

Assessment of Regenerative Agriculture Practices



Environment
Handbook

REGENERATIVE
AGRICULTURE

V 3.1

DANONE

REGENERATIVE AGRICULTURE



Regenerative agriculture is a set of farming principles and practices that increase biodiversity, enrich soils, improve watersheds, and enhance the ecosystem. It is a response to the overwhelmingly predominant current agricultural practices that encourage the release of carbon dioxide into the atmosphere and the degradation of our soils. At this rate, it is expected that within 50 years, the world's population will have increased to 9 billion, and we will struggle to find enough arable topsoil to feed our population.

Thankfully, there are steps that can be taken to help secure sustainable food systems for future generations - by changing our approach and practices, and by implementing sustainable ways of working our lands. By applying regenerative agriculture practices, we can capture carbon from the atmosphere and spread it back within our soils to get the natural balance back in place. Using nature's living technology allows us to turn the tide and contribute to reversing climate change and biodiversity loss while mitigating their negative effects on food production and ecosystem services. This will help create healthier soils, restore biodiversity, and create more productive farms, revitalizing local communities.

At Danone, agriculture is at the heart of what we do, and we truly believe that the regeneration of soils is one of the greatest challenges of our generation. Working with over 58,000 farmers worldwide, Danone is fully dedicated to meeting this challenge and being a pioneer in regenerative agriculture. Since 2017, we have launched ambitious projects supporting farmers, in the development of sustainable agricultural practices. Whether it is through worldwide initiatives (such as COP21 's 4 for 1000), through our projects with farmers and suppliers, or collaborative partnerships with peers throughout the supply chain (e.g., Farming for Generations, OP2B, SAI), we are committed to taking responsibility and doing our part to respond to this global challenge. Today, regenerative agriculture is one of the KPIs we follow as part of our *Entreprise à Mission* journey.

Our engagement is based on 3 main pillars: protecting soil, empowering generations of farmers, and promoting animal welfare. This is supported by on-farm assessment tools to establish a diagnosis of farm practices and support the definition and implementation of ad-hoc continuous improvement plans for and with farmers.

This document is a practitioner's handbook, that provides guidance on the assessment focused on the pillar "Protecting Soils". Furthermore, it aims to provide a comprehensive set of practices to support the implementation of regenerative agriculture practices, leading to positive holistic environmental impacts.



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A. Purpose of the Danone Environmental Scorecard

Regenerative agriculture fits into Danone’s larger mission: to bring health through food to as many people as possible. As part of our *Entreprise à Mission* journey, we have created a holistic assessment tool, relevant to different geographies, crops and livestock. To evaluate farms’ strengths and improvements areas, and promote the adoption of best practices, the Danone Environmental Scorecard was born.

This scorecard has 3 main ambitions:



Five main types of production can be assessed using this scorecard:

-  Livestock producer only: dairy cow breeders that do not produce the feed on their farms;
-  Livestock and crops (cereals and/or pasture) producer: dairy cow breeders that produce part of the feed on their farms;
-  Orchards producer (for inter-row only);
-  Strawberry producer;
-  Above ground crop producer (e.g. beetroots) & below ground crop producer

The final purpose is to provide Danone with an overview and understanding of farmers’ performance in regenerative agriculture. Based on the results, Danone will work with engaged farmers to move towards better practices, that regenerate the environment. Danone is committed to adopting a collaborative and voluntary approach and to work hand-in-hand with farmers, suppliers and partners, for the benefit of the whole supply chain.

Since January 2022, the Environmental Scorecard was digitalized and embedded as a survey within the Transparency-One platform. Specific training materials are available to explain how to connect to the Transparency-One platform and how to launch the environmental survey with farmers and suppliers.





B. Purpose of this Handbook (Environment)

This Handbook is designed to help technicians and practitioners assess farmers' level of adherence to regenerative agriculture practices, based on the Danone Environmental Scorecard, and to advise them on continuous improvement plans and best practices. It provides a brief description of the practices assessed and further details on how to rate these practices on farm, with tips and examples.

The Environmental Scorecard covers 4 main categories of practices to be assessed on the acreage dedicated to Danone's production – 1. Soil, 2. Manure (only for dairy farms), 3. Biodiversity and 4. Water.

Each category has a number of sub-categories, all covering different practices. Each practice has 4 levels of scoring:

- **Level 0** – This level means that the baseline is not met by the farmer i.e., the farmer does not follow any practices considered to support regenerative agriculture on this specific criteria.
- **Level 1** – The baseline i.e., the minimum required to have initiated a transition towards regenerative agriculture practices.
- **Level 2** – Level 1 is met and at least one good practice is implemented, proving the producer's adherence to regenerative agriculture principles.
- **Level 3** – Level 2 is met and at least one best-in-class practice is implemented, proving that the producer is an ambassador of the best practice.

Scorecard and scoring fundamental principles:

- For multi-level systems, the main practice used always prevails.
- Unless otherwise stated, all calculation methodologies in this document have been developed by Danone and its partners.
- We consider crop years rather than the calendar year, except for the crop rotation criteria, where the length of the rotation is considered. Past harvests are taken into consideration, not current growing seasons.
- It is important to note that Danone **does not expect perfect scores**. Some of the best practices are difficult and costly to implement, and it can prove challenging to implement them simultaneously. The aim is for farmers and their technicians to better understand regenerative agriculture and be familiar with the best practices associated to progressively transition towards fully regenerative agriculture systems





Where to find the tool?

1. You can find the tool under the Transparency-One platform:
<https://app.transparency-one.com/auth/login?ReturnUrl=https:%2F%2Fapp.transparency-one.com%2F>. If you are not already a user of the platform, please ask access to the tool by raising a ticket on Service Now.
2. Ask your Danone contact be trained on the Transparency-One tool and the Environmental survey before using it and launching assessments.

What to do once the assessment is finished?

The results will be directly sent to Danone platform. They will also be sent by email to the addresses you entered at the end of the assessment, before submitting the survey.

Where can I find the FAQs?

Please visit our Danone Regenerative Agriculture Knowledge Center: the FAQ will be regularly updated and do not hesitate to use the 'Get in touch' section or contact the Danone Global Regenerative Agriculture Team to raise any additional questions.
<https://regenerative-agriculture.danone.com/>





Assessment



High level description

SOIL – SOIL MANAGEMENT PRACTICES



The manipulation or preparation of the soil into a targeted condition by mechanical tillage can have very negative impacts. It creates erosion, decreases carbon sequestration as well as water and nutrient holding capacity. Instead of damaging machinery and practices, farmers are encouraged to use nature-based solutions such as rotations, soil cover, roots system selection as well as reducing tillage etc. to prepare the soil before planting.

1 Proportion of untilled cultivated land per year *(Livestock + crop producers orchard producers (for inter-row only), above ground crops producers, below ground crops producer)*

Land is considered to have had limited tillage operations if the following machinery was used on the field between the harvest of the previous crop and the current year's planting at a depth < 10 cm.

Best practice: Minimise tillage as much as possible using the machinery described in the scorecard. The bigger the proportion of untilled soil, the higher the level of regenerative agriculture achieved. The aim minimize the depth regarding the machinery used, with a threshold at 10 cm.

- 🎯 Level 0 This is in the event the vast majority of the soil is tilled at least once per year.
- 🎯 Level 1 Baseline: 30% to 59% of the acreage dedicated to Danone production
- 🎯 Level 2 60% to 89% of the acreage dedicated to Danone production
- 🎯 Level 3 Over 90% of the acreage dedicated to Danone production

NB: For this criteria, the depth of tillage prevails over the type of machinery used

NOTE:

A field or an interrow are said to have had limited tillage operations (< 10 cm max) if the following machinery was used on the field between the harvest of the previous crop and the current year's planting at a depth < 10 cm.

Suggested machinery representing a light soil management are tine rotative harrow, rotavator, spring tine harrow, vibrocultivator.

Any machinery representing a heavy soil management such as stubble cultivator, TS plow can still be used at a depth less than 10 cm.



EXAMPLE

- Total farm acreage dedicated to Danone product = 7 ha
- Acreage dedicated to Danone product that does not undergo tillage = 4ha

Percentage of acreage dedicated to Danone that does not undergo tillage = $4/7 \times 100 = 57\%$ → Final score: Level 1



Assessment



High level description

2 Proportion of untilled cultivated land per year *(Strawberry producers)*

Land is considered to have had limited tillage operations if the following machinery was used on the field between the harvest of the previous crop and the current year's planting at a depth < 10 cm.

Best practice: Minimise tillage as much as possible using the machinery described in the scorecard. The bigger the proportion of untilled soil, the higher the level of regenerative agriculture achieved. The aim here is simply to have a minimal depth regarding the machinery used and not going through tilling at a depth < 10 cm.

- 🎯 Level 0 This is in the event the vast majority of the soil is tilled at least once per year.
- 🎯 Level 1 Baseline: 30% to 59% of the surface dedicated to Danone production
- 🎯 Level 2 60% to 89% of the surface dedicated to Danone production
- 🎯 Level 3 60% to 90% of the surface dedicated to Danone production
OR
agricultural techniques to limit erosion:
 - no till on windy days
 - extend plant lifespan to 2 years
 - use a motocultor instead of a tractor



EXAMPLE

This percentage can be established directly with the farmer by determining the surface that does not undergo tillage or undergoes only limited tillage (ex: 4 ha) and dividing it by the total surface of the farm (ex: 7 ha). In this example, the percentage would be 57% ($4/7 \times 100$ – Level 1)



Assessment

2 Tillage intensity *(Livestock + crop producers, orchard producers (for inter-row only), above ground crops producers, below ground crops producer, strawberry producer)*

Average number of passes over the past 3 years on the acreage dedicated to Danone production (or the inter-row) with any machinery.

Best practice: Minimise tillage as much as possible by using the machinery described in the scorecard. Once the proportion of the soil being tilled has been established, the goal is to determine the average number of passes over the past 3 years, with any machinery (as listed in the scorecard). It is the number of passes divided by number of crops divided by 3 years e.g., (average number of passes = number of passes / number of crops) / 3). The timeline is the crop year.

- 🎯 Level 0 Higher than 5 passes. This will mostly happen in farms where only 1 type of crop-is cultivated.
- 🎯 Level 1 Baseline: 4 to 5 passes. Ex: 5 passes for only 1 crop
- 🎯 Level 2 2 to 3,99 passes. Ex: 3 passes for each of the 2 crops.
- 🎯 Level 3 0 to 1,99 passes. Ex: 1 pass for 1 crop.



EXAMPLE

Here we are looking for a weighted average of the tillage intensity. Below is an example which includes several crops with different tillage intensity.

YEAR Y+3

10 ha alfalfa = 3 passes (on year of implementation)

50 ha corn in rotation with wheat (non-Danone supply) = 9 passes on corn + 6 passes on wheat = 15 passes

20 ha meadow = 0 passes

Total Year Y+3 : $((10 * 3 + 15 * 50 + 20 * 0) / (10 + 50 + 20)) / 3 = 3,25$ passes on average during the last 3 years = LEVEL 2 (2 to 3,99 passes)

YEAR Y+6:

10 ha alfalfa = 0 passes

50 ha corn in rotation with cover crop (non-Danone supply) = 6 passes on corn + 3 pass cover crop = 9 passes

20 ha meadow = 0 pass

Total Year Y+6: $(10 * 0 + 9 * 50 + 20 * 0) / (10 + 50 + 20)) / 3 = 1,87$ passes on average = LEVEL 3 (0 to 1,99 passes)



Best practices



What are the recommended practices?

If stopping tilling proves challenging, it is still recommended to leave more time between each tilling and extend plant lifespan to 2 years to give the soil some rest. It is recommended to mainly reduce depth of the tillage as well as the frequency before seeding.

It is also crucial to inspect the soils routinely for loss of structure, signs of damage, capping and erosion in order to understand the damage that previous or continued tilling may have caused. Identify and focus firstly on protecting vulnerable soils prone to erosion and leaching.



Example of untilled land



What are the non-recommended practices?

There are a series of practices associated with tilling that are particularly damaging for soils and are therefore NOT recommended:

- Tillage on hillsides, as it facilitates erosion and water run off.
- Tilling on windy day.
- Tilling too deep into the ground, as it will worsen the carbon release and harm biodiversity.
- Over-tilling. The more you till, the more compacted the soil will be.
- Ploughing: Flip soil layers around



Tilled land, exposing soil to erosion by natural elements

Source: Effect of tillage method on soil water infiltration, organic carbon content and structure, YH Yang, JC Wu, JM Zhang,



How to best implement the good practice

- Start planning at least 1 year ahead, to audit and understand the soil, adapt the equipment and prepare the soil properly.
- Set up the planter correctly. Every seed should be placed at the same depth, at the same spacing in the same environment.
- Plant according to soil conditions, not the calendar.
- Seek help from successful no-till farmers for good recommendations. This can be a difficult process and tips from successful experiences can be helpful.

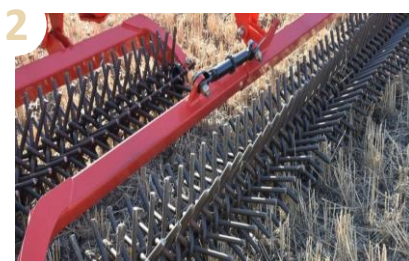
Combine with deep roots intercrops and soil cover to limit compaction, reduce traffic on the land. You can also integrate weed management plan to prevent weed infestation.

For perennial crops you can implement orchards on your land to favor non returning machinery for initial decompactions such as rippers instead of ploughers.

Limiting tillage and other types of work on soil can be challenging, especially if the soil is already highly compacted or weed beds are very well implanted. Transitioning to non-tilling practices will take time and loss in production efficiency is likely. However, due to the highly beneficial effects of non-tilling practices on soil, this criteria remains one of the most important of this scorecard.

Example of suggested machinery:

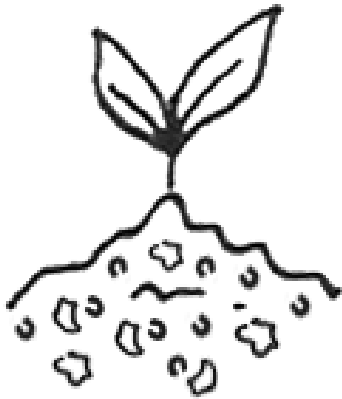
- 1: Spring tine harrow
- 2: Tine rotative harrow
- 3: Rotavator
- 4: Vibrocultivator





High level description

SOIL – SURFACE COVERED



The amount of soil covered with any type of crop can have a large influence on soil health. Bare soils are susceptible to erosion and water loss as well as the production of dry matter. Without the nutrients and structure necessary for successful plant growth, soil will either dry out or wash away. The implementation of mulches and green covers (using nitrogen catch crop for example) is therefore encouraged to maintain the soil nutrients and structure and reduce the need for chemical fertilizers. Continuity in soil cover is targeted here (soil is considered bare from the time it has been tilled). It can be difficult to keep soil covered, especially in semi-arid areas. It may be necessary to compromise: some cover is better than none and the size or quantity of biomass of the cover crop is not evaluated.

1 Proportion of soil covered per year *(Livestock + crop producers, orchard producers (for inter-row only), above ground crops producers, below ground crops producer, strawberry producers (for area between beds only))*

Average number of months over the past 3 years during which the acreage of the crop dedicated to Danone (or inter-row) was not covered (by crops, dense crops residues, cover crops, permanent and temporary pasture, mulch or snow). The cover crop can be a crop not dedicated to Danone supply chain.

Best practice: The aim is to establish how much of the soil is covered with crop. The time period of level 3 has been calculated considering the time of feasibility by including the time of growth of plants (except bad weather conditions). The more time the soil is covered, the higher the level of regenerative agriculture is achieved.

- 🎯 Level 0 This is in the event soil is on average not covered during a majority of the year
- 🎯 Level 1 Baseline: The soil remains bare between 3 months and 2 completed months
- 🎯 Level 2 The soil remains bare between 2 to 1 completed month over a 3 years period
- 🎯 Level 3 The soil remains bare during 1 month at most over a 3 years period

Note : Cover crop can be a crop not dedicated to Danone. Weeds are not considered cover crops



EXAMPLE

This average can be established directly with the farmer by determining the surface that is not covered over the last 3 years:
 For example: 2 months during the 1st year, 1 month during the 2nd year and 2 months during the 3rd year. In this example the average will be $(2+1+2)/3 = 1,5$ – Level 2





Assessment







High level description

2 Proportion of land under temporary or permanent pasture or meadow

(Livestock + crop producers)

Pastures include a range of vegetation types (grass, shrubs, tree cover) that are of exceptional biodiversity importance as well as an extremely important carbon store. Maintenance is crucial to ensure a good grazing management.

Best practice: Coverage of the soil, with permanent pasture or meadow. The bigger the proportion of covered soil, the higher the level of regenerative agriculture achieved. The aim is to establish how much of the soil is covered with permanent pasture or meadow.

-  Level 0 This is in the event the vast majority of the soil is not covered.
-  Level 1 We consider the minimum requirement for the baseline to be between 30% and 59% of the soil covered permanently.
-  Level 2 Between 60% and 75% of the soil covered permanently.
-  Level 3 Over 75% of the soil covered permanently.



EXAMPLE

This percentage can be established directly with the farmer by determining the surface covered permanently (ex: 5 ha) and dividing it by the total surface of the farm (ex: 7 ha). In this example, the percentage would be 71% ($5/7 \times 100$ – Level 1).



Best practices

**What are the recommended practices?**

Live cover crops (such as Nitrogen catch crop) can have very beneficial effects if the cover chosen is the right one. So, it is important to choose wisely based on different factors mentioned below. It is also important to promote the diversity of plant cover using multiple species, such as legumes, which makes it possible to extend the duration of the cover and amplifies the beneficial effects on soil microfauna. When growing a cover crop is not possible for part of the season, mulches are a good alternative.

Also, there needs to be a period of 10 to 14 days after terminating the cover crop, before it is recommended to plant again.



An example of cover crop

**What are the non-recommended practices?**

It is important, before each seeding, not to use fire or boiling water to clear the soil from cover crops for any purpose, as fire depletes soil nutrients and causes erosion.

Using a crop from the same family as the crop being harvested is also not recommended as the positive effects will be reduced, particularly in terms of nutrient regeneration, but also pest pressure.

Cover crops attract many beneficial insects. Don't harm those with an unnecessary insecticide application.



An example of bare land

**How to best implement the good practice**

One of the most important parts of this practice is to choose the right cover crop. This choice can be in 3 steps:

1. Understand the soil and its constraints (depending on the soil type, number of harvests in a year, the crop rotation etc.).
2. Set out the objectives with the farmer. If the main objective is to reduce pest pressure for example, it is better to focus on cover crops with biocide effects and favor their diversity.
3. Adapt the choice of cover crop based on available resources on the farm (equipment, human resources etc.).

There are many different types of cover crops and they all can have different effects on the soil, so choosing carefully which one is better adapted will ensure the success of this practice.





High level description

SOIL - CROP ROTATION







Monocultures, i.e., growing and harvesting the same crop year on year is not good for the soil or for the biodiversity of the agroecosystem. The lack of plant diversity encourages the accumulation of certain nutrients and the rarefaction of others. To maintain healthy soils, practices where several different plants are grown in long and diverse rotations are encouraged.

1

Proportion of land with crop rotation *(Livestock + crop producers, strawberry producers, above ground crops producers, below ground crops producers, orchard producers (for inter-row only))*

Proportion of land (or inter-row) growing a minimum of 3 different families of crop on the same field

Best practice: growing a minimum of **3 different crop types** on the field to encourage biodiversity and the capture of necessary nutrients in the food grown. The different crops can be grown within the same year, or through a longer period of time. The aim here is to establish the proportion of land growing a minimum of 3 different crops types on the same plot. The timeline is crop rotation; it can range up to several years.

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">  Level 0 This is in the event the vast majority of the land does not have any crop rotation.  Level 1 Baseline: We consider the minimum requirement for the baseline to be between 30% and 59% of soil with crop rotation. | <ul style="list-style-type: none">  Level 2 Between 60% and 89% of soil with crop rotation.  Level 3 The vast majority (90% or more) of soil with crop rotation. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



EXAMPLE

This percentage can be established directly with the farmer by determining the surface that grows 3 or more crops (ex: 10 ha) and dividing it by the total surface of the farm (ex: 25 ha). In this example, the percentage would be 40% (10/25x100 – Level 1).

Surfaces growing less than 3 crops do not meet baseline.





Assessment



High level description

2 Number of species in the crop rotation – excluding permanent pasture (Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers)

Average number of crops of various families and species rotated with one another on the surface dedicated to Danone production, intercropping included. Timeline is crop rotation; it can range up to several years.

Best practice: Once the proportion of land that benefits from crop rotation has been determined, we need to look at the number of different species making up the different crops. The more diverse are the different crops, the higher the level of regenerative agriculture achieved. The aim here is to get an average number of crops of various species rotated at plot level, intercropping included, on the surface dedicated to Danone production. A table of the different species can be found page 18.

- | | |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <p>🎯 Level 0 There is no crop rotation or less than 4 different species within the rotation</p> | <p>🎯 Level 2 Plot of land includes at least 5 different species of plants, including minimum 1 legume.</p> |
| <p>🎯 Level 1 Baseline: Plot of land includes at least 4 different species of plants.</p> | <p>🎯 Level 3 Plot of land includes at least 7 different species of plants, including minimum 1 legume.</p> |



EXAMPLE

#1: A rotation of wheat and barley is considered as a rotation between 2 species of the same family.
 #2: A farm has a rotation planned over a 5 years period as follows:
 Y: Corn + Wheat
 Y+1: Wheat + Mixed cover crops (4 meslin species incl. 1 legume)
 Y+3 to +5: Alfalfa (legume)
 Number of species : 1 corn + 1 wheat + 4 meslin + 1 alfalfa = 5 species incl. 2 legumes = LEVEL 3

3 Inter-row cover crops management (Orchard producers (for inter-row only))

Average number of crops of various families and species rotated on the inter-row at plot level.

Best practice: Once the proportion of land that benefits from crop rotation has been determined, we need to look at the number of different species making up the different crops. The more diverse are the different crops, the higher the level of regenerative agriculture achieved. The aim here is to get an average number of crops of various species rotated at plot level, intercropping included, on the surface dedicated to Danone production. A table of the different species can be found page 18.

- | |
|----------------------------------------------------------------------------------------------------------------------|
| <p>🎯 Level 0 This is in the event there is no crop rotation or less than 4 different species within the rotation</p> |
| <p>🎯 Level 1 Baseline: Plot of land includes at least 4 different species of plants.</p> |
| <p>🎯 Level 2 Plot of land includes at least 5 different species of plants, including 1 legume.</p> |
| <p>🎯 Level 3 Plot of land includes at least 7 different species of plants, including 1 legume.</p> |





What are the recommended practices?

As usual, the devil is in the detail. It is not enough to just rotate crops, the rotation needs to include different species and there are many ways to ensure the crop rotation provides maximum benefits.

Plants with different root system lengths and shapes benefit soil structure. Deeply rooted pivot crops such as tomatoes, carrots, or beets break up the soil creating channels for air and water as they mine minerals in the subsoil, bringing them up where other plants can use them next year. Rotating corn and soybeans allows farmers to use less nitrogen fertilizer. Dense shallow surface root systems enable decompaction of the first horizon, and heavy organic matter inputs.

Looking at alternating heavy feeders with light feeders to reduce demands on your soil is recommended.



Land with crop diversity



What are the non-recommended practices?

Species of the same family often suffer from the same pests and diseases and take up similar nutrients.

Therefore, planting different crops from the same species on a plot of land will not be efficient. The same nutrient will build up and the same types of diseases and pests will too.



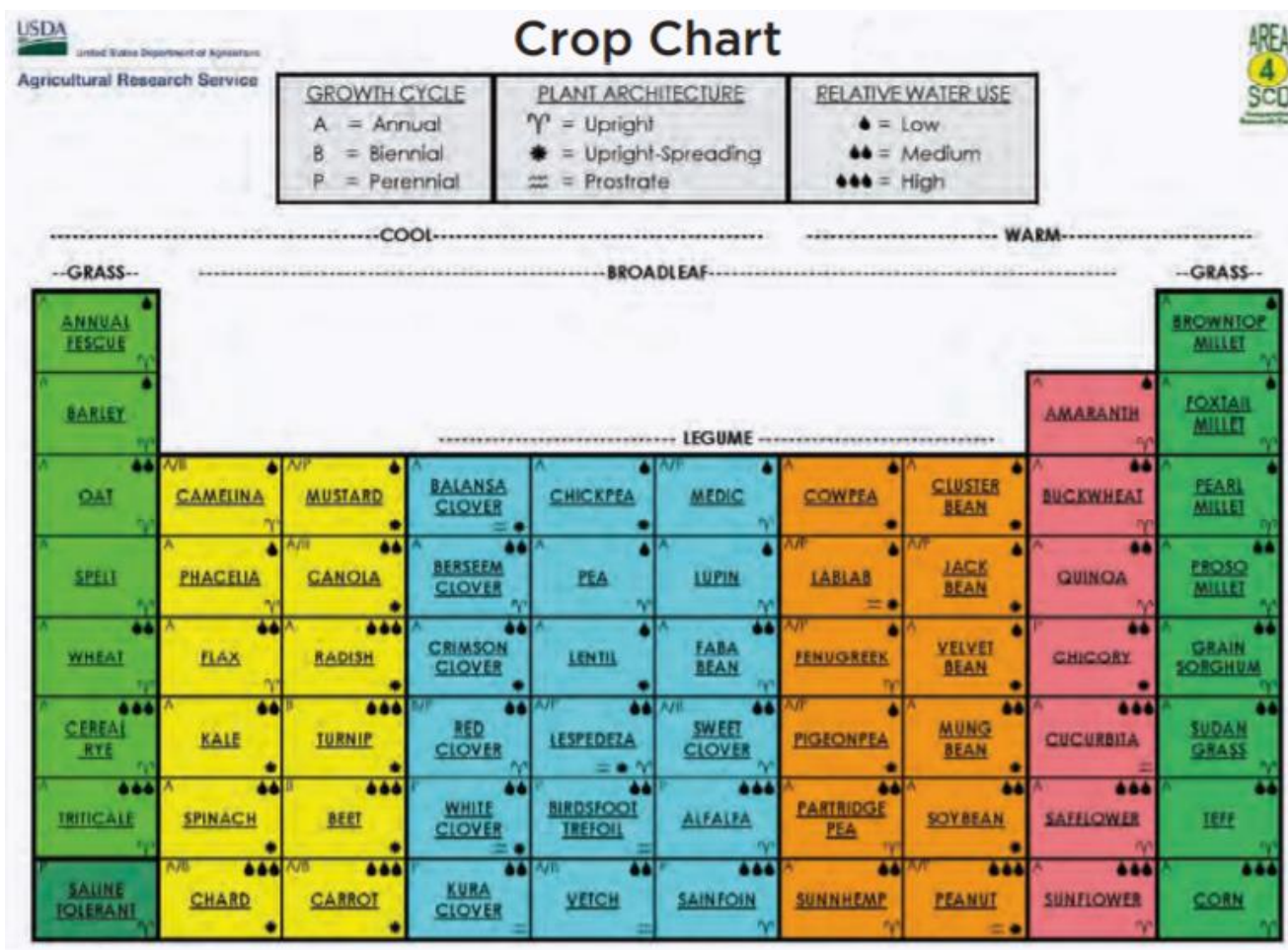
Example of monoculture



How to best implement the good practice

It can be difficult to organise the crop rotation well. If there are 3 different crop species growing on different plots of land, keeping track of what was grown where will be a challenge. It is therefore recommended to use specialised software to compile all the information regarding crop rotation year on year. These software or programmes can not only save and hold valuable information, they also advise on the next best rotation to make in order to get the maximum benefit from the rotation.





Example of a crop chart classifying the different crop families. This example is based on crops mainly from mild climate.





Assessment



High level description

SOIL - FERTILIZATION



The dependency to intensively use certain fertilizers can be damaging for soil, leading to disbalance and loss of natural fertility potential over time. Nitrogen is a key player in producing chlorophyll, the pigment that absorbs sunlight for basic photosynthesis needs. It is therefore a crucial nutrient for soil. Too much of it however will limit the availability of other nutrients critical for plants development, affecting the ability of the crop to develop properly.

The use of organic fertilizers that do not disrupt the natural relationship between microorganisms and plant roots are highly recommended.

1 Soil nitrogen balance assessment *(Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers, (for inter-row only))*

An effective tool and /or balance accounting method to estimate the magnitude of Nitrogen loss versus gain of the agro-eco system over a year, and to appraise its sustainability. It refers to Nitrogen inputs from various sources: mineral, organic and industrial including manure, compost, legume crop residues, urea.

Best practice: Reduce the use of chemical fertilizer as much as possible to replace them with adequate crop rotations, organic fertilizers or other practices in order to regulate properly the level of Nitrogen in the soil. Soil Nitrogen balance assessment (SNBA) serves as an effective tool to estimate the magnitude of Nitrogen loss/gain of the ecosystems and to appraise their sustainability. It refers to Nitrogen inputs from various sources: mineral, organic and industrial including manure, compost, legume crop residues, urea, etc. The aim is to understand what is the level of Nitrogen within the soil in order to be able to adapt the use of fertilizers accordingly. Multiple analyses may be necessary if the surface dedicated to Danone has different types of crops. For this assessment, we consider all types of fertilization (mineral or organic such as manure or compost). A full Nitrogen balance takes into account the initial soil Nitrogen content, quantity exported by plants, quantities restituted to the ground by crop residues and cover crops, as well as fertilizers inputs.

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>⊙ Level 0 There is no efficient way of establishing the level of Nitrogen in the farm's soil.</p> | <p>⊙ Level 1 Baseline: The amount of Nitrogen brought to the crop is known (ex: 1kg N mineral + 3 kg Manure)</p> |
| <p>⊙ Level 2 At least 1 of the practices below is followed:</p> <ul style="list-style-type: none"> - Simplified Nitrogen balance (fertilizer inputs = crop needs - soil Nitrogen supply) - Nitrogen soil and/or leaf analysis this year to manage the fertilisation on my farm | <p>⊙ Level 3 Implement at parcel level a yearly Nutrient Management Plan with a strategic approach. Have at least 1 analysis displaying the total quantity of matter brought and the content of Nitrogen in the matter. It could be based on a use of agrometeorological crop monitoring tool or software using weather forecasts (rain, temperature) that calculates automatically the quantity of Nitrogen needed and when to apply it.</p> |

Note : For this assessment, we are mainly focusing on Nitrogen as it has a bigger impact in terms of emissions of greenhouse gas and nitrates.

In orchard production, plant tissue analysis is used to directly measure the amount of nutrients in the trees, and for established perennial crops, is usually a better indicator of nutrient status than a soil test.





Best practices

✔ **What are the recommended practices?**

Constant monitoring of levels of Nitrogen is a must. It is the only way to know what the soil needs to be more productive.

Matching the fertilizer to the crop is also key. Different species need different types of fertilizers and not all of them will have the same benefits.

Precise targeted fertilization takes into account nutrient availability and plant needs throughout the growing season', as well as possible negative interactions between different types of nutrients.



Leachate – example of organic fertilizer

✘ **What are the non-recommended practices?**

Applying chemical and organic fertilizer (containing Nitrogen) in a location or manner which makes it likely that the fertilizer will directly enter a water course should be avoided. Additionally, no such fertilizers may be applied during a flood watch or warning, tropical storm watch or warning, or a hurricane watch or warning.



An example of inorganic fertilizer

↻ **How to best implement the good practice**

There are several factors a farmer needs to consider and plan for before making the decision to change their current practices. Before changing fertilization practices, a farmer needs to understand their soil better. Analyzing the soil for Nitrogen and Phosphorus to establish excess nutrients is crucial.

Once that analysis has been done, the right fertilizer for the right crop can be chosen based on concrete figures, provide the nutrients the soil needs.

Trialing and testing solutions on a small scale before making a wholesale switch to a new root medium or fertilization program is essential.





High level description

SOIL – SOIL ORGANIC MATTER



Soil organic matter is the fraction of soil that consists of plant or animal tissue in various stages of breakdown (decomposition). The finer fraction of organic matter, the healthier the soil. It actively contributes to soil carbon sequestration and soil productivity. Understanding the level of organic matter in a farm's soil is an important step that allows better monitoring and management of the land. It is an indicator of soil health in regenerative agriculture which makes it possible to have a first measurement of carbon sequestration - one of the means of offsetting our emissions. We measure it by performing soil analysis with sampling (have at least 5 samples to have an average per field). It is possible to use infrared methods (scanner) or reference of the rate of organic matter according to the rate of clay.

1 Frequency of soil organic matter monitoring *(Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)*

Proportion of analyzed land use every 5 years (including pasture if applicable)

Best practice: Maintain or rebuild soil organic matter at a maximum depth. The best practices described previously such as no-till, vegetation cover and crop rotation all contribute to the preservation of soil organic matter on a parcel. The aim here is therefore to establish the proportion of analysed land use every 5 years (including pasture). This is designed to adapt practices and maintain/restore a healthy soil organic matter level.

- Level 0 The vast majority of the plot has not been audited for organic matter.
- Level 1 Baseline: At least 50% of the plot that has received an analysis within the past 5 years.
- Level 2 At least 75% of the plot has received an analysis within the past 5 years.
- Level 3 At least 90% of the plot has received an analysis within the past 5 years.



EXAMPLE

We establish the percentage by dividing the surface of soil where the amount of organic matter is known (ex: 50 ha) by the total surface of the plot (ex: 100 ha). In this example, the percentage is 50% - LEVEL 1





Assessment



High level description

- 2** **Content of organic matter** ((Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers, (for inter-row only))

Weighted average organic matter content (%), not older than 5 years

Best practice: It is important to understand the average percentage of organic matter content within the different soil types on a farm not older than 5 years. You will use a weighted average to calculate the percentage of organic matter content. Again, if applicable, we include pastures.



This is not yet scored as part of this assessment but we encourage farmers to calculate the percentage of organic matter within their soil.

Note : Soil health is conditioned by organic matter content but also by other important elements not scored here like pH It is possible to raise the pH with whitewashing if necessary.



EXAMPLE

For a 100ha farm:

1 plot of 50ha with 5% of organic matter

1 plot of 30ha with 2% of organic matter

1 plot of 20ha with 1% of organic matter.

Therefore, there are 3.3% of organic matter = $(50 \cdot 5 + 30 \cdot 2 + 20 \cdot 1) / 100 = 3,3\%$.



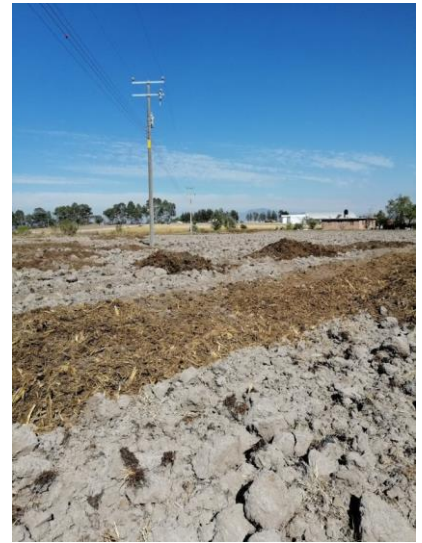


What are the recommended practices?

Applying these regenerative agriculture practices will help improve the level of organic matter in soil:

- Tillage reduced to a minimum, as organic matter exposed to air will decrease mineralization rate and increase the risk of erosion.
- Cover crops, providing Nitrogen and other nutrients (especially with legumes) will also increase the level of organic matter
- Crop rotation with perennial grass or legumes reduces erosion and builds up organic matter as a result of decomposing the roots biomass
- Avoiding soil compaction to reduce waterlogging
- Protect the soil against erosion
- Provide organic carbon to your soil (manure, mulch, biochar etc)

Good grassland management strongly influences storage of organic matter in the soil, so it is highly advisable to carry out an analysis not only on arable land but also on grasslands.



An example of soil covered with organic carbon to increase level of organic matter.



What are the non-recommended practices?

Focusing on the actual percentage of organic matter within the soil is ineffective. Most of productive agricultural soils have between 3 and 6% of organic matter, but potential organic matter storage in soils vary very much based on the percentage of clay. Ensuring soils are protected against erosions and carbon outbursts, and that there are regular additions of organic matter to 'feed' the soil is more important than achieving any particular measured value of soil organic matter.

Sampling and analysing soil approximately every five years is needed, because accumulation takes time, and what matters is the long-term trend.



How to best implement the good practice

The most common method used to estimate the amount of organic matter present in a soil sample is by measuring the weight lost by an oven-dried (105°C) soil sample when it is heated to 400°C; this is known as 'loss on ignition', essentially the organic matter is burnt off. This is a widely used method.





SOIL BEST PRACTICES

1.

Introduce crop rotation



Ensures a high diversity of nutrients to the soil.

2.

Use cover crops



Protects the soil's nutrients and reduces erosion and water loss.

3.

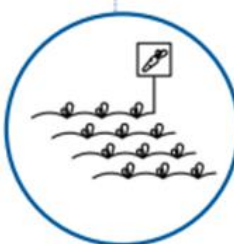
Avoid Phytosanitary products



Protects the soil from harmful phytosanitary products.

4.

Reduce tilling



Ensures carbon sequestration, avoids deterioration of biodiversity.

5.

Use natural fertilizer



Increases levels of organic matter and nutrients.

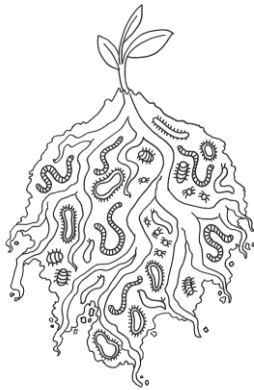




Assessment



High level description



Soil analyses allow you to determine a) the physical characteristics of the soil (including structure and texture) and b) the chemical composition of the soil, i.e., the content of fertilizing mineral elements in the soil.

1 Soil content management *(Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)*

Ability to interpret and adapt practices according to the results of the soil analysis

Best practice: Soil analyses are very revealing of the soil quality. They provide information on the salinity, the level of compaction, the quantity and type of microorganisms present, etc. It is important for the farmer to carry out his analyses but also to know how to interpret them in order to adapt his agricultural practices such as tillage or the fertilization plan. The more practices are adapted to the soil the higher the level of regenerative agriculture is achieved.

- ⊙ Level 0 There is no soil analysis conducted or they are not interpreted after being completed.
- ⊙ Level 1 Baseline: The soil analysis is interpreted (with the help of a technician if needed).
- ⊙ Level 2 The fertilization plan is adapted based on the results of my soil analysis.
- ⊙ Level 3 Farming system and practices are adapted according to the results of my soil analysis (crop rotation, seed selection, soil management, etc.).

Note:

In order to know the number of analyses to be done on your farm, you must determine the number of homogeneous plots it has.

Homogeneous plots are **crop plots that have the same history (crop successions and technical itineraries) and/or have the same soil type, depth and topography, etc.**

It will then be necessary to carry out regular soil and organic matter analyses on each of the homogeneous plots.





Assessment



High level description



Manure management refers to capture, storage, treatment, and utilization of animal manures in an environmentally sustainable manner. It can be retained in various holding facilities. Animal manure can be in a liquid, slurry, or solid form. Manure is a valuable resource, which, if used appropriately, can replace significant amounts of chemical fertilizers, with positive impact on soil and reduction of expenses. However, unless animal manure is managed carefully to minimize odor, nutrient losses, and emissions, it can become a source of pollution and a threat to aquifers and surface waters. A proper sustainable manure management plan is necessary to tackle those issues.

1

Slurry storage (Livestock farmers)

Best practice: Efficient storage is a crucial part of manure management. For slurry or liquid manure (made up of 0% to 15% solids), storage is different to solid manure. There are several slurry manure storage systems available, with different levels of efficiency and environmental impacts. The aim is to establish the maturity of the manure storage facilities through the different levels. In the event the farm has a combination of practices and storage systems, we will only take into consideration the practice or type of storage that covers the largest percentage of the farm's manure.

- ⦿ Level 0 There is no manure storage management on the farm preventing it to spill or leak.
- ⦿ Level 1 Baseline: basic manure collection and storage system such as lagoons, pits, slotted floors, scrapers etc. to avoid spills and leaks.
- ⦿ Level 2 Level 1 + a covering system such as phase separator and/or natural crust cover to avoid gas emission.
- ⦿ Level 3 Level 2 + a maintenance or transformation system such as cover liquid slurry pits and lagoons OR anaerobic digester.

Note:

Slurry is generated in systems where little, or no bedding is added to the excreted manure/urine. Slurry manure is typically between 5% and 15% solids. It is "thicker" than liquid manure but cannot be stacked or handled the same way as solid manure.

If there is no slurry storage, indicate the same achieved level as for dry manure criteria. Example: If you achieve level 1 for dry manure, indicate here level 1 for slurry storage criteria.





Assessment

2 Dry manure storage from straw bedding or slurry separation *(Livestock farmers)*

Best practice: Efficient storage is a crucial part of manure management. For solid manure, there are also several storage systems available, with different levels of efficiency and environmental impacts. The aim here is to establish the maturity of the manure storage facilities through the different levels. In the event the farm has a combination of practices and storage systems, we will only take into consideration the practice or type of storage that covers the largest percentage of the farm's manure.

- ⊙ Level 0 There is no manure storage management on the farm preventing it to spill or leak.
- ⊙ Level 1 Baseline: basic manure collection and storage system such as dry stack system
- ⊙ Level 2 The farm has a closed storage for solid manure or slurry (a barn, plastic, at least a roof, any combination that covers the manure at the stage it is), to prevent spills and leaks in the environment.
- ⊙ Level 3 The farm has one of the following practices:
 - Excretion deposited directly on pastures during grazing OR
 - Daily spread during authorized periods of the year OR
 - Anaerobic digester

Note:

Dry manure is fresh manure from the barn mixed with straw, hay, shavings or wood pellet bedding. Solid manure has 20% solids content.

If there is no dry manure storage, indicate here the same achieved level as for slurry storage in this criteria. Example: If you achieve level 3 for slurry storage, indicate here level 3 for the dry manure criteria.





3 Manure handling techniques (Livestock farmers)

Utilization of animal manure in an environmentally sustainable manner.

Best practice: Manipulation and utilisation of the manure in a sustainable way. The aim is to establish the maturity of the manure re-utilisation practices through the different levels (in the event the manure is not re-utilised within the farm, but sold, this criteria will not apply).

- ⊙ Level 0 Manure is not stored nor re-utilised.
- ⊙ Level 1 Baseline: basic level of re-utilization of the manure. Respect of local rules is mandatory AND:

 - register the quantity and time of year for manure spreading AND
 - No agricultural spreading in case of snow, frozen ground, bare ground or when the soil is already saturated
- ⊙ Level 2 Level 1 AND:

 - Monitoring and management of the manure spreading AND
 - No spreading near water, houses, in case of sloping soils and/or necessity of a buffer zone (minimum 10 meters or more depending on local legislation).
- ⊙ Level 3 Level 2 AND:

 - Manure spreading techniques to limit ammonia losses

Note

No agricultural spreading in case of snow, frozen ground, bare ground or when the soil is already saturated

From an agronomist standpoint the practice of manure spreading in case of snow or frozen ground is to be avoided because it increases the risk of runoff and environmental pollution. During winter period, manure can be stored.

(source: Tillage and Manure Application Effects on Mineral Nitrogen Leaching from Seasonally Frozen Soils - Satish Gupta, Emmanuelle Munyankusi)





✔ What are the recommended practices?

Manure management is complex and there are risks associated with poor management. It is therefore recommended to:

- Regularly check effluent, slurry tanks and slatted tanks to avoid overflow.
- Ensure proper maintenance and repair of all slurry storage tanks, pipework and valves.
- Spread livestock slurries and manures only when field and weather conditions are suitable to prevent water pollution.
- Keep manure and slurry covered as much as possible to prevent methane and nitrous oxide emissions
- Respect local rules and regulations.



An example of Anaerobic digester

✘ What are the non-recommended practices?

Not storing manure in a **proper sustainable** manure management system can become a source of pollution and a threat to aquifers and surface waters. In order to avoid pollution, it is important **not** to store or spread livestock slurries close to a water course (10m minimum distance recommended) or drinking water supply water course (50m minimum distance recommended).

Storing or spreading on steeply sloping fields, when the soil is wet or waterlogged is also not recommended, due to flooding risks.



An example of solid storage, with no proper manure storage system

♻️ How to best implement the good practice

Rules and regulations vary greatly depending on countries and regions. It is therefore important to be aware of the specificities that apply in the region where the farm is located. Ensuring the design of the structure respects the criteria of sizing, covering, emergency spillway, odour control etc... will go very far in ensuring that the farm has a usable and sustainable manure management system.



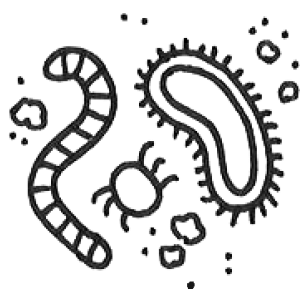
Examples of closed storage, with proper manure storage system





High level description

BIODIVERSITY – PEST AND WEEDS MANAGEMENT



Pest, weeds and fungus can have a devastating impact on farmland which can be widely avoided with the use of pesticides. However, some of these products can in turn disrupt soil biotic communities — the very life that drives soil carbon sequestration. Biocontrol agents represent a healthy alternative to the use of synthetic chemicals for weed management and comprises using living organisms or natural substances to prevent or reduce damage caused by harmful organisms (animal pests, weeds and pathogens). There are 4 categories of approaches to biological control based on the use of control agents – Macro-organisms (insects, nematodes), micro-organisms (viruses, bacteria or fungi), chemical mediators (pheromones), natural substances of mineral, plant or animal origin.

1 Herbicides management *(Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)*

The development of weeds control strategies include preventive and nature-based techniques as well as mechanical methods. It covers a range of approaches, from inexpensive techniques to very innovative technologies.

Best practice: Use of bio-controls agents only to manage weeds, with no use of synthetic chemicals. The aim is to assess the farmer’s understanding of the weed pressure, and the associated management and control through such tools as through comprehensive integrated weeds management (IPM) plans. It considers controls (reporting on frequency of product usage, etc.) as well as the product being used for the control. The more control AND the more biocontrol agents used, the higher the level of regenerative agriculture achieved.

- 🎯 Level 0 Use of unauthorized products (based on local and regional laws) or use of soil disinfection.
- 🎯 Level 1 Baseline - Basic management (search for greater efficiency):

 - knowledge of the weeds pressure
 - organic-certified AND conventional herbicides consumption monitoring (treatment notebook with frequency, type of products, etc.)
 - lower treatment doses
 - suitable spreading practices and precision tools (height, speed, etc.).
- 🎯 Level 2 Advanced management towards alternative techniques: replacement of conventional inputs by alternative techniques within a mid/long term pressure reduction management plan and use of tailored inputs or targeted herbicides in the seed furrows
- 🎯 Level 3 Expert management: no manufactured crop protection products (including the ones authorized in organic certification); only biocontrol agents)

Example of advanced management techniques: mechanical weeding, plants extracts, targeted and specific steam sterilization, using of weed-competitive crops, crop sowing time and spatial arrangement, etc.

Exception: In case of any mandatory treatment by local authority, the farmer will still be awarded level 2.

Exception for expert management: In case of any mandatory treatment by local authority, the farmer will still be awarded level 3.









High level description

2 Insecticides management *Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)*

The development of pest control strategies incorporates preventive and nature-based techniques as well as mechanical methods. It covers a range of approaches, from inexpensive techniques to very innovative technologies.

Best practice: Use of bio-controls agents only to manage pests, with no use of synthetic chemicals. The aim here is to understand the farmer's understanding of the pest pressure, and the associated management and control through such tools as through comprehensive integrated pest management plans. You will be looking at the pest controls (reporting on frequency of product usage, etc.) as well as the product being used for the control. The more control AND the more biocontrol agents used, the higher the level of regenerative agriculture achieved.

-  Level 0 Use of unauthorized products (based on local and regional laws) or use of soil disinfection.
-  Level 1 Baseline: basic management (search for greater efficiency):
 - knowledge of the pest pressure
 - organic-certified AND conventional insecticides consumption monitoring (treatment notebook with frequency, type of products...)
 - lower treatment doses
 - suitable spreading practices and precision tools (height, speed, etc.).
-  Level 2 Advanced management towards alternative techniques: replacement of conventional inputs by alternative techniques within a mid/long term pressure reduction management plan and use of tailored inputs or targeted insecticides
-  Level 3 Expert management: no crop manufactured protection products, (including the ones authorized in organic certification); only biocontrol agents.

Example of advanced management techniques:
Pheromones and light traps, auxiliary insects, plants extracts, crop sowing time and spatial arrangement, etc.

Exception: In case of any mandatory treatment by local authority the farmer will still be awarded level 2.

Example of expert management techniques:
Chitosan

Exception: In case of any mandatory treatment by local authority the farmer will still be awarded level 3.





High level description

3 Fungicides management *(Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)*

The development of fungus control strategies incorporates preventive and nature-based techniques as well as mechanical methods. It covers a range of approaches, from inexpensive techniques to very innovative technologies.

Best practice: Use of bio-controls agents only to manage fungus, with no use of synthetic chemicals. The aim here is to understand the farmer's understanding of the fungus, and the associated management and control through such tools as through comprehensive integrated fungus management plans. You will be looking at the fungus controls (reporting on frequency of product usage, etc.) as well as the product being used for the control. The more control AND the more biocontrol agents used, the higher the level of regenerative agriculture achieved.

- ⊙ Level 0 Use of unauthorized products (based on local and regional laws) or use of soil disinfection.
- ⊙ Level 1 Baseline: basic management (search for greater efficiency):

 - knowledge of the fungal pressure
 - organic-certified AND conventional fungicides consumption monitoring (treatment notebook with frequency, type of products, etc)
 - lower treatment doses
 - suitable spreading practices and precision tools (height, speed, etc.).
- ⊙ Level 2 Advanced management towards alternative techniques: replacement of conventional inputs by alternative techniques within a mid/long term pressure reduction management plan and use of tailored inputs or targeted fungicides
- ⊙ Level 3 Expert management: no manufactured crop protection products, (including the ones authorized in organic certification); only biocontrol agents.

Example of advanced management techniques:

Auxiliary bacteria, plants extracts, targeted and specific steam sterilization, crop sowing time and spatial arrangement, etc.

Exception: In case of any mandatory treatment by local authority the farmer will still be awarded level 2.

Example of expert management techniques: Bio-stimulants

Exception: In case of any mandatory treatment by local authority the farmer will still be awarded level 3.





Assessment



High level description

4

Treatment frequency (Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)

Quantity of active ingredient proportion of crop protection treatment/ha/year

Best practice: The aim is to establish the exact frequency of herbicides products application. The more frequent are the treatments with non-biocontrol agents, the more harmful it will be on the soil and the ecosystem. Farmers who only use bio-control agents will not be scored on this criteria.

- ⦿ This is not yet scored as part of this assessment but we encourage farmers to calculate the frequency of herbicides products application.

5

Treatment frequency (Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)

Quantity of active ingredient proportion of crop protection treatment/ha/year

Best practice: The aim is to establish the exact frequency of insecticides products application. The more frequent are the treatments with non-biocontrol agents, the more harmful it will be on the soil and the ecosystem. Farmers who only use bio-control agents will not be scored on this criteria.

- ⦿ This is not yet scored as part of this assessment but we encourage farmers to calculate the frequency of insecticides products application.

6

Treatment frequency (Livestock + crop producers, above ground crops producers, below ground crops producers, strawberry producers, orchard producers)

Quantity of active ingredient proportion of crop protection treatment/ha/year

Best practice: The aim is to establish the exact frequency of fungicides products application. The more frequent are the treatments with non-biocontrol agents, the more harmful it will be on the soil and the ecosystem. Farmers who only use bio-control agents will not be scored on this criteria.

- ⦿ This is not yet scored as part of this assessment but we encourage farmers to calculate the frequency of fungicides products application.





Best practices

DANONE ONE PLANET. ONE HEALTH

✓ What are the recommended practices?

Switching entirely from chemical pesticides to organic pesticides or biocontrol agents can be challenging and take several trials iterations over a number of years. So, until a farm is ready for the transition, good management can go a long way in ensuring the right usage of pesticides.

It is recommended to spray **only** if there is a specific pest or disease that needs to be controlled. Preventive and or systematic spreading are very damaging for biodiversity. Use the right pesticides only to control the issue that has been identified and keep appropriate records of pesticide use.



An example of bio-control agents

Some good practices even entirely suppress the need for any types of agents such as mechanical weeding or seedbed delay. These practices are also recommended.

Certain chemicals such as sulfur, Spinosad or copper are authorized in some countries, but are still considered pesticides for the purpose of this scoring.

✗ What are the non-recommended practices?

It is also important to understand what the soil needs to be healthy. Getting rid of 100% of the weeds can be counterproductive. Removing too many weeds, mulch or other ground cover exposes the soil to the elements which can deteriorate the quality of the soil. Exposed soil washes away easily and will dry out.

Improper use of chemicals can also be a health hazard risk to people who are in contact with it.



An example of harmful pesticides

↻ How to best implement the good practice

Switching to bio-controls only is not something that can be done overnight. It is a process by which farmers first reduce the amount of chemical pesticides and then replace it with bio-controls.

- First, reduce pesticides by only applying them when necessary, reduce waste during spraying etc. And avoid particularly harmful large spectrum products.
- Second, apply better management by reducing the frequency of treatment, reduction of dosage, better targeting when spraying, optimization of product choice, prevention etc.
- Third, start introducing bio-controls to replace the pesticides. Again, only where and when necessary.



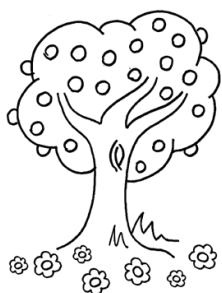


Assessment



High level description

BIODIVERSITY – ON-FARM NATURAL HABITAT



Cultivation of the land affects the capacity of areas to support native biodiversity. In highly cultivated area, most of the natural habitat, is destroyed or drastically reduced. It is important to keep a certain percentage of natural habitat i.e., uncultivated land within the farmland where a specific species lives. This encourages biodiversity and in turn, ensures a healthier agro-ecosystem with functional benefits for the crops (e.g., natural biocontrol).

1 Proportion of natural habitats in the agricultural land (All producers)

Protecting and enhancing natural habitats on our agricultural lands (such as trees, woodland, meadow, oasis or stonewalls) can be extremely beneficial to foster biodiversity.

Best practice: The aim is to establish the percentage of the land dedicated to natural habitats i.e., non cultivated or built/productive area. A wide variety of natural habitats allow to host many species of insects, birds and mammals which require a particular habitat (embankment, old tree, scree, grassy strip, etc.) and/or a specific food resource for their life cycle to live

- Level 0 The vast majority of the land is used either for cultivation or for other productive activities.

- Level 1 Baseline: We consider the minimum requirement for the baseline to be 5% and 7% of the land dedicated to natural habitat.

- Level 2 Between 7% and 10% of the land is dedicated to natural habitat.

- Level 3 Over 10% of the land is dedicated to natural habitat.

Depending on the type of natural habitat, there are different ways to calculate it. If in a form of a strip, the calculation will be based on the length of the strip. Most of the time, 1000ml* will equal 1ha.

If in a form of an area with vegetation such as bushes or hedges, 1ha of land will equal 1ha of natural habitat.

These calculations methods are indicative.

*linear meter, calculated either on the line joining the trunks (aligned trees) or on the edge of the plot



EXAMPLE

This percentage can be established directly with the farmer by determining the surface that is dedicated to natural habitat (ex: 1 ha) and dividing it by the total surface of the farm (ex: 25 ha). In this example, the percentage would be 4% (1/25x100) – Level 0. Farms smaller than 5ha are excluded from this criteria.





Assessment



High level description

2 Landscape elements management (All producers)

Among the many practices that allow to foster and maximize the function of natural habitats, one of the key practices is the preservation and light maintenance of landscape elements.

Best practice: Moderate interventions on hedges and bushes with several species and stratification is important to preserve biodiversity within the farm. The aim is to protect the multi-layered hedges and bushes that are a shelter, breeding and feeding area for many animal and plant species. The more diverse the hedges are and the more lightly they are maintained, the higher the level of regenerative agriculture is achieved.

- ⊙ Level 0 Not recommended machinery are used or have single-species hedges.
- ⊙ Level 1 Baseline: We consider the minimum requirement for the baseline as layered multi-species hedges which are pruned once a year.
- ⊙ Level 2 Multilayered multi-species hedges that are pruned once every 2 years at most.
- ⊙ Level 3 Multilayered multi-species hedges that are pruned once every 3years at most.

Example of not recommended machinery: Use of a verge cutter, massive bucking, pollarding, harvester or a cutter bar can cause the wood to split, which can lead to the development of diseases and rots.

Example of recommended machinery: Saw blade, pruning shears





Best practices

**What are the recommended practices?**

Understanding what constitutes a natural habitat and which one is best adapted to the location of the farm is important. Natural habitats include ecological corridors in agricultural landscapes (fixed and non-productive elements) such as hedges, bushes, woodland and isolated trees, stonewalls, uncultivated field margins and corners, wetlands, deserts, non-cultivated/built/productive areas.

It is recommended to fully understand the best natural habitats for a specific land. Favouring the use of native species, the diversity of habitats, and their continuity with other ecological corridors is key.



An example of land with natural habitat

**What are the non-recommended practices?**

It is not recommended to introduce wildlife or plants that are foreign species, not naturally present in the landscape. Their introduction can have an unknown and negative effect on the whole ecosystem, and even favor invasive species. Although having natural habitats on a farm can be an effective tool to regulate the number of pests, it is unwise to rely purely on it for pest management. The use of biocontrol will most likely still be necessary.



An example of land with no natural habitat

**How to best implement the good practice**

Like in all of the other best practices described, an audit and thorough understanding of the agro-ecosystem is crucial before you can try to improve or restore its natural habitat. First, understand the climate, the drainage, and soil conditions, and neighbouring habitat already present.

A wildlife and natural habitat management plan is then necessary. Select the wildlife species according to geographic specificities and plan the implantation of the habitat accordingly. In order to plan for success, the following elements are required:

- A written description of the area
- A clear set of objectives and requirements
- An action plan





Assessment

 High level description

BIODIVERSITY – FEED SELF-SUFFICIENCY







When dealing with livestock, feeding requirement can be a source of worry in terms of cost, availability, volatility and quality of the products. Feed self-sufficiency can ensure better cost control and a higher confidence in the quality of the product due to the full traceability. It can also lead to financial savings thanks to the fact that the farmers are growing the livestock food themselves, instead of buying it. Because the industry in charge of feeding livestock is often linked to intense deforestation, and highly contributing to climate change, feed self-sufficiency is an important criteria of regenerative agriculture.

1 **Origin of protein feed** (Livestock farmers)

Traceability of the proteins used in animal feed.

Best practice: Having the highest possible traceability of the protein products purchased to feed livestock. The livestock feed will in many ways determine the quality of the milk and meat they will produce. Unhealthy food will create low quality milk and unhealthy livestock. The aim is to determine the percentage of sustainable protein products farmers feed to their livestock. **Farmers need to prove the traceability of products purchased out of the farm.**

-  **Level 0** The vast majority of the protein products are either not traceable or come from non-sustainable sources. Level 0 also applies to proteins sourced locally but whose upstream origin is unknown.
-  **Level 1** Baseline: We consider the minimum requirement for the baseline to be between 60% and 79% of the protein products come from sustainable sources
-  **Level 2** Between 80% and 99% of the protein products come from sustainable sources.
-  **Level 3** 100% of the protein products come from sustainable sources.

Note:
% must be calculated or estimated based on mass.

If protein is coming from concentrates, please consider the main protein ingredient



EXAMPLE

This can be established directly with the farmer by determining what percentage of the overall protein used on of the surface dedicated to Danone production is sustainable (ex: 15% untraceable Soy + 40% grass + 30% alfalfa + 15 % rapeseed = 85% of traceable protein source – Level 2). Pull the information from the Cool Farm tool (CFT) if available, otherwise please give an estimate.





Assessment







High level description



Local protein (Livestock farmers)

Proportion of protein locally grown (on farm or < 500 km from the farm).

Best practice: The aim is to determine the percentage of the protein locally grown i.e. grown by the farmer or locally by third parties less than 500km away. The more food is self-grown by the farmer, the higher the level of self-sufficiency. It also has a positive effect on carbon emissions, since the feed no longer has to travel.

-  Level 0 The vast majority of the protein consumed by livestock is purchased and not grown by the farmer or locally sourced. Level 0 also applies to proteins sourced locally but whose upstream origin is unknown.
-  Level 1 Baseline: We consider the minimum requirement for the baseline to be between 30% and 49% of the protein products to be grown by the farmer or locally.
-  Level 2 Between 50% and 79% of the protein products are grown by the farmer or locally.
-  Level 3 Over 80% of the protein products are grown by the farmer or locally.



EXAMPLE

This percentage can be established directly with the farmer by determining the amount of protein locally grown (ex: 500kg/year) and dividing it by the total amount of protein consumed by the livestock (ex: 1500kg/year). In this example, the percentage would be 33% (500/1500x100 – Level 1). Give an estimate as the data is not available in CFT.



EXAMPLE

Below is an example of how to calculate the percentage of local protein when there are 3 types of protein coming from different sources. Feeding details:

- 30% of the protein is Soy from the farm
- 30% of the protein is alfalfa from a neighboring farm
- 40% of the protein is Soy from a source of more than 500km away

The calculation for local protein is 30% + 30% = 60%
= LEVEL 2 (50% to 80% of local protein)









Assessment

3 Local forage (Livestock farmers)

Proportion of forage locally grown (on farm or < 250 km).

Best practice: The aim is to determine the percentage of the forage locally grown i.e. grown by the farmer (or locally by third parties less than 250km away). This percentage can be established directly with the farmer by determining by the amount of forage locally grown.

-  Level 0 The vast majority of the forage consumed by livestock is purchased and not grown by the farmer or locally.
-  Level 1 Baseline: We consider the minimum requirement for the baseline to be between 30% and 49% by weight of the forage to be grown by the farmer or locally.
-  Level 2 Between 50% and 79% by weight of the forage are grown by the farmer or locally.
-  Level 3 Over 80% by weight of the forage are grown by the farmer or locally.

Note: As forage is a lot larger in volume than protein, its transportation requires more resources which increases carbon emissions.



EXAMPLE

As the data is not available in Cool Farm Tool, establish this percentage directly with the farmer by determining the amount of forage locally grown (ex: 500kg/year) and dividing it by the total amount of forage consumed by the livestock (ex: 1500kg/year). In this example, the percentage would be 33% (500/1500x100 – Level 1).





Best practices

✓ What are the recommended practices?

There are several sustainable proteins to take into consideration:

- Soy (only when it is imported from a non-deforested certified area or produced in Europe, US or produced in a low deforestation risk area or on-farm produced),
- Alternatives sources of proteins (legumes or by products like rapeseed cake, brewers' grains, etc.),
- Grass.



An example of source of protein grown by the farmer to feed it's own livestock

Feed provided to livestock must contain as much of these sustainable sources of protein as possible.

Danone is strongly committed to eliminate deforestation from its supply chain. Several certifications that ensure the right source when it comes to soy supply are available on the market. Moreover, it is important to note that regenerative agriculture practices strongly recommend farmer to be autonomous in livestock feeding i.e., to grow their protein for livestock consumption themselves. Traceability would then be easier, and it also has a positive impact on biodiversity and soil nutrients when different types of crops are used.



ProTerra and Donau are 2 certifications accepted by Danone as a proof of non-deforestation

✗ What are the non-recommended practices?

Not following the regulations in place in a specific country/geographical area can be dangerous for livestock health. There are many sources of feed for livestock that can seem practically and economically attractive but are actually very harmful to livestock.

Traceability is key here and farmers need to ensure feed is coming from reliable sources, certified by Danone-approved organizations as much as possible.

♻️ How to best implement the good practice

Feeding any material that has not been produced specifically for use by livestock can be dangerous. It is therefore recommended to start by ensuring the livestock is not being fed harmful or illegal products. This can be done through a generic risk assessment.

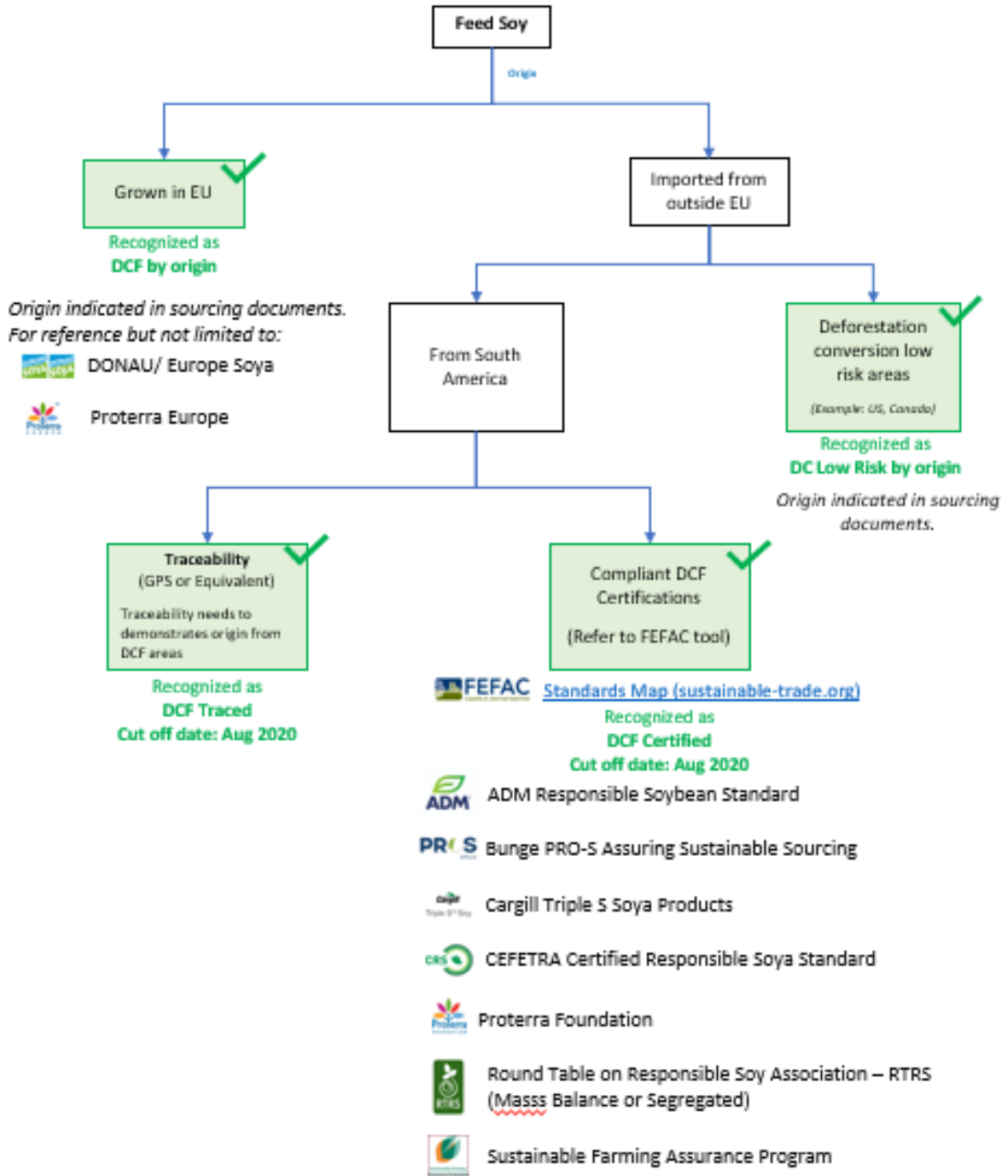
Keeping up to date with local regulations is also recommended, as livestock feeding is a highly regulated market.

Sourcing from trusted, local farmers is usually the safest option.





Deforestation Conversion Free (DCF) Feed Soy
(EU Milk – Feed Soy Sourcing Standards Map)



SOURCE: Danone

For more information <https://www.danone.com/content/dam/danone-corp/danone-com/about-us-impact/policies-and-commitments/en/2022/forest-update-on-key-categories-2021-data.pdf>





High level description

WATER – WATER QUANTITY MANAGEMENT



Fresh water is essential to life and is one of the irreplaceable resources needed in agriculture. It is a very scarce resource that is becoming more and more difficult to access, especially in certain regions of the world where water stress has become a pressing issue. If not managed properly, fresh water can be vastly wasted, leading to higher costs and even more scarcity of this crucial resource. **For the purpose of this assessment, we are only looking at water used for irrigation (excluding water used to dislodge pests, clean milking equipment, etc.)**

1

Irrigation source

(Irrigation systems - over 25% of the surface related to Danone's supply chain production irrigated)

Sources of water include natural surface water (rivers, reservoirs and lakes), rainwater, groundwater, piped water supply and reclaimed/recaptured/recycled water. Fossil water is groundwater that has remained sealed in an aquifer for a long period of time and is not renewable.

Best practice: Ensure a farm's water sources are traceable and sustainable. It is crucial for farms to understand the necessity of getting their water from sustainable or renewable sources. Adopting sustainable management practices of water resources by understanding, measuring and assessing how water flows around the farm will help to manage water efficiently and reduce pollution risks. The aim is to understand what is the source of the water used within a farm.

- Level 0 The farm does not meet the baseline
OR uses fossil water (underground water reservoirs that have been geologically sealed. The water contained in them cannot be replenished and may have been locked in for thousands of years)
- Level 1 The farm has a water-use license to irrigate a specific parcel or parcels of land (but do not necessarily respect it). We acknowledge that license may not be sufficient for a farm's need, but it still provides a good indication on the pressure applied on water resources.
- Level 2 The farm respects the water-use license it has been granted and can prove it.
- Level 3 The farm tracks and monitor irrigation water sources and water balance and/or
The farm relies on rainwater to water the crops for over 75% of the surface related to Danone's supply chain production and/or
The farm uses water recycled from industrial process





Assessment



High level description





2

Irrigation type

(Irrigation systems - over 25% of the surface related to Danone's supply chain production irrigated)

Each irrigation method has upsides and downsides. By far, the best sustainable irrigation techniques are drip irrigation and micro-sprinkler irrigation.

Best practice: Ensure there is no waste in water usage and that the irrigation system in place efficiently manages water supply. The way the water is supplied within a farm can be a big source of waste. Practices such as spray irrigation use large amounts of water with little efficiency (meaning a reduced percentage of the water applied actually reaches the crop, or the supplied amount exceeds plant needs at that moment). There are other practices however that make the best use of the water by releasing water only where needed, when needed, with high uptake percentage by the crop. These systems are called micro-irrigation and include drip irrigation and micro-sprinkler irrigation. The aim is to establish what system is and rank it based on its efficiency. We acknowledge that drip irrigation might not be the most efficient in terms of plant and root development but it is still considered a level 3 practice due to its benefits on water usage.

-  Level 0 The irrigation system does not meet baseline (Permanent flooding, occasional flooding from ground water sources)
-  Level 1 Baseline: occasional flooding irrigation from renewable surface water only (occasionally open)
-  Level 2 Managed micro-sprinkler irrigation (sprinkler and centre pivot)
-  Level 3 Managed drip irrigation, including underground and / or managed micro-sprinkler irrigation

Exception: Overhead micro-sprinkler irrigation can be used as anti-freeze for orchards production (LEVEL 3)





Assessment

3 Irrigation Management *(Irrigation systems - over 25% of the surface related to Danone's supply chain production irrigated)*

Schedule and regulate irrigation water application to meet crops water needs without wasting water, soil, plant nutrients, or energy. This means applying water according to crop needs in amounts that can be held in the soil, and at rates compatible with the soil absorption characteristics and the erosion risk.

Best practice: The frequency and management of water usage need to be analysed in order to reduce waste while still responding to the crops water needs. The aim here is to ensure water is only being used on crops when it is necessary. This is determined by looking at irrigation management system and evaluating the efficiency of the system.

- ⊙ Level 0 There is no management system in place to ensure irrigation is only performed when needed.
- ⊙ Level 1 Baseline: the farm has a basic irrigation management system and practices that include at least quantity assessment of all water used on the parcels with a functional tool (example water meter), including free water supply AND no irrigation when sufficient rain for crop need.
- ⊙ Level 2 The farm has an advanced irrigation management system and practices that include at least a simplified water efficiency model to assess the flow of water in and out of the system AND irrigation scheduling by monitoring the weather forecast, as well as soil and plant moisture
- ⊙ Level 3 The farm has an expert irrigation management system that includes at least systems/practices of level 2 AND a monitoring of the soil needs by using sensors or management tools (decision support tools) or other similar tools.

4 Water usage *(All producers)*

Quantity of water (all types of water including pumped water for irrigation, frost protection, pest management, machinery and farm building cleaning, etc.) used at farm level (L/year).

Best practice: Use of the minimum amount of water needed. The actual quantity of water used at farm level (L/year) is therefore a good indication of how much of this resource is needed in a given year.

- ⊙ This is not yet scored as part of this assessment but we encourage farmers to calculate the actual quantity of water used per year.

Note: Criteria to be assessed at farm level and not at Danone's supply chain level





Best practices



What are the recommended practices?

Management of water is a huge challenge for our generation which goes beyond agriculture practices. Farmers therefore need to contribute to saving this resource and move towards sustainable sources of water that include:

- Natural surface water (rivers, reservoirs and lakes), or groundwater.
- Rain water,
- Piped water supply and harvested from rain / reclaimed/ recaptured/ recycled water.

On top of getting water from sustainable resource, the recommendation is to move away from surface irrigation as much as possible to favor micro-irrigation.



An example of micro-irrigation system



What are the non-recommended practices?

Sustainable water sources are crucial. Fossil water sources, which are ancient water bodies that have been contained in some undisturbed space, typically groundwater in an aquifer, for millennia and are not renewable are therefore not recommended as a viable source of water.

Not recommended either, are surface irrigation systems, especially sprayers.



An example of flooding, a very inefficient irrigation system



How to best implement the good practice

Once again, a transition can be challenging. While using irrigation system can create financial savings thanks to lower volumes of water being used, the price of the material required can be high. A thorough financial planning is therefore necessary in order to avoid bad surprises.

As in any other transition, technical knowledge is also key. The current irrigation technic needs to be evaluated as well as the specificities of the land. Indeed, the efficiency of the transition to a micro-irrigation system can depend on the land's topography, the water resources and the soil specificities.





High level description

WATER – WATER QUALITY MANAGEMENT



Water quality is vital for the success of agriculture, and in turn, proper agricultural management practices are necessary to meet domestic water quality standards and provide for a healthy ecosystem. Certain agricultural practices result in water pollution due to the run-off of fertilizers, slurry, silt, chemicals and pathogens into rivers, streams and bays. This kind of pollution promotes the growth of algae and bacteria at fast rates, stripping the water of its oxygen. Several practices can significantly reduce the pollution of these water courses. For the purpose of this scoring, a water course is defined as a river, drainage or irrigation canal. It can be natural such as rivers or streams, or artificial (meaning it was constructed by humans).

1 Buffer zone *(All producers with water course)*

Strip of permanent vegetated land of a minimum of 5 m width (herbs, grass, bushes, trees) or at least including hedges planted continuously alongside water courses and occupying a bandwidth of the strip significant enough to protect valuable natural assets.

Best practice: Implementation or preservation of buffer zones when a farm has water courses. The larger part of the water surrounded by buffer zone, the more protected it is. The aim is therefore to calculate the percentage of the water course that has buffer zone as described above.

- ⊙ Level 0 Less than 25% of the water course is protected by buffer zones.
- ⊙ Level 1 Baseline: Between 25% and 34% of the water course is protected by buffer zones and the rest is protected by strips of at least 1m.
- ⊙ Level 2 Between 35% and 49% of the water course is protected by buffer zones and the rest is protected by strips of at least 1m.
- ⊙ Level 3 Over 50% of the water course is protected by buffer zones and the rest is protected by strips of at least 1m.

2 Buffer zone surface *(All producers with water course)*

Reliable estimation of the proportion of the-farm water courses surrounded by buffer zone (%).

Best practice: Increasing the percentage of buffer zone surrounding a water course. The aim is to ensure there is a plan to maintain and increase buffer zones.

- ⊙ This is not yet scored as part of this assessment but we encourage farmers to start planning to increase the buffer zones around water courses
- ⊙ If you have the precise estimation of the buffer zone surface on your farm please indicate it in the comment section (in m²)





Assessment

3 Contaminated runoff water management (*All producers*)

Management of wastewater generated from crop and livestock operations: agrochemicals tanks cleaning, agrochemicals canisters cleaning, cleaning of the milking system (parlor, yards, milk cooling..), manure and slurry process generated wastewater-cleaning of farm buildings.

Best practice: Reducing the source of pollution that can contaminate the water. Another way of reducing water course pollution is to have less pollution on the soil in the first place (from livestock or crops effluents). There are systems/practices that can be put in place to ensure minimum pollution and good management of contaminated waters (including proper collection, storage, treatment, disposal, and/or reclaim).

- ⊙ Level 0 There is no contaminated runoff water management system in place.
- ⊙ Level 1 Baseline: We consider the minimum to be the use of a collection and storage system for all wastewaters on the farm (livestock and crops effluents).
- ⊙ Level 2 Use of a dedicated collection and storage system for contaminated runoff waters.
- ⊙ Level 3 Level 2 + wastewater treatment process (sprayer with auto rinse system, etc.) and reclaim of any kind (irrigation of another plot, plant watering etc.)



Note: Example of runoff water storage



EXAMPLE

There are many effective practices for managing contaminated water runoff management practices, below are a few to help with the scoring:

Level 2: wastewater collection tanks for natural settling or oil separators, sludge traps, phyto/sun dehydration / recycled crust collection tanks, Pytobac/heliosec .

Level 3: system producing clear water reused for irrigation, reverse osmosis, settling pond, phyto purification with reuse of water for irrigation etc.





Best practices

**What are the recommended practices?**

The focus on not polluting water courses is of vital importance. The main thing to do is carefully plan all storage, handling arrangements and disposal of everything that can pollute water courses such as livestock slurries and manures, animal feed stuffs, silage effluent, agricultural fuel oil, dirty water, fertilisers, veterinary medicines, chemicals and pesticides of a farm. Careful planning significantly reduces risks.



An example of buffer zone next to a water course

**What are the non-recommended practices?**

There are several ground rules that drastically reduce the pollution of water courses if applied:

- Don't tie animals too close to rivers, streams or ponds. Their waste could pollute that water.
- Don't wash sprayers or your crops in rivers or ponds, to ensure that chemicals do not pollute the water.
- Don't dispose of pesticides or other farms chemicals in rivers or ponds.
- Don't allow livestock to have access to water courses. Instead, provide water at drinking troughs wherever possible.

The aim is to make sure water courses are NOT altered in any way.



A cow next to a water course, which can be a source of pollution

**How to best implement the good practice**

Updates on the rules and regulations that may apply to a specific country or region is one thing to continuously look at. Planning carefully by getting professional advice on how to ensure minimal or no pollution will also help.

Before implementing buffer zones and water management systems, it is recommended to work towards reducing dirty water around the farm and carry out a land risk assessment for slurry and manure which will provide useful information on how to best prevent further pollution.





Glossary

Anaerobic digester = The technology that takes sludge, manure, and other organic waste materials and produces natural gas (methane) that can be used as a renewable energy.

Buffer zone = An area of land designated for environmental protection. The main purpose is to enhance the protection of a specific conservation area, often peripheral to it. For the purpose of this assessment, buffer zones refer to the protection of water streams.

Carbon sequestration = Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and mitigate climate change. Carbon sequestered, or stored, is carbon not re-emitted into the atmosphere for a period of at least 100 years.

Chemicals = A chemical is any substance consisting of matter. There are natural chemicals which are produced by nature, and synthetic chemicals, which are made by humans using methods different than those nature uses, and these chemical structures may or may not be found in nature.

Crop species = A group of closely related crops that are very similar to each other and are usually capable of interbreeding and producing fertile offspring.

Crop species = Crop species are the different types of crop that can be found in nature. The narrowing of diversity in crop species contributing to the world's food supplies has been considered a potential threat to food security.

Discing/Disking = Soil preparation practice, using machinery such as disker, that usually follows ploughing but precedes seeding. Manages residues from the previous crop and creates seed beds in the soil.

Dry manure = Dry manure is fresh manure from the barn mixed with straw, hay, shavings, or wood pellet bedding. Solid manure has 20% solids content.

Dry stack = A Dry Stack means a fabricated structure for temporary storage of animal waste.

Ecological Focus Area (EFA) = an area of land upon which agricultural practices are carried out, that are beneficial for the climate and the environment.

Erosion = The process by which the surface of the earth is worn away by the action of water, glaciers, winds, waves, etc. While erosion is a natural process, human activities have increased by 10-40 times the rate at which fertile soils' erosion is occurring globally.





Glossary

Fertilizer = A chemical or natural substance added to soil or land to increase its fertility. Many sources of fertilizers exist, both natural and industrially produced, with widely different effects on soils, crops and ecosystems.

Forage = Raw and/or fermented fibrous feed for cattle.

Harrow = One of the most common types of farm equipment which breaks up and smooth out the surface of the soil, used for seedbed finishing with the primary goal of preparing the soil for growing crops. Harrowing is usually done immediately after disking.

Legume = a plant that has its seeds in a pod, such as the bean or pea and can develop a symbiosis with Nitrogen-fixing bacteria, hence capturing Nitrogen for the air and releasing it back into the soil in a form available for plants uptake.

Manure = Organic matter that is used as organic fertilizer in agriculture. Most manure consists of animal faeces (livestock manure, bird droplets, etc.); other sources include compost and green manure.

Micro-irrigation = Irrigation method with lower pressure and flow than a traditional sprinkler system, widely used in agriculture. This practice is more economically beneficial and more respectful of the environment.

Micro-organism = Any living organism too tiny to be seen with the naked eye. There are different groups of micro-organism including bacteria, archaea, fungi (yeasts and moulds), algae, protozoa, and viruses.

Natural habitat = An ecological or environmental area where a specific species lives. It is the place in nature that particular species calls home, such as bushes, groves, permanent pastures etc... Natural habitat includes pasture of grass and meadow and excluding land with cover crops.

Nitrogen = The chemical element that forms about 78 per cent of the earth's atmosphere, but even though there is so much Nitrogen in the air, there is very little in the Earth's crust. It can be found under several gaseous or ionic forms (ammonia, air, nitrous oxide, urea, nitrates...), only a limited fraction of which is available for plants uptake. It can be used to make fertilisers, nitric acid, nylon, dyes and explosives.

Nutrient = A substance that provides nourishment essential for the maintenance and growth of life and for growth.

Organic farm: Agricultural system that involves the use of biological materials, avoiding synthetic substances to maintain soil fertility, and operates according to certified standards.





Glossary

Organic matter = Biological material in the process of decaying or decomposing, such as humus. It is more generally a large source of carbon-based compounds found within the environments.

Pasture = Land covered with grass and other low plants suitable for grazing animals, especially cattle or sheep. Permanent pasture (pasture of 5 years or longer) are land used to naturally grow grasses or other herbaceous forage or through cultivation. For the purpose of this assessment, They will not be included in the farm's crop rotation, but do account for a surface of natural habitat. Temporary pasture are grassland less than 5 years of age, included in a crop rotation.

Pesticide = A synthetic chemical substance used to eliminate insects or other organisms considered harmful to cultivated plants or farmed animals. Pesticides are widely used in agriculture and can have proven negative effects on the biodiversity and general health of soils.

Protein = Macronutrient that is essential to building muscle mass. It is commonly found in animal products, though is also present in other sources, such as nuts and legumes.

Seeding = The process of planting.

Soil compaction = Soil compaction occurs when soil particles are pressed together, reducing pore space between them. Heavily compacted soils contain few large pores, less total pore volume and, consequently, a greater density. A compacted soil has a reduced rate of both water infiltration and drainage.

Slurry = A semi-liquid mixture of fine particles of manure suspended in water. Slurry manure is generated in systems where little, or no bedding is added to the excreted manure/urine. Slurry manure is typically between 5% and 15% solids. It is "thicker" than liquid manure but cannot be stacked or handled the same way as solid manure.

Slurry pit = A hole, dam, or circular concrete structure where farmers gather all their animal waste together with other unusable organic matter.

Tillage = The agricultural preparation of soil by mechanical agitation of various types, such as digging, stirring, and overturning. Although tillage has presented advantages to farmers, certain aspects of this practice (such as overturning and ploughing) is now considered harmful for soils in the long-term.

Water run-off = Water from farm fields due to irrigation, rain, or melted snow that flows over the earth that can absorb into the ground, enter bodies of waters or evaporate. This runoff can contain pesticides, sediment, nutrients and metals, which can contaminate sources of water.

Weed = A wild plant growing where it is not wanted and in competition with cultivated plants. When becoming out of control, weed can become invasive and affect crops yields and quality.





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