Handout

How to prioritize Regenerative Agriculture Objectives and Measures

for Strawberry Production in Mexico

Introduction

While intensive agricultural practices and changes in land-use threaten biodiversity and contributes to climate change, agriculture is of key importance for its protection as many species and habitats are closely linked to agricultural production. With the support of food standards and through individually defined, goal-oriented sourcing requirements, the food sector can make a significant contribution to curbing biodiversity loss.

Aim of this workshop is to provide an in-depth understanding of how goals and related (agricultural) measures for the protection of biodiversity and conservation of ecosystem services can be prioritized in order to achieve the greatest benefit for biodiversity in the shortest possible time.

Food Production, Biodiversity and Regenerative Agriculture

Biodiversity is responsible for ecosystem services that affect the productivity of agricultural systems in various ways. Species diversity within an ecosystem makes a more effective use of available resources, which increases the overall bio-productivity and its resilience when facing disturbances e.g. due to climate change. Ecosystem services dependant on species and habitat diversity include pollination and natural pest control. Both contribute to higher agricultural yields and reduced cost of agricultural inputs. Around 75% per cent of the main crops grown globally for human consumption rely to at least some extent on pollinators for growth, quality and/or seed production (Klein et al., 2007).

Within the brief Pollinators: Importance for nature and human well-being, drivers of decline and the need for monitoring; May 2020, Issue 23, the European Commission visualizes the importance of pollinators for agricultural systems. The following image displays the benefit of wild pollination for strawberry production:

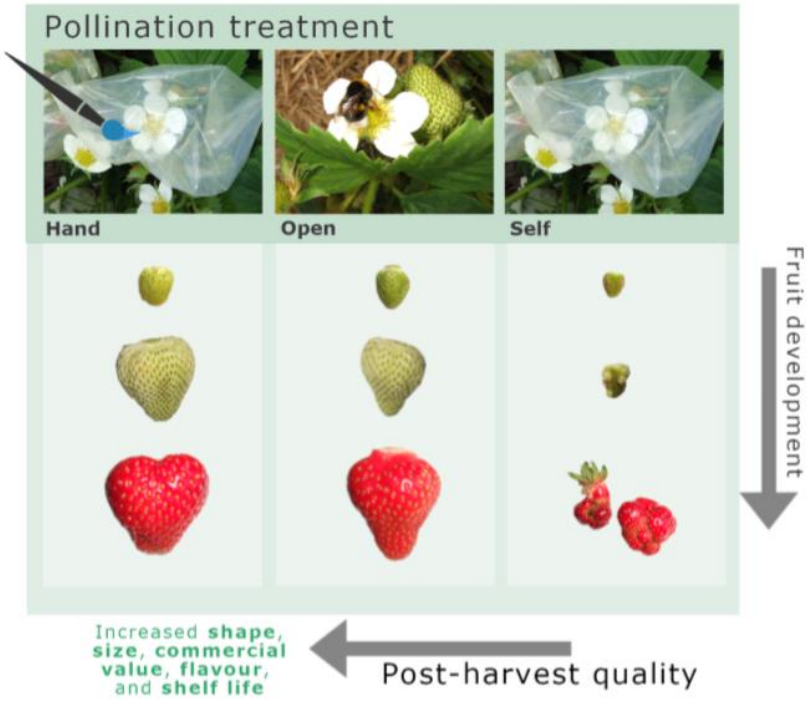


Figure 5. Impacts of different forms of pollination on factors that affect commercial value of strawberries, as shown by Wietzke *et al.* (2018) (redrawn figure). While this study found no difference between the effects of open (insect) and hand (human) pollination on value, it noted the high labour intensity of hand pollination.

The importance of ecosystem services for humans is evident in the areas of food production, clothing, regulation of micro- and macro-climate, soil fertility and water quality as well as the protection against natural extreme events and the resilience of agricultural system against climate change.

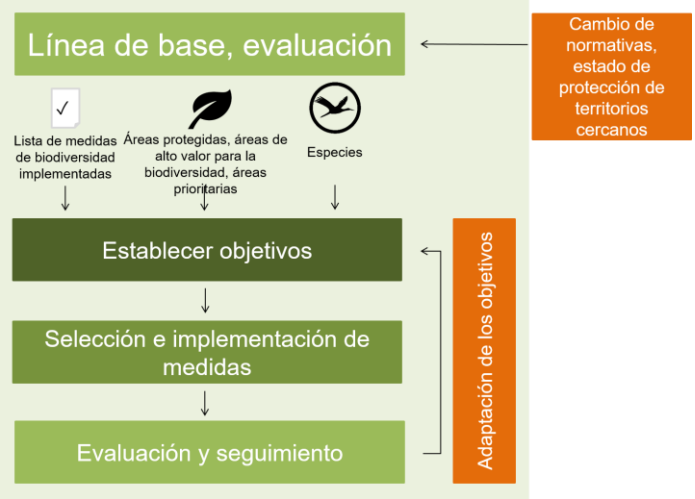
The FUTURE BRIEF: Pollinators: Importance for nature and human well-being, drivers of decline and the need for monitoring; May 2020, Issue 23 can be found at: https://ec.europa.eu/environment/integration/research/newsalert/pdf/issue-23-2020-05-pollinators-future-brief__en.pdf

Getting Started: Establishing a Biodiversity Action Plan for Regenerative Agriculture

The Biodiversity Action Plan (BAP) is the basis for protecting and promoting biodiversity on and around the farm.

The BAP consists of four sections: *1) describe the baseline 2) setting goals for the protection of biodiversity 3) develop and implement related (agricultural) measures* and finally *4) monitor the progress.*

The baseline assessment considers the current situation and status of biodiversity on the production site and pays attention to the areas of high biological value, semi-nature habitats and the present flora and fauna.



The goals for the protection of biodiversity and conservation of ecosystem services are based on the baseline assessment and should be formulated in correspondence with experts, consultants and/or standards, considering the local requirements and conditions. Once the objectives have been set and prioritized, appropriate measures must be identified. If more than one measure can contribute to achieve a goal, a prioritization of measures need to take place in order to establish a precise way of proceeding.

In the workshops and this handout the focus was on the second and third of the four steps for the creation of the Biodiversity Action Plan for Regenerative Agriculture: *setting goals* and *developing and implementing measures* for the protection of biodiversity. The spotlight lies on the prioritization of goals to protect and enhance biodiversity and ensure ecosystem service provision their related measures.

For more information on the different sections of the Biodiversity Action Plan, please look here: https://www.business-biodiversity.eu/es/formacin-sobre-biodiversidad-materiales

Strawberry Production in Maravatío, México

In order to provide goals for the protection of biodiversity, suitable for the region of Maravatío, two aspects need to be considered:

1. The agricultural practices of the Strawberry-production
2. The regional context and conditions of the environment/landscape

In the logic of the Biodiversity Action Plan both aspects are derived from the baseline assessment. In the situation at hand, Secoam provided the baseline assessment on which all steps are based.

Formulate and prioritize goals

Based on the baseline assessment, the farmer or farm-advisor may formulate goals for the protection of biodiversity and conservation of ecosystem services on farm-level. However, goals need to be SMART: Specific, measurable, attributable, realistic and time-bound. The transition from a draft goal towards a SMART goal should happen in a dialogue between the farmer, the acting company and environmental experts.

How to create and manage SMART goals

SMART goals differ from pre-defined draft goals by a) a statement of tangible numbers and figures that describe the goal precisely and b) by being defined in a consensus of all participating stakeholders.

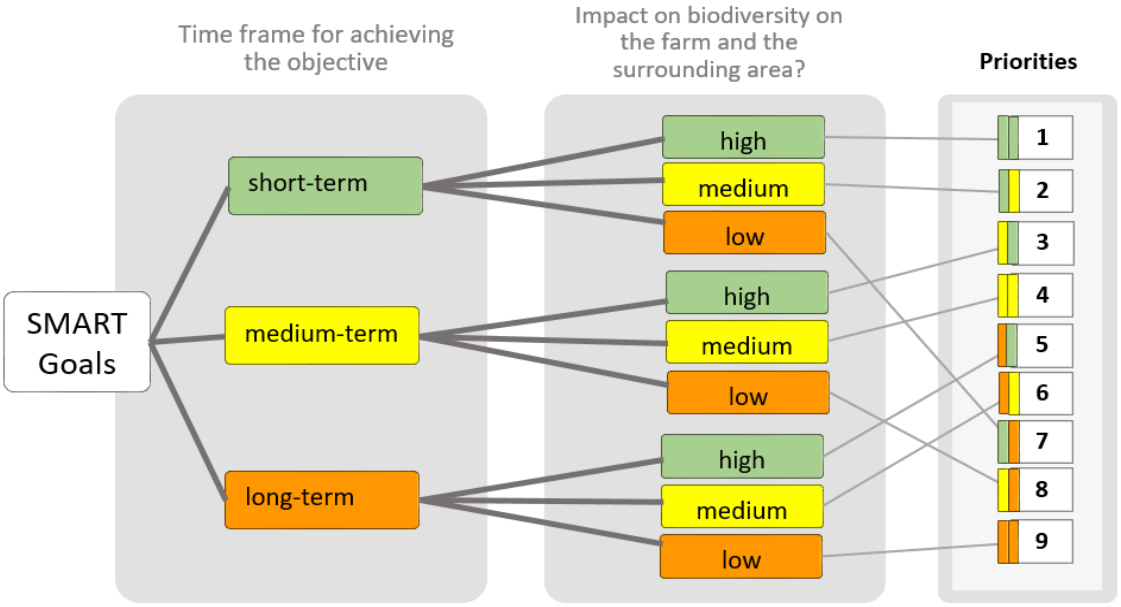
Examples:

Predefined, draft goals	**Exchange to find consensus with farmers, local biodiversity experts and the respective company**	**SMART goals**
plant trees on farmland		Plant **100 trees** on the agricultural used farmland
reduce erosion		Implement **a green-cover** on all of your field **in order to** reduce erosion

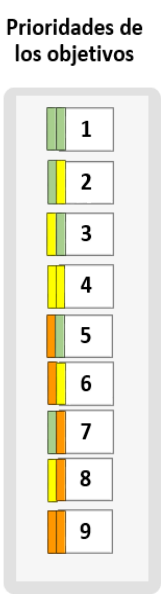
Once defined, the list of SMART goals should relate to
a) agroecological goals (specific farming/agricultural practices) and
b) biodiversity management goals (creation and protection of ecological structures on and around the farm).

The created list of SMART goals for the protection of biodiversity and conservation of ecosystem services may have a high number of entries. However, as company and farmer's resources are limited, this list needs to be prioritized, respecting the benefits for biodiversity as well as the timeframe that it may take to reach the goals.

Graphic 1: How to prioritize SMART goals



Focusing on Resources

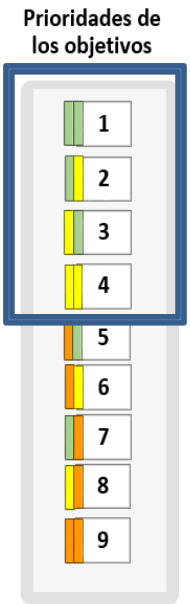


After prioritizing the SMART goals for the protection of biodiversity, it is up to the company to set a frame for focusing their resources on. It is likely to be unrealistic to strive to achieve all biodiversity goals at once.

In the example at hand, the company decides to focus first on the achievement of the first 5 SMART goals for the protection of biodiversity. The focus is displayed as a blue frame in the graph on the right hand side. This focus needs to be set individually by every company.

Once the focus is defined, measures need to be identified that contribute to achieve the chosen SMART-goals. Thereby, any company should first keep working at finding measures that contribute to the goals within the set focus, before resources are spent on the other SMART-goals.

If a farm manages to achieve all of the focused SMART-goals, than this famer in collaboration with the farm advisor and a local biodiversity expert should thrive to reach the goals not prioritized.



Formulating Measures

Once the focus has been set, appropriate measures must be identified to reach the SMART-goals within. Often more than one measure contributes to achieve a SMART-goal.

It is advised to prioritize the measures according to their benefit for biodiversity, their complexity of implementation and the related costs for the farmer in order to establish a clear framework that displays with which measure to start.

The aim is to start with measures that have a high benefit for biodiversity, are little complex in their implementation and come with as little cost for the farmer as possible. Just like SMART-goals, measure to achieve those goals also need to be as specific as possible.

Table 3: Example of measures to achieve the defined SMART-goals

SMART-goal	specific measures
Increase soil organic matter (SOM) on your fields by 0.3% until 2025	Leave organic substances (plant-rest) on soil to rot
	Use of natural fertilizers, such as manure
	Implement regular SOM-examination and monitoring
Increase amount of ecological structures (hedges, ponds, trees, small habitats, etc.) on your farm to 10% of your farming area	Plant hedges in order to connect biotopes (use native plant species)
	Create new habitats/ecological structures (e.g. stone surfaces, hedges, ponds, flowering strips) on farming area that is less productive or along the border of you fields.

As it is impossible to implement all measures simultaneously, prioritizing is very important. To do so, the following three decisive questions must be answered for each goal:

Prioritizing Measures

1. How big is the impact on biodiversity within strawberry cultivation and surrounding areas (low, medium, high)?
   - The impact on biodiversity is reflected by the local effect on plant and animal populations, which the biodiversity measure has on and around the farm
   - E.g. to increase the soil organic matter you can either use organic fertilizer or leave organic residues (plant-residues) on fields to rot. But through providing a food source for various insects, the latter (rotting plant residues) has a higher effect on biodiversity.

2. What is the anticipated complexity of the measure (low or high)?
   - The complexity reflects the workload, knowhow and equipment that the farmer needs to implement the measure.
   - E.g. new techniques for rainwater collection (ponds, sifón de colección, etc.) might include a lot of material and workload (high complexity) while introducing a documentation on how much water is been used for irrigation is less complex (low complexity).

3. What is the anticipated cost-benefit-ratio (favorable or unfavorable)?
   - The cost-benefit-ratio reflects on one hand the costs that are attached to the implementation of a biodiversity measure and on the other hand it includes possible yield losses or gains. Both estimations are then compared with the benefits provided by the biodiversity measure for the cultivation system.

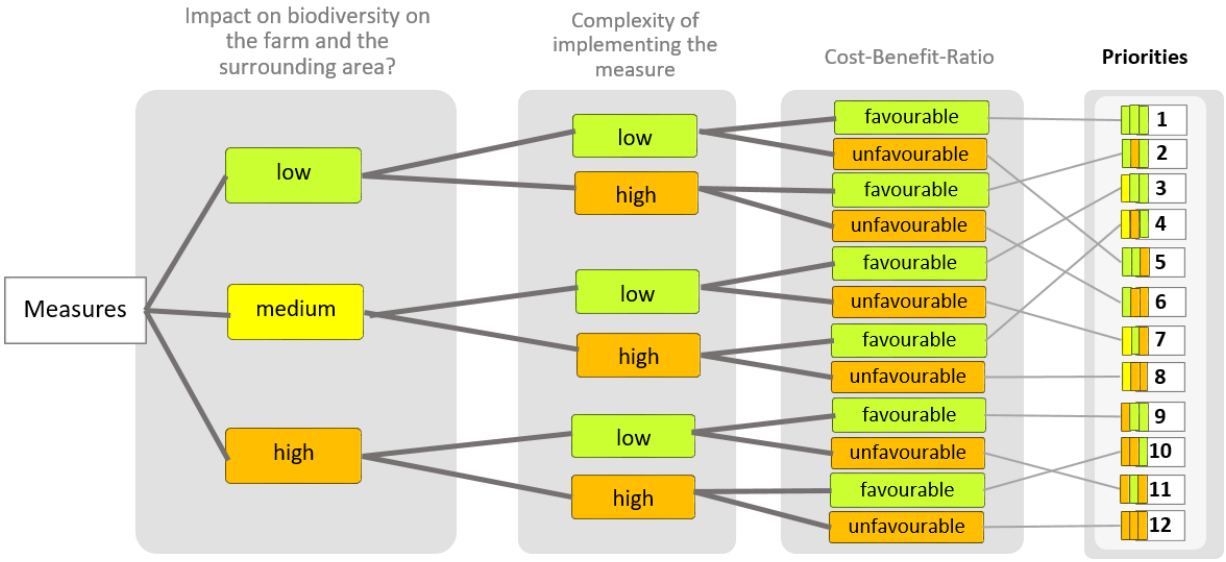
- E.g. If the benefit is ranked higher than or equal to the costs

E.g. to create small border habitats such as flower strips to attract beneficiary insects like pollinators is rather less expensive (low or medium costs) but may increase the yield of the strawberry production through additional pollination and pest control (medium or high). The cost benefit ratio is favorable.

- If the benefit is ranked lower than the costs

E.g. planting solitary trees are not beneficial for the production/do not impact the resilience of the farming area (low effect) and create extra costs (medium expensive). The cost-benefit-ratio is unfavorable.

Graphic 2: How to prioritize measures



Finally, when all these steps have been carried out, a prioritised list of measures results as shown in graph 2. These measures should be implemented one after the other. If an agricultural enterprise has implemented all measures or has achieved the objectives by implementing fewer measures, then measures for the non-focused objectives (section XX) should be developed and implemented.

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Ministerio Federal de Medio Ambiente, Protección de la Naturaleza y Seguridad Nuclear de la República Federal de Alemania

Esta directriz y los talleres sobre el Biodiversity Action Plan que se dieron online en mayo 2020, se vinculan al Proyecto Madre Tierra

Este proyecto fue diseñado y elaborado por las siguientes organizaciones/empresas: