscious steps should be taken to reduce greenhouse gas emissions at every stage of agricultural production. At the same time, care should be taken to ensure that these plans are environmentally, socially, and economically sustainable. The participation of all stakeholders, as well as education and awareness-raising efforts, are also important for the plan to be effective.

10. CARBON FOOTPRINT MONITORING AND REPORTING

A carbon footprint refers to the total amount of greenhouse gas emissions released into the atmosphere by an organisation, event or product. Tracking and reporting a carbon footprint is a critical step in understanding an organisation's environmental impact and reducing it.

This process involves tracking, assessing, and developing strategies to reduce greenhouse gas emissions. Monitoring and reporting carbon footprints in the agricultural sector can help develop sustainable farming practices and minimise environmental impacts. Such reporting is essential for measuring, tracking, and creating more efficient farming practices.

A. CARBON FOOTPRİNT MONİTORİNG PROCESS

1. Data Collection:

Data collection is a fundamental step in creating a carbon footprint report. Agricultural businesses must gather information from various data sources in order to measure greenhouse gas emissions. This data includes energy consumption (fossil fuels, such as diesel and petrol, and renewable energy sources, such as solar and wind), fossil fuel use (vehicles, tractors, and other machinery), agricultural practices (emissions from fertilisation, irrigation, soil cultivation, and biological control methods), livestock farming (methane emissions from animals, feed production, animal care, and other activities), and waste management (emissions from the processing and disposal of agricultural waste).

2. Calcultion of Greenhouse Gas Emissions

After data collection, greenhouse gas emissions must be calculated. This calculation typically includes carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) emissions. For emission calculations, internationally recognised standards and protocols are used. Among these, the GHG Protocol (Greenhouse Gas Protocol) is widely used to provide emission calculations for companies and organisations. Additionally, ISO 14064 ensures the accuracy and consistency of greenhouse gas emissions and provides an important reference for emission calculations. Another source is the IPCC (Intergovernmental Panel on Climate Change), which serves as a reference for measuring agricultural emissions.

3. Carbon Footprint Calculation Methods:

The most common methods used in carbon footprint calculations are as follows: Direct emissions include emissions that arise directly from agricultural activities, such as fossil fuel use or methane emissions from livestock farming. Indirect emissions are emissions resulting from the energy, electricity, heating, and cooling systems used by the agricultural operation. Other indirect emissions refer to emissions resulting from transportation, logistics, and material use within the product supply chain. To calculate emissions, specific emission factors are used for each activity type; these factors vary depending on the type of fuel used, agricultural techniques, and animal species.

B. Carbon Footprint Report

A carbon footprint report is a summary of all greenhouse gas emissions generated by a business's activities. This report helps the organisation understand its environmental impact, set targets and achieve its sustainability goals.

A carbon footprint report should include the following elements:

• The purpose and scope of the report should be defined, and the monitoring period (annual, quarterly, etc.) and the types of emissions reported (CO2, methane, etc.) should be specified. In addition, the activities for which emissions are calculated (agriculture, livestock farming, water management, energy consumption) should be indicated.

• All sources contributing to the carbon footprint of the agricultural enterprise should be listed in detail. These should include fuel consumption, electricity use, fertilisation, irrigation, livestock farming, etc.

• The methodology and calculation tools used for emission calculations should be clearly stated. This means that the emission factors and calculation methods should be included in the report.

• The total carbon footprint of the agricultural operation should be calculated and reported in CO2e (Carbon Dioxide Equivalent). It is important to specify this total emission amount as a net value on an annual basis or for a specific period.

• Current emission reduction strategies and improvements made (e.g., improving energy efficiency, reducing synthetic fertiliser use, livestock-related practices) should be reported. Short- and long-term emission reduction targets should be set, and plans for achieving these targets should be presented.

• The standards applied (ISO 14064, GHG Protocol, etc.) and certifications obtained (e.g., carbon neutral certification) should be included in the report.

• The sources of the data included in the report, their accuracy rates, and the transparency of the calculation methods used should be ensured.

• The tools and monitoring methodology used to track the carbon footprint should be explained. Additionally, information on the frequency of monitoring and evaluation processes should be provided.

• Emissions reduction strategies, the success levels of these strategies, and future plans (e.g., use of renewable energy, energy efficiency improvements, low-carbon farming methods) should be outlined in the report.

C. TOOLS AND SOFTWARE FOR CARBON FOOTPRINT TRACKING AND REPORTING

Various software and digital tools can be used to simplify carbon footprint calculations and improve accuracy. These tools help calculate and report the carbon footprint of agricultural activities:

1. **Ecowise:** Software that calculates greenhouse gas emissions based on the GHG Protocol.
2. **Carbon Trust Footprint Calculator:** An environmentally friendly software that provides carbon footprint calculation and reporting for agricultural businesses.
3. **Cool Farm Tool:** An environmentally friendly tool used to calculate the carbon footprint of agricultural activities.
4. **Farm Carbon Cutting Toolkit:** A tool that helps farmers develop emission calculation and reduction strategies.
5. **GHG Protocol Software:** Software used to calculate greenhouse gas emissions based on the GHG Protocol.

D. CARBON FOOTPRINT REPORTING AND LEGAL REQUIREMENTS

Agricultural businesses must prepare carbon footprint reports in accordance with local and international legal regulations. These reports are critical for farmers who wish to transparently demonstrate their environmentally friendly practices or obtain sustainability certifications. In particular, carbon footprint reporting may become a legal requirement in regional applications such as the European Union; therefore, regulations in the sector must be closely monitored.

11. PLAN FOR INCREASING RENEWABLE ENERGY MANAGEMENT AND USE

Renewable energy management is a sustainability strategy developed to plan, monitor and continuously increase the use of solar, wind, biogas and other renewable energy sources in agricultural production processes. This approach reduces farms' carbon footprint while also lowering energy costs and minimising environmental impacts.

A. ANALYSIS AND EVALUATION OF ENERGY CONSUMPTION

To analyse energy usage, all energy-consuming processes such as irrigation, heating, cooling, processing and lighting are identified, and the annual energy consumption of each process is examined.

The proportion of renewable sources in the total energy consumption of the farm is calculated to determine the potential for transition from conventional energy sources to renewable energy. Additionally, old and energy-intensive equipment, inefficient systems, and areas of unplanned energy consumption are identified, and opportunities for improvement in these areas are evaluated.

B. PLANNING AND DEVELOPMENT OF RENEWABLE ENERGY SOURCES

Various systems can be implemented within the scope of renewable energy use in agriculture.

Solar energy systems can be installed in suitable areas such as greenhouses, building roofs and field edges; they can be used for irrigation pumps, lighting and operating small machines. Wind energy can be used to provide support with low-power turbines in areas with high wind potential and can be combined with solar energy to create hybrid systems. Additionally, biogas production can be carried out using animal waste and plant residues, thereby providing energy, organic fertiliser production, and waste management. To ensure the efficient use of renewable energy, energy storage systems can also be established; for example, excess energy generated on sunny days can be stored in batteries for use at night or transferred to the grid in grid-connected farms.

C. ENERGY MANAGEMENT STRATEGIES

Smart systems and automation technologies can be widely used to increase energy efficiency in agriculture.

Irrigation systems can be automated using timers and moisture sensors to save water and energy. In greenhouse environments, ventilation and heating systems can be optimised according to need using temperature sensors. Energy production and consumption should be monitored on a daily or monthly basis, and the overall performance of the system should be evaluated based on this data. This allows energy efficiency scores to be created and specific targets to be set. Additionally, the use of energy-saving technologies is important; for example, LED lighting, low-energy consumption motors, and drip irrigation systems should be preferred. To prevent unnecessary energy consumption, automatic shut-off systems should be installed for unused devices.

D. STRATEGIC EXPANSION FOR INCREASED USAGE

The effectiveness of renewable energy use in agricultural activities can be increased by developing energy production capacity. To this end, additional units can be added to existing solar panel or wind turbine systems, or low-efficiency old systems can be replaced with higher-efficiency ones.

The widespread use of renewable energy is important not only for production but also for other stages of agricultural processing (such as product processing, cooling, and transportation). Additionally, farmers can collaborate with neighbouring agricultural businesses to establish shared solar energy or biogas systems; this approach enables cost-sharing and increases system capacity. Hybrid systems that combine solar and wind energy support the continuity of energy supply, while energy storage systems can effectively manage seasonal production-consumption imbalances.

E. FINANCIAL PLANNING AND USE OF INCENTIVES

When planning investments in renewable energy projects, it is important to prioritise applications that will provide a return on investment within 3 to 5 years. The systems to be established should be modular in structure and designed to be expandable over time according to needs.

In terms of financial support, in addition to incentives offered by national institutions such as the Agricultural and Rural Development Support Agency (TKDK), the IPARD programme, and the Ministry of Agriculture, grants and funds can also be obtained from international sources such as the World Bank and the European Union. Furthermore, implementing projects through cooperatives or producer associations can facilitate access to additional financial support.

F. TRAINING, DISSEMINATION AND SUSTAINABILITY CULTURE

Training programmes should be organised for farmers to promote the widespread use of renewable energy applications; these programmes should provide information on energy technologies, system maintenance and incentive applications. In addition, examples from local farms should be presented, and success stories and the economic and environmental benefits achieved should be shared; this will encourage new users through the transfer of experience.

The awareness that energy conservation translates into cost savings should be instilled to promote a culture of sustainability, and inclusivity should be enhanced through special support programmes targeting young farmers and women producers.

12. ANIMAL INTEGRATION MANAGEMENT

Animal integration management refers to the coordinated and harmonious conduct of plant and animal production activities. This management approach is of great importance in terms of enhancing ecosystem services, protecting soil health, supporting biodiversity, and promoting sustainable agricultural practices. In systems where agriculture and livestock farming are planned together, productivity increases while environmental impacts decrease. Proper management of grazing areas and appropriate integration of animals ensure that this process is efficient and sustainable.

Sustainable grazing practices aim to protect both environmental and animal health by ensuring that animals use grazing areas in a balanced manner. In this context, existing grazing areas are first assessed; animal density is determined by considering the size of the areas, soil structure, vegetation cover, water resources, and suitability for grazing. Rotational grazing, rather than continuous grazing in the same areas, contributes to the rest of pastures, the renewal of vegetation cover, and the protection of soil health. Grazing times and durations are regulated according to the growth cycles of plants to prevent overgrazing.

The number of animals is determined based on the carrying capacity of grazing areas to maintain ecosystem balance. At the same time, soil and plant health should be regularly monitored, and necessary measures should be taken against erosion risk. Grazing paths should be properly planned, and plant species that support biodiversity should be protected to prevent the growth of only one type of grass.

If existing grazing areas have suitable conditions and livestock are present on the farm, these animals should be integrated into production areas. For this integration process, criteria such as the soil structure and quality of pastures, the nutritional value of vegetation cover, sufficient and sustainable water sources, low erosion risk, and rich biological diversity must be met.

Integrating animals into the land provides numerous benefits. As a natural source of fertiliser, it increases the nutrient content of the soil and reduces the need for chemical fertilisers. Animal activities reduce the need for soil cultivation, while grazing also helps control erosion. At the same time, it supports biodiversity by contributing to the growth of various plant species. The rotational planning of agriculture and grazing allows land to rest, thereby enhancing both agricultural and environmental sustainability.

13. SUBCONTRACTORS

Subcontractors are third parties assigned by the main operator to carry out specific tasks in various production areas, primarily in the agricultural sector. The operator is directly responsible for the activities carried out by subcontractors, and effective management of this relationship is crucial for the successful implementation of sustainable agricultural practices.

The operator is responsible for regulating and monitoring the relationship with the subcontractor. In this context, monitoring and evaluation processes take centre stage. The activities carried out by the subcontractor must be monitored at regular intervals, and the compliance of these activities with the specified quality, environmental, and legal standards must be checked. This process can be carried out by the operator's own internal audit teams, and the results must be reported to the subcontractor. If necessary, corrective actions must be taken in line with these reports.

Monitoring the performance of subcontractors is also of particular importance. The operator should set performance targets based on criteria such as sustainability, occupational safety, product quality and efficiency, and request progress reports on these targets. This allows the success of the work carried out to be measured and intervention to be made where necessary. Additionally, the operator should provide continuous training support to subcontractors and keep them informed about new agricultural technologies, environmental regulations, and sustainability principles.

The contracts entered into with subcontractors form the foundation of the relationship.

These contracts should include;

- **The clear identities,** roles and responsibilities of the parties.
- **Working conditions,** job descriptions, delivery times, delays and tasks to be performed should be specified in detail.
- **The scope of** work should include the tools and equipment used, details of agricultural activities and compliance with environmental standards.
- **Quality and performance criteria** must be clearly defined, and the subcontractor must be obliged to comply with these standards.
- **Payment terms** must be clearly specified, including when and how much payment will be made. This plan can be structured according to specific stages of the work.
- **Environmental and sustainability obligations** must be included in the contract; attention must be paid to issues such as soil, water, and pesticide use.
- **The right to audit** must be included in a manner that defines the operator's authority to monitor and intervene in activities.
- **Penalties to be applied in case of violation** must be clearly defined with provisions such as fines or termination of the contract.
- **Insurance requirement** must provide the necessary coverage for potential accidents or damages.
- **Confidentiality clauses** must ensure the protection of commercial and technical information belonging to the agricultural business.

These provisions ensure the establishment of a reliable, sustainable, and legally compliant working relationship between the operator and the subcontractor. Such structured relationships enhance both the quality of work and support environmentally and socially responsible agricultural production processes. For the success of agricultural activities, these collaborations must be conducted in an open, transparent, and controlled manner.

14. PRODUCER GROUP REQUIREMENTS

A producer group is a community of operators who come together with common goals to engage in sustainable agricultural production. Such groups are particularly important in the agricultural sector in terms of promoting environmental responsibility and ensuring sustainability. For a producer group to function successfully, it must have certain structural characteristics, activity planning, environmental standards and regular monitoring mechanisms. Below, the fundamental elements related to the formation, activities, responsibilities, and operations of producer groups are explained.

A. FORMATION AND STRUCTURE OF THE PRODUCER GROUP

1. Producer group: A collective structure formed by farmers who have come together around a specific product or application and who share similar production principles. The group should be established in accordance with the local conditions and production methods of its members and should be based on common objectives.

2. Membership Criteria:

• Membership should be granted according to specific standards; priority should be given to producers who embrace the principle of sustainability and bear environmental responsibility.

• Prospective members are expected to demonstrate their commitment to complying with group standards and working in cooperation with other members.

3. Management Organisation:

• The group's managers should be democratically elected by members, and a fair structure should be established.

• Management should monitor production processes, find solutions to problems, and organise regular meetings to facilitate information sharing.

B. ACTIVITIES OF THE PRODUCER GROUP AND MONITORING PROCESS

1. Joint Activity Plan:

The group should develop an activity plan in line with common objectives and implement sustainable agricultural techniques within the scope of this plan.

The plan should cover the following production stages:

• Soil preparation

• Irrigation and water management

• Fertilisation

• Pesticide use

• Environmental impacts should be taken into account at all stages.

2. Monitoring and Evaluation:

• The producer group should monitor whether activities comply with environmental and efficiency criteria.

• Annual performance reports should be prepared, shared with members, and progress in implementation should be tracked through these reports.

C. SUSTAINABLE AGRICULTURAL PRACTICES AND ENVIRONMENTAL STANDARDS

1. Training and Information:

Group members should be educated on topics such as:

• Soil conservation,

• Efficient use of water resources,

• Increasing biodiversity,

• Reducing the use of natural fertilisers and pesticides. These educational programmes will raise environmental awareness and enable members to engage in more conscious production practices.

2. Environmental and Social Responsibility:

• Prevent soil erosion

• Reduce water wastage

• Adopt environmentally focused practices such as protecting natural habitats. In addition, the producer group is responsible for ensuring the occupational health and safety of farmers.

D. COOPERATION AND COMMON GOALS

1. Cooperation and Sharing:

Solidarity within the group and sharing information and resources are fundamental principles. Among members:

• Sharing best practices

• Transferring production experience

• Joint purchasing and marketing activities can be carried out.

2. Market Strategies:

• By developing joint marketing methods, products can reach wider markets.

• Standardising product quality increases the group's competitive strength in the market.

E. AUDIT AND CONTINUITY

1. External Audit:

Group should work with independent audit organisations to assess the compliance of its practices with sustainability standards.

2. Internal Audit:

Regular audits should be conducted within the group; each member's activities should be monitored and their compliance with group principles should be verified.

3. Certification:

• Group should have national and international certifications that document environmentally friendly farming practices.

• Certifications increase market confidence and ensure quality assurance.

F. COMMUNİCATİON AND INFORMATİON FLOW

1. Internal Communication:

• Group members should communicate regularly through meetings and digital platforms.

• Joint decision-making processes should be supported by open communication.

2. External Communication:

• The producer group should communicate with public institutions, consumers and other external stakeholders;

• It should develop public relations strategies by promoting its sustainable practices.

15. TRAINING AND INFORMATION SHARING

Training and knowledge sharing are of great importance for the successful implementation of sustainability and environmental responsibility in agriculture. Access to information and awareness of new methods and technologies among both producer groups and individual producers enable more efficient, environmentally friendly and economically sustainable agricultural practices.

In this context, education programmes and information sharing networks should be effectively structured, up-to-date information should be made available to farmers, and continuous development should be supported.

Training programmes provide farmers with information on sustainable agricultural methods. These programmes cover basic topics such as soil management, water use, biodiversity, fertilisation and pest control. Training on soil health covers topics such as protecting soil from erosion, increasing organic matter levels and appropriate processing techniques. Water management training aims to raise awareness about efficient water use, modern irrigation systems, and drought mitigation. Biodiversity enhancement training encourages the protection of natural life in agricultural areas. The importance of natural and organic practices is emphasised in training on fertiliser and pesticide use, with the goal of reducing chemical inputs.

Training can be delivered through various methods. Workshops and seminars offer practical learning opportunities in addition to theoretical knowledge. Field training allows farmers to gain experience in real-life situations. With the widespread use of the internet, online training and webinars have also become an important resource. These methods enable wider participation in training programmes. To enhance the effectiveness of training programmes, they should be delivered by expert trainers. Agricultural engineers, environmental specialists, professionals with experience in sustainable agriculture, and certification consultants play a crucial role in this process.

Information sharing and communication networks facilitate the dissemination of agricultural knowledge. Regular meetings should be held within producer groups, and members should share their experiences with each other. Individual farmers can also be included in information sharing to create a mutual learning environment. Workshops are an effective method for sharing success stories, discussing challenges, and developing joint solutions.

Information sharing can also be supported through digital resources. Online forums, social media groups, and mobile applications related to agriculture help farmers keep up with current developments. Through these platforms, real-time information on soil analyses, diseases, and pests can be obtained. In addition, e-books, technical guides, and reports help reinforce training and provide farmers with resources they can refer to at any time.

Collaboration with local experts is also important in the knowledge transfer process. Agricultural engineers, agricultural cooperatives, and environmental consultants can provide guidance to farmers. Local agricultural associations and organisations should also be considered as structures that encourage knowledge sharing.

Monitoring and improving education and knowledge sharing is essential for maintaining the effectiveness of the system. Feedback should be collected from participants after training sessions, and content should be updated accordingly. In addition, farmers should be monitored to see whether they are applying what they have learned, and success rates should be evaluated. These evaluations are important for improving the quality of training and measuring the level of sustainability in agriculture.

Since the agricultural sector is a constantly changing field, training content must be updated regularly. New technologies, scientific developments, and environmental approaches should be integrated into training, and farmers should be kept informed of these developments. Including scientific research and field experience in training content increases the relevance and effectiveness of applications.

The sustainability of education and knowledge sharing is critical to ensuring the continuity of the system. Since sustainable practices in agriculture require continuous development, training should be repeated periodically to provide farmers with new knowledge and skills. During this process, farmers can specialise in specific areas and obtain certifications, thereby enhancing their knowledge levels. Such certification programmes also help farmers gain a competitive advantage in the market.

The sustainability of training depends on the availability of necessary resources. Resources such as training materials, expert trainers, digital training infrastructure and financial support must be provided on a regular basis. In this way, agricultural knowledge can be continuously increased at both the individual and collective levels.

Education and knowledge sharing are one of the cornerstones of sustainability in agriculture. When operators, producer groups, and local experts work together to share their knowledge and experience, it facilitates the widespread adoption of environmentally friendly and efficient agricultural production. The effective use of training, the adoption of technological developments, and the continuity of this process are of vital importance for environmental protection and economic sustainability.

16. TRACEABILITY

Traceability in agriculture refers to the recording and tracking of all inputs used, all practices carried out, and all stages the product goes through from field to table.

Why is Traceability Important?

- Consumers learn where the product comes from and gain greater confidence in it.
- Errors, diseases, or quality issues are more easily identified and managed.
- Environmentally friendly practices are documented and reported.
- Environmental impacts such as carbon footprints become trackable.

How to Set Up a Traceability Plan?

1. Setting Objectives

- To record every step of the production process
- To optimise input use
- To document sustainable farming practices
- To monitor environmental impacts (e.g. carbon emissions)
- To provide transparent and reliable information to consumers

2. Record Keeping Methods

Manual methods:

• Paper-based production log

• Simple Excel spreadsheets

Digital systems:

• Daily records via mobile apps

• Product-based tracking via QR codes

• Secure data chain via blockchain-based systems

3. Types of Information to Track

• Product type and planting date

• Fertilisation, pesticide application and irrigation information

• Harvest date and quantity of product obtained

• Before/after photos of the land

• Soil analysis results

• Data on carbon sequestration and biodiversity (if available)

4. Integration with Supply Chain

• All suppliers of inputs (seeds, fertilisers, etc.) must be recorded

• Product processing and distribution conditions must be documented

• Traceability must be ensured all the way to the end user through product-specific tracking numbers (e.g. QR codes)

17. MONITORING AND EVALUATION

Monitoring and evaluation in agriculture is a critical mechanism for achieving environmental, economic, and social sustainability goals and ensuring continuous improvement. This process encompasses data collection, analysis, performance measurement, and decision-making based on results.

Below, detailed information is provided on how the monitoring and evaluation process in the agricultural sector should be structured and how this process can contribute to sustainable agriculture goals.

A. MONITORING PROCESS

1. Monitoring Objectives

• To ensure that agricultural activities are carried out in line with sustainability goals

• To track input use, environmental impacts and productivity

• To enable timely intervention and corrective measures

2. Scope of Monitoring

• Environmental impacts: Water use, soil erosion, biodiversity status, chemical input use

• Productivity: Product quantity, quality, labour productivity

• Resource use: Consumption of water, energy and other natural resources

• Input management: Fertiliser and pesticide quantities, frequency of use and legal compliance

3. Monitoring Methods

• On-site observation and field visits

• Soil, water and air analyses

• Digital systems: Mobile applications, sensors, remote monitoring systems

4. Monitoring Frequency

• Monthly/seasonal monitoring: Tracking short-term changes

• Annual reporting: Evaluating long-term trends

B. EVALUATION PROCESS

1. Evaluation Criteria

• Sustainability compliance: Alignment with environmental, economic, and social goals

• Efficiency and quality: Changes in product outputs

• Environmental impacts: Carbon emissions, water usage, soil health

• Resource efficiency: Input/output ratios, energy and water savings

• Economic analysis: Input costs, revenue changes

2. Data Analysis and Reporting

• Systematic recording of collected data

• Monitoring performance changes through comparative analyses

• Providing feedback to farmers through performance reports

3. Methods

• KPI (Key Performance Indicators): Evaluation using specific metrics

• Trend analysis: Comparison with previous periods

C. USE OF RESULTS

1. Creating Action Plans

• Identifying areas for improvement through data-driven decision-making

• Developing short-, medium- and long-term intervention strategies

2. Continuous Improvement

• Updating training programmes, technological applications and agricultural strategies based on data results

3. Communication with Stakeholders

• Sharing monitoring and evaluation outputs with farmers, cooperatives, public institutions, and other stakeholders

• Building trust and awareness through transparent data sharing

D. CHALLENGES AND SOLUTİONS

Challenge	Solution
Data collection challenges	Digital tools, training and technical support
Time and resource constraints	Automation systems, cloud-based solutions
Lack of producer participation and motivation	Appropriate training language, incentives and easy-to-understand systems

Monitoring and evaluation processes are fundamental building blocks for guiding sustainable agriculture. When properly structured, they minimise environmental impacts, increase productivity and make agricultural production more economically sustainable.

18. SOCIAL REQUIREMENTS

1. Working Conditions:

All employees should work in healthy, safe and dignified environments; working hours, rest periods and social rights should comply with legal regulations. Regular inspections should be carried out in these areas.

2. Forced Labour and Child Labour:

All forms of forced labour and child labour are prohibited. It must be verified that employees are employed of their own free will, and reliable documents must be used to verify their age.

3. Prevention of Discrimination:

There should be no discrimination based on gender, age, ethnic origin, religion or disability in recruitment, remuneration, promotion and dismissal processes; equal opportunities should be provided.

4. Charging:

All employees must be paid at least the legal minimum wage, on time and in a documented manner. Overtime pay must be paid in accordance with the law.

5. Occupational Health and Safety:

Risk analyses should be conducted, protective equipment should be provided, and regular occupational health and safety training should be provided. Accident prevention measures and emergency plans should be prepared.

6. Employee Records:

Records containing information about employees' identity, entry/exit, wages, working hours, social security and training should be kept regularly and be available for inspection.

19. FIELD APPLICATION GUIDE

Under the Regenevate Plant Production Land Standard, farmers are required to carry out monitoring activities based on their observations and tests on the land. These tests demonstrate how producers meet both standard and legal requirements using simple but effective methods. Observational assessments help identify problem areas in agricultural land early on and reduce risks. All observations and findings must be recorded in the "Field Guide Worksheet" document and archived annually.

1. PLANT HEALTH OBSERVATIONS

Visual Assessment:

The colour of plant leaves, plant height and homogeneity level are examined in relation to land productivity. These visual findings provide initial information about the overall health of the plant.

• NDVI (Normalised Difference Vegetation Index) Use:

NDVI is a vegetation index that analyses the vitality and density levels of vegetation through remote sensing systems (satellite imaging and drone technologies). The following parameters can be monitored with NDVI:

- Plant health and stress levels
- Optimisation of nitrogen and fertiliser use
- Pest or disease diagnosis
- Weed identification

2. SOIL COLOUR ASSESSMENT

Soil colour is an important indicator of the amount of organic matter and moisture in the soil.

• **Dark Brown:** Indicates high organic matter content.

• **Grey or blue spots:** These indicate areas with high groundwater levels and drainage problems. When wet, they appear dark grey, and when dry, they appear light grey, reflecting oxygen-depleted conditions.

3. SOIL ODOUR ANALYSIS

Microbial activity and moisture balance are assessed by removing soil and smelling it:

- **Forest Soil Odour:** High microbial activity and adequate aeration.
- **Sour or Rotten Odour:** Excessive moisture, anaerobic conditions and pathogenic bacterial activity.
- **Metallic Odour:** Indicates a lack of organic matter.

4. SOIL PHYSICAL AND CHEMICAL ANALYSIS

Detailed analyses should be conducted every three years to assess the productivity potential and sustainability of the soil.

Scope of analysis:

- Soil structure and water retention capacity
- Nutrients (macro and micro elements)
- pH, salinity and alkalinity levels
- Organic matter level

5. SOIL MACRO AND MICROBIOLOGICAL DIVERSITY

Soil biological diversity is a critical indicator of soil health and ecosystem services.

- **Observational Study:** The presence of organisms such as earthworms and insects is examined in a soil sample taken with a shovel.
- **Microbiological Analysis:** Should be conducted every three years; methods such as PLFA (Phospholipid Fatty Acid Analysis) should be used to measure microbial diversity and abundance in the soil.

All field observations and analysis results should be regularly recorded on the Field Guide Worksheet and stored annually. This documentation is necessary to prove that monitoring activities are carried out in a transparent and traceable manner.

20. OBSERVATION, RECORDING AND PRESENTATION OF THE RESULTS OF SOIL IMPROVEMENT ACTIVITIES DURING INSPECTION

The location information (GPS coordinates/parcel numbers) of the land where soil samples were taken, soil analysis results, field observations and tests of remedial applications should be recorded in the 'Field Guide Worksheet' below and presented to the auditor during the audit.

ANNEX-1: APPLICATION GUIDE WORK SHEET

Field Observation Criteria	Monitoring	GPS Coordinates Parcel number	Date	Observations
Plant health	Observation results			
Soil colour	Observation results			
Soil odour	Observation results			
Soil physical and chemical analysis	Analysis results			
Macro/micro biological diversity in soil	Analysis results, observation results			
Flora	Observation results			
Fauna	Observation results			