FOOD & BIODIVERSITY

Biodiversity Management

Guideline on elaborating a Biodiversity Action Plan

Content

The Biodiversity Action Plan (BAP)

A Biodiversity Action Plan (BAP) is a strategic tool and road map to improve biodiversity on the farm through the development and application of a biodiversity management plan. It helps advisors and farmers to bundle activities for promoting biodiversity, to allow an overview over existing approaches and to facilitate an evaluation of these approaches with respect to the local situation and issues for local fauna and flora.

The baseline of existing ecological structures and agricultural practices relevant to biodiversity will be assessed. Taking the initial situation into account, the potentials for more protection of biological diversity are identified. The farmer sets goals and selects measures to achieve them. The implementation of the measures and their results are documented, i.e. the BAP is updated and thus supports the farmer in monitoring biodiversity performance. When developing a Biodiversity Action Plan for the first time, the farmer should be supported by an experienced advisor. Of course, the expertise of an expert on biodiversity, a nature conservation authority or a regional environmental organisation is also very helpful and also opens up opportunities for cooperation.

The existence of a BAP supports both the supplier and the certifier to check compliance with biodiversity criteria and to assess the quality of the implemented measures.

A BAP can also be part of a higher-level management plan that is already required by various standards or companies, such as an environmental management system. The current ISO 14001 contains references to "Wildlife" and "Biodiversity". The environmental management system is best suited to improve the biodiversity performance of an organisation by analysing the current situation (environmental assessment) and developing and implementing an environmental programme with targets and measures for biodiversity. In contrast to EMAS III (Eco-Management and Audit Scheme), ISO 14001 does not require mandatory reporting and is therefore less transparent.

It is neither practical nor effective for small farmers to draw up individual biodiversity action plans. Here the cooperative or producer association is called upon to develop a BAP for all members of the community and to ensure that ambitious biodiversity goals are pursued at the community level without endangering the livelihood of an individual smallholder.

Whether individual or joint BAP, a person responsible for coordinating planning, implementation and monitoring should always be appointed.

The Biodiversity Performance Tool (BPT)

The Biodiversity Performance Tool (BPT) is an online application that supports the farmer in creating a BAP. The tool is focused on the four climate zones in Europe; a version for subtropical and tropical regions is in preparation. It is applicable for different types of farming: Cereals, vegetables, perennial crops (e.g. fruit, olives), livestock (dairy cattle and meat production).

After completing a questionnaire with almost 100 questions on agricultural practices and ecological and socio-economic aspects relevant to biodiversity, the BPT provides a structured overview of the initial situation and an assessment of the strengths and weaknesses of the farm. These are shown in red, yellow and green in the traffic light system.

The tool also provides an overview of possible measures to create more potential for biodiversity and reduce negative impacts. A link provides detailed information on the implementation, expected results and positive side effects of each measure.

By continuously using the tool - at least every three years - the farmer documents the changes. With this simple but meaningful monitoring, the farm can demonstrate the extent to which biodiversity measures have been implemented and the aspects in which the farm has improved - or not.

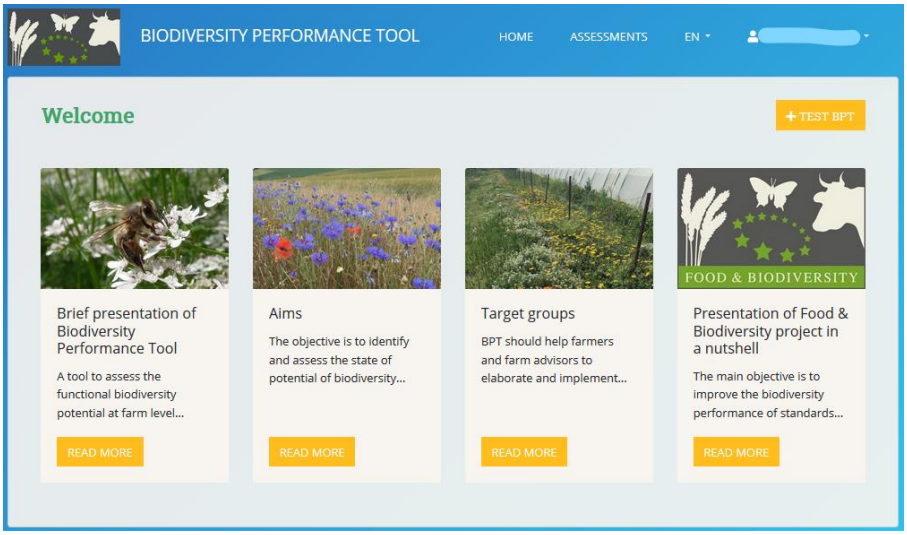

Figure 1: Screenshot of the Biodiversity Performance Tool website (source: Lake Constance Foundation)

Link to the Biodiversity Performance Tool: www.biodiversity-performance.eu

Link to training material and Biodiversity Factsheets: www.business-biodiversity.eu/en/biodiversity-training

Of course, farmers can also create a BAP without the BPT. It is important that the BAP is updated regularly.

Procedure and content

As a classical management tool, the BAP includes four steps:

1. Baseline assessment
2. Setting goals and priorities
3. Selection and implementation of measures with time line
4. Monitoring and evaluation

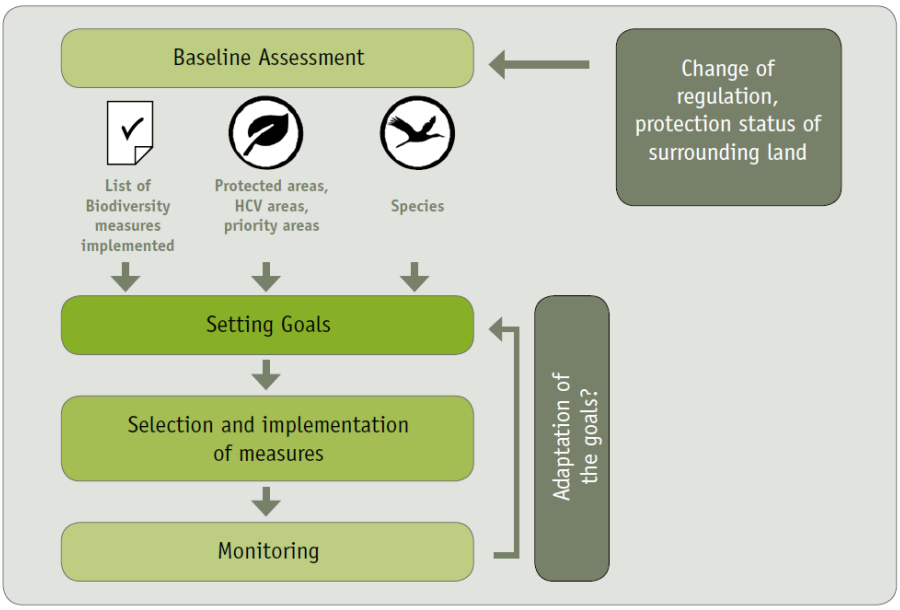

Figure 2: The four steps of a Biodiversity Action Plan (source: Didem Senturk)

The BAP should be reviewed and updated every three years:

- Have legal requirements with relevance for biological diversity changed? Are there new regulations / protection status for certain habitats and/or species in the region?
- Are there changed framework conditions that influence ecosystems and/or species, e.g. impacts of climate change? Is (external) expertise needed to effectively address the new challenges?
- Are the implemented measures and their results taken into account in the BAP? Have the effects been evaluated on the basis of the selected key figures and indicators? Have the measures achieved the planned results?
- Were the self-imposed goals achieved?
    - If not - why not? What other measures should be taken to achieve the goal?
    - Are there objectives that can only be achieved if the farmer cooperates with other farmers in the immediate neighborhood, e.g. the establishment of a biotope corridor? How can this cooperation be initiated?
    - If yes - first of all congratulations! And then the consideration of what new ambitious goals the farmer should set himself.

It is not expected that farmers implement the selected measures all at once and instead the measures should be differentiated into short and medium-term measures. Farmers can start with a couple of activities and then show a continuous improvement for the next years. For some of the measures such as the creation of biotope corridors to connect habitats or for the protection of species, it is more effective to work with other farmers in the neighborhood. This increases the effectiveness of the measure.

1. Baseline assessment

At the beginning of a Biodiversity Action Plan, a baseline assessment is conducted. The baseline assessment gathers information on landscape characteristics and biodiversity of the region such as sensitive and protected biodiversity areas, endangered and protected species and semi-natural habitats on or around the farm as well as cultivated areas. Existing biodiversity measures should also be included in the baseline assessment. Describing the initial situation is important for the following reasons: priority actions can be defined and measurable objectives defined. In addition, the farmer and the certifier can assess the effects of the measures implemented if they know the baseline situation.

What information is needed?

a) Areas used for agricultural production/sourcing (stables, warehouses, garages, etc.)

b) Areas with high value for biodiversity (on the farm or in the immediate surrounding):

- Natural (primary) ecosystems
- Protected areas
- High Conservation Value Areas

c) Semi-natural habitats such as:

- Ecological corridors (buffer zones, flowering stripes, streams, rivers or other linear structures)
- Fallow land
- Patches on the farm not used for production, but having a natural vegetation or plantings
- Hedges, shrubs, bushes
- Trees
- Forest or forest edges
- Extensively managed permanent pastures
- Ponds

d) Protected and endangered animal and plant species - when your farm operation is in or adjacent to an area with high value for biodiversity. Since protected and endangered species - in particular animal species - do not adhere to protected area boundaries, the farmer should generally check whether such species occur on the farm or in the immediate vicinity.

e) 2 - 3 indicator species for monitoring the development of biodiversity

f) Measures to protect existing biodiversity as well as measures to create potential for increasing biodiversity already implemented

g) VERY good practices to ensure more biodiversity already implemented

h) Description of potential risks for biodiversity: risks may come from agricultural activities as well as from adjacent areas (e.g. busy roads, noise sources, outside of Europe = contamination, by untreated sewage or illegal landfills).

The farmer transfers the information to a map. For this purpose, satellite images or aerial photographs can be used or, alternatively, a sketch of the farm can be made.

Figure 3: a) sketch of the farm land, b) satellite image of the farm land (source: Lake Constance Foundation)

In addition, the farmer should compile the following lists:

- List of animal and plant species that have been classified by the government as a protected species or have been placed on a national Red List and/or the Red List of IUCN. If the area of occurrence is known than this should also be included into the map. If the farm is in the range of a protected species, this should be included in the map. List of measures already implemented to protect existing biodiversity and to create potential for more biodiversity.
- List of biodiversity friendly farming practices for more biodiversity already implemented (see for further information the chapter VERY GOOD PRACTICES TO ENSURE MORE BIODIVERSITY)

The baseline assessment goes hand in hand with the monitoring of impacts on biodiversity. For more information, see also the monitoring chapter.

Where do I get the information from?

Information about	Where to get it? Who can help?
Protected areas in the vicinity of the farm	Lower Nature Conservation Authority; Regional Nature Conservation Authority; Regional Private Nature Conservation Organisation
High Conservation Value Areas (HCV Areas)	So far only expelled outside Europe!!! Information about designated HCV Areas as well as background and process for determination = High Conservation Value Network
Valuable / protected habitats in the EU, in the region	EU Fauna-Flora-Habitat Richtlinie. 200 habitat types and 1,000 animal and plant species are listed in the Habitats Directive. https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm There is a Natura 2000 Network Viewer available: http://natura2000.eea.europa.eu/ Lower nature conservation authority; Regional nature conservation authority; Regional private nature conservation organisation can also provide this information.
Protected and endangered animal and plant species in the region	EU Fauna-Flora-Habitat Directive. http://natura2000.eea.europa.eu Lower nature conservation authority; Regional nature conservation authority; Regional private nature conservation organisation can also provide this information.
Selection of 2 - 3 regional indicator species for monitoring	Lower nature conservation authority; Regional nature conservation authority; Regional private nature conservation organisation may propose suitable indicator species. They can also provide information on when and how monitoring of these species should be implemented. If a supplier has several producers in one municipality/county, it makes sense to select the same 2 - 3 indicator species for all producers and to organise cross-farm monitoring.
Mappuing of the farm	e.g. https://earth.google.com/web/; www.google.de/maps/ (satellite image); https://code-de.org/

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Methodological Guideline on Baseline Assessment

2. Setting measurable goals to protect and improve biodiversity

2.1. Identify priorities

A demanding BAP contains two overarching objectives that build on each other:

- Protection of existing ecosystems and species as well as the creation of potentials for more biodiversity
- Continuous reduction of negative impacts through the implementation of VERY good professional practice

With the help of the map produced and the list of measures already implemented, the farmer can set priorities that support these two overarching objectives, for example:

Current situation	Possible opportunity ….
Existing areas with high value for biodiversity, semi-natural habitats are not connected.	… to create a corridor network?
Semi-natural habitats are not present.	… to plant trees or bushes or develop other semi-natural habitats
A river is flowing through the production site.	… to create buffer zones?
No trees present.	… to plant trees?
The farm is near or adjacent to an area with high value for biodiversity.	… to identify protected and endangered species?
Endangered/protected species are present on or in the immediate surroundings of the farm.	… to protect these species by maintaining their habitat?

! To protect existing biodiversity and to create potential should be a priority!

However, negative impacts on biodiversity should also be avoided or reduced. The general main causes of biodiversity loss can help to identify the specific negative impacts of the operation:

- ***Degradation or destruction of ecosystems***: Numerous studies have identified agriculture as the main cause of degradation and destruction of ecosystems. The report of the World Biodiversity Council IPBES in 2019 concludes that agriculture is responsible for the degradation of about 23% of soils worldwide. Every year, 24 billion fertile soils are lost. The loss of productivity is estimated at between USD 235 and 577 billion. According to the FAO, around 60,000 square kilometres of rainforest are still destroyed every year to gain agricultural land ..... dramatic figures that underline the fact that the loss of ecosystems and biodiversity has reached a dimension that has just as negative consequences as climate change.

  The situation for Europe and Central Asia does not look any better despite extensive EU legislation! Since 1970, wetlands have decreased by 51% and natural and semi-natural grasslands, bogs and coastal and marine habitats have been degraded. According to the IPBES Report 2018, 73% of the EU's freshwater habitats worthy of protection have an unfavourable conservation status. Throughout Europe and Central Asia, lakes, ponds and rivers are changing or disappearing entirely as a result of agricultural intensification, irrigation and urban development, combined with climate change. Agricultural land and cultural landscapes can also be highly biodiverse - if action is taken!

How does your farm do? **Does the farm contribute to the degradation or even destruction of ecosystems/habitats in the immediate vicinity of the farm**, e.g. through the drifting of pesticides and/or fertilisers into the nearby stream or through the intensive management of habitats that are not protected but are nevertheless valuable habitats?

- ***Overexploitation of natural resources:*** It affects not only wild fauna and flora, but also soil biodiversity. **Does your activity contribute to the overexploitation of natural resources?** Examples are: overfishing of species, soil erosion and strong runoff of silt into lakes and rivers; overuse of soils due to inadequate crop rotation, soil and water sources pollutes with nitrate, pesticides or other contaminants; water resources that are taken at a rate that exceeds the recharge rate.
- ***The expansion of alien invasive species:*** Invasive species compete with naturally occurring species for habitats and resources. They can thus displace other species or entire communities of species. Invasive species in the EU include the Spiny-cheek crayfish, the muskrat, and the giant hogweed (for a list see https://ec.europa.eu/environment/nature/invasivealien/list/index_en.htm). **Are there species on the farm or in the immediate surroundings**, which can be a potential threat for native species as well as for agricultural production?
- ***Contamination:*** Is often the reason for the degradation of ecosystems, especially in the case of aquatic ecosystems such as streams, rivers, lakes, wetlands and ground water. According to IPBES, 85% of the world's lakes and wetlands have already disappeared or become so degraded that they can no longer perform their ecosystem functions. While waste management, sewerage and wastewater treatment systems are functioning in large parts of the EU, this basic environmental infrastructure is often non-existent in the new EU countries, Central Asia and in tropical and subtropical regions. In the EU, nitrogen inputs have led to large-scale groundwater pollution in recent decades. In addition, pesticides are also a frequent source of contamination. Are there still sources of pollution of ecosystems on the farm? Do diffuse nutrient inputs from nitrogenous fertilisers affect groundwater or surface water? To avoid potential impacts see Chapter “Very good practices to ensure more biodiversity”.
- ***Climate Change:*** The loss of biodiversity and climate change go hand in hand. Agriculture, for example, is a major emitter of methane and nitrous oxide - two particularly dangerous greenhouse gases. Emissions more than doubled between 1961 and 2016. 2/3 of nitrous oxide emissions are associated with the use of fertilisers and the spreading of liquid manure. Of course, agriculture also suffers massively from the consequences of climate change: degradation of land to desertification, periods of drought, heavy rainfall, storms, new pests.... Protecting biodiversity is both climate protection and adaptation to climate change! Only intact ecosystems are more resistant to the effects of climate change and able to provide ecosystem services such as groundwater recharge, clean water and air, fertile soils or pollination of crops.

Newly developed agricultural areas: A further aspect, which should be considered and become a priority

If farmers are planning to create new agricultural land, the following questions must be answered:

- Is the “new” area land of high ecological value?
- Are there habitats of protected/endangered species?
- Is the “new” area next to or in a protected area?
- Is it in or next to a biotope corridor?
- Is this a water-scarce area with stressed water sources (rivers, creeks, lakes, groundwater)?

If these questions were answered with yes, then the potential impact on biodiversity of agricultural activities will be high and it must be considered leave this area be. If it was decided that the area could be used, then the priority goal should be to implement special protection measures to ensure that the characteristic of the areas and the occurrence of species will not be influenced.

2.2. Setting measurable goals

Defining goals, the ability to measure the achievements is of major importance to evaluate the measures taken. Sometimes, it is not possible to quantify - and then qualitative goals are appropriate. Goals should be defined based on the list of identified impacts and opportunities for biodiversity and need to be SMART.

S = Specific	**M** = Measurable	**A** = Attainable	**R** = Realistic	**T** = Timely

The improvement of biodiversity needs time and the implementation of measures underlies the operational timetable of the farm. Therefore, it is recommendable to prioritize the goals regarding their practicability and their value to biodiversity:

- Can the set goals be achieved in the short, medium and long term?
- Is the added value for biodiversity low, medium or high?

! Short term goals with a high benefit for biodiversity should receive a high priority!

Possible goals:

- Increase of semi-natural habitats (% of the total farm area)
- Increase of areas connecting habitats / ecosystems (number and length of corridors)
- Promotion of a protected / endangered species - (increase in population, increase in habitat or food sources for a particular species). It is often only possible to check the growth of an animal population with the help of an expert. The expansion of a plant species can also be checked by a layman. See also Monitoring.
- Continuous increase of implementation of “VERY good practices to ensure more biodiversity” and corresponding reduction of negative impacts on biodiversity (reduction of the use of pesticides, synthetic fertilizers, etc.).
- Strengthening of protected areas in the neighborhood of the farm by setting up a buffer zone (qm or length)
- Creation of a round table on biodiversity with the farmers in the region in order to join efforts and to contribute to the regional Biodiversity Strategy
- Establishment of a practicable and meaningful monitoring of biodiversity
- Support the agro-biodiversity by growing and keeping traditional regional crops and animal breeds (number)

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Methodological Guidelines on Setting Goals and Priorities

3. Selection and implementation of measures

After defining goals, appropriate measures to achieve them should be identified and described in the Biodiversity Action Plan.

For every measure, it is important to identify:

- the objective
- the resources needed
- the responsible person for implementation
- a timetable for implementation

As well as the goals, also the measures can be prioritized. This can be done by assessing each measure regarding:

- how difficult it will be to implement (easy, medium, difficult)
- the benefits for biodiversity (low, medium, and high)
- and further benefits, e.g. climate protection, adaptation to climate change, competitive advantages (low, medium, high)

The decision about which measure should be implemented depends on the individual situation. Of first priority should be measures with the highest positive effect on biodiversity and the shortest period of implementation. However, in some cases high impact measures will be difficult to implement. In this case, it is better to start with easier ones with less impact but using the time to prepare the implementation of the difficult measures.

The following potential measures should be understood as examples, might not be exhaustive, and can be supplemented. As mentioned earlier, it is not expected that farmers implement the selected measures all at once. Farmers can start with a couple of activities and then show a continuous improvement during the next years.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Methodological Guidelines on Setting Goals and Priorities

3.1. Biodiversity management – protecting and creating potential

3.1.1. Increasing the share of semi-natural habitats

Why?

Semi-natural habitats are important elements to promote biodiversity on farm operations. They provide refuge and food for animals and plants. Sufficient size (each habitat and overall) and high quality implementation create potential for increased biodiversity. In addition, these habitats contribute to CO_2 storage, hydrological balance or microclimate creation. The value of individual habitats is further enhanced if they are linked by biotope corridors.

What to do? ….. Examples…..

For areas taken out of agricultural production:

- Preserving natural and semi-natural habitats. A minimum of 10% of semi-natural habitats at farm level should be present. They are preferably located adjacent and inside (large) agricultural.
- A minimum of 15% of canopy cover of the farm (or group of member farms) in the case of growing shade tolerant crops should be reached.
- Identify areas on the farm that are in a beneficial position for semi natural habitats or less productive (stony areas, steep slopes, wet areas etc.) or already covered by natural vegetation and use them as or create semi-natural habitat on them (e.g. planting trees, hedges and other refuges for wildlife).

For newly developed agricultural areas:

- If areas will be converted into farm land an independent environmental impact assessment prior to the conversion should be carried out
- If areas were recently converted into farmland, the loss of biodiversity/habitats must be compensated/restored

Further possible measures:

- Construction of stone or deadwood piles
- Installing nesting aids for wild bees
- Installing nest boxes for insectivorous birds or bats
- Implementation of riparian strips
- Planting of solitary trees
- Implementation of field margins
- Creation of ponds that are attractive for wildlife, e.g. amphibia
- Installing permanent water points for fauna

Detailed description of numerous measures (Action Fact Sheets) for the protection of biodiversity or the creation of potential:

- https://www.business-biodiversity.eu/en/biodiversity-training/advisors

3.1.2. Management of semi-natural habitats

Why?

Diverse vegetation, natural or planted such as hedges flower strips etc. provide habitat, shelter and food for a variety of animals and plants. In addition to the size, semi-natural habitats must also have a certain quality in order to be optimally used by the animals and plants as described above. Quality is expressed, among other things, in the diversity of landscape elements, plant selection and suitable maintenance.

What to do? ….. Examples…..

- Maintenance of stone or deadwood piles
- Neither fertilizer nor plant protection products are used on any ecological structure
- Only seeds of regionally native species are used for field margins and flower strips.
- Planting of new hedges: only native species are used for.
- Maintenance of hedges: e.g. trimming of hedgerows max. every 3 years; respecting breeding seasons.
- Regular cutting of solitary trees
- Manage fallow land in order to enhance biodiversity
- Support reversion to natural vegetation (if possible)
- No burning

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Action Fact Sheets for Biodiversity Management
- Guideline on the Protection of Primary Ecosystems and Semi-natural habitats

3.1.3. Creation of habitat corridors

Why?

Habitat corridors connect habitats separated by human activities or structures, allowing an exchange of individuals between populations. Wide corridors provide for greater diversity and are effected less from adjoining land uses and associated edge effects. In general, the wider the corridor is the better it is for biodiversity.

What to do? ….. Examples…..

- Create, maintain and enhance a network of natural vegetation along live fences, hedges, ditches, riparian strips, roadside and field margins across the landscape. Please note: buffer zones are also representing habitat corridors.
- If the farm operation borders with a protected area, areas specified for biodiversity on the farm must be connected to the protected area
- Areas specified for biodiversity at the farm operation are connected to one another via habitat corridors. The farmer should be informed about habitat corridor networks and integrate them wherever possible. This includes also migratory routes and wildlife corridors.
- Minimize disruption of habitat corridors by farm activities.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Action Fact Sheets for Biodiversity Management

3.1.4. Grassland preservation

Why?

Grassland as such is very diverse in plant and animal species, providing breeding ground, habitat and protection. Around one third of fern species and flowering plants mainly occur in grasslands. These represent about one third of the endangered fern species and flower plants in general. Therefore, the intensive use of grasslands strongly affects biodiversity.

What to do? ….. Examples…..

- Permanent grassland will not be ploughed/converted into arable land.
- Creation of a management plan for grazing (for grazing see also in the chapter "Very good practices").
- Avoiding soil compaction through grazing or heavy machinery.

  To prevent soil degradation grazing by pigs is reduced to a minimum or not carried out at all. This measure is not relevant in extensive forms of farming where food resources are sufficiently abundant (e.g. acorns in Dehesas/Montados and agro-forestry systems).
- The livestock density shall not exceed 1.4 livestock units/ha fodder area. A period is defined by reducing the stocking density to this maximum.
- Grazing is done in a way that the vegetation between grazing has enough time for regeneration.
- To protect the soil, turf is not mowed.

3.1.5. Specific measures for the protection of species

Why?

According to the report of the World Biodiversity Council IPBES, about one million of eight million animal and plant species are threatened with extinction. Amphibians, corals and many plant species are particularly at risk.

Since there have been humans on earth, never before have so many animals and plants become extinct as now. The IPBES report leaves no doubt that a gigantic extinction of species is taking place on Earth, comparable to the death of dinosaurs about 65 million years ago. The more than 150 IPBES experts underline that humans have already "strongly changed" three quarters of the earth's surface - not including the oceans.

Accordingly, measures or combination of measures should be implemented in order to counteract the main causes and to protect and conserve those species. Identification of endangered species is not always easy, and the same applies for the identification of measures. We recommend cooperating with local experts from the early beginning.

What to do? ….. Examples…..

- Obtain information about protected and endangered species in the region and identify protected and endangered animal and plant species on or adjacent to the farm (see baseline assessment)
- Report the presence of protected and endangered plant and animal species to the certifying standard/company and/or regional environmental protection agencies

- Seek cooperation with local experts to identify measures promoting this species
- No burning of natural vegetation for any reasons.
- Endangered and protected species are never subject of hunting, killing or collection
- Practices that interfere with or put in danger protected/endangered animals are avoided. This can be for example:
    - Felling of trees or cutting of hedges during mating/nesting season for birds
    - Mowing/haying fields during optimal pollination conditions (during day, sunny weather)
- Seeding cereals in wide rows (drill gaps) to support light demanding wild herbs and field birds
- Seeding cereals with low seed densities to support light demanding wild herbs and field birds
- Late stubble treatment to support concurrence weak wild herbs
- Large scale support of rare, endangered wild herbs with protected plots
- Keeping catch crop or cereal strips over winter to provide winter cover and retreat possibilities for hare
- Increasing cultivation of spring crops to support field birds
- Installing skylark windows
- Cultivation of traditional and less intensive cereal varieties
- High cut or not managed strip in clover grass to support field birds, insects and hare
- Annual to perennial fallow land
- Farm traditional, rare plant and animal species and breeds

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Action Fact Sheets for Biodiversity Management
- Species examples of endangered species, woody elements, invasive species for selected counties

3.1.6. Protection of primary (natural) ecosystems, semi-natural habitats and protected areas

Why?

Primary (natural) ecosystems, semi-natural habitats and protected areas have a high diversity of animals and plants and are therefore particularly valuable. A disturbance of the balance between organisms in an ecosystem/habitat but also the interactions of the organisms and the environment can result in significant and irreversible damage. For example, eliminating parts of a forest can alter its biodiversity and thus influencing the oxygen level in the air, dries the climate, enhances erosion, reduces the number of predators and increases other populations – often pests or invasive species - that cause major economic and social problems.

What to do? ….. Examples…..

- Natural (primary) ecosystems must not be converted or used as agricultural land.
- Semi-natural habitats and areas of high value for biodiversity e.g. HCV areas are only used sustainably, which means to keep and support natural processes and to prevent damages
- Negative impacts on neighboring natural (primary) ecosystems and protected areas are

prevented. Negative impacts can arise from fertilizing, spraying of pesticides, use of heavy machinery… (for this please check also the chapter "Very good agricultural practices to ensure more biodiversity")

- If drainage is inevitable, natural soil drainage is preferred over installed water drainage canals.
- No drainage of marshes; no extraction of peats (climate protection, carbon sink)
- If peatland is agriculturally used, proof must be given that these activities are compatible with biodiversity protection. If biodiversity friendly farming is not possible, it should be checked whether there are possibilities for subsidies in order to exclude these areas from cultivation.
- Water drainage canals are removed wherever possible and the restoration of former wetland sites is supported.

Air is seen in this regard as a natural ecosystem, too. Any negative impacts on air quality of the agricultural activities/sourcing must be identified. Measures are taken to counteract these negative impacts.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Guideline on the Protection of Primary Ecosystems and Semi-natural habitats

3.1.7. Protection of water bodies; management of riparian strips

Why?

Water is the basis for all life and therefore a very valuable resource. Aquatic ecosystems are hotspots of biological diversity. According to the EU Water Framework Directive, all waters should be in good condition by 2015, with exemptions in place by 2027 at the latest. Reporting by EU Member States in 2018 shows that this target is still a long way off. Only 40% of Europe's surface waters are in good ecological status or potential (EEA, 2018). The main causes of the moderate to poor status are predominantly changes in the water body structure, e.g. due to transverse structures and straightening, as well as diffuse discharges, especially from agriculture. Groundwater generally looks better: 74% is in good chemical status and 89% in good quantitative status. Here, too, the reasons for the failure to meet the target are diffuse inputs from agriculture - especially nitrate - and water withdrawals that lead to a lowering of the groundwater level.

What to do? ….. Examples…..

- Larger cattle herds are not allowed free access to natural water bodies in order to prevent contamination of water with excrements and protect public health.
- A buffer zone of primarily native vegetation is kept along seasonal and permanent water bodies. The buffer zone should be of minimum 10 m width and kept free of fertilizers and pesticides.
- Materials and substances inappropriate for the environment and biodiversity such as oil, CPPs (cast polypropylene), CPP packaging or containers, medicines, animal manure are not disposed in rivers, streams or other surface or ground waters.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Action Fact Sheets on Biodiversity Management

3.1.8. Prevent Introduction and Spread of Invasive Alien Species

Why?

Invasive alien species is a species or subspecies that is not native to a given place and whose presence or introduction in that place causes damage to the environment and potentially cause native species' extinction, modify ecosystem processes and act as disease vectors what may cause extinction of native species in the worst case.

The problems caused by invasive alien species have potentially large economic consequences. Not all alien species become invasive but this happens rather often because the new environment does not contain the same ecological conditions as the original one. Thus the alien species can multiply without control thus threatening and degrading the local biodiversity and ecosystems, negatively impacting economies (e.g. losses to crops, forests, pastures, their control costs) and human well-being (e.g. infectious diseases).

The introduction of alien species has many different pathways including shipments of food and movements of biological materials.

What to do? ….. Examples…..

- Identify invasive alien species on the site of the farm. Where to get this information?
  - Ask the responsible agricultural advisor from the certifying standard or company
  - Ask local, regional or national authorities
  - Contact local or national wildlife or nature-protection NGOs
  - The World´s Worst Invasive Alien Species have been identified on the following homepage http://www.issg.org/worst100_species.html
- Manage identified alien invasive species with appropriate practices. This will differ from species to species. Further information is provided by the certifying standard/company.
- The presence of invasive alien species on the farm land is reported to regional environmental protection agencies.
- Before new, non-native plant species are cultivated or animal species are kept, one should inquire about their "potential for invasion". If no information is available, then experiences made in other countries should be collected.
- During importing and exporting of products the farm operator must ensure that no alien invasive species enter or leave the farm (minimum visual inspection)
- Invasive plant species and any of their parts or remnants must not be disposed in aquatic ecosystems.
- Exchange information and raise awareness among the local population on potential risks and trends regarding exotic species etc.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

Species examples of endangered species, woody elements, invasive species for selected counties

3.1.9. Wild harvesting

Why?

The increasing demand for wild plants and animals poses major ecological and social challenges. The pressure on vulnerable species can harm local ecosystems and the livelihoods of the collectors. Wild collections and hunting should be done sustainably - in a way that populations remain stable and have enough time for reproduction and growing. Habitats must not be damaged or altered and no other plants or animals must be affected. For the farmer/collector to safeguard this can be a challenge if there are other people, too. Communities, cooperatives or associations must take the responsibility to monitor the target species and safeguard the long-term business.

What to do? ….. Examples…..

- No hunting, fishing or gathering of rare, threatened or endangered species on the farm or in the region.
- Before hunting/collecting information about regeneration rate and stability of the population must be obtained.
- Engage local biodiversity experts (elder, local/regional NGOs, nature administration) in this task.
- The wild collection is carried out in accordance with FairWild Standards or the Union of Ethical Biotrade Standard (UEBT).
- Signing of the Charter Natura 2000 if the collection takes place in Natura 2000 areas.
- Protected areas are not impaired.
- Hunting/collecting of common species only on a level that allows stability for the population.
- Species which may be destroyed or damaged through collection must be collected with appropriate collection practices (species which do not reproduce easily or which grow slowly should not be collected)
- Collection methods may not damage the environment. They must ensure optimum conditions for regeneration of the plant species harvested. Regeneration is guaranteed when enough flowers, seeds, leaves or roots stay untouched, so that they can reproduce.
- Burning is not used for hunting/collecting purposes.
- Collect each time in a different place within the collection area. Never collect all plants from the same part of the collection area, and do not return to the same site for collection more than once per collection season.
- Wildlife is not held in captivity.

Further Information:

- For information on wild harvesting and collection, see the work and standard of The Union of Ethical Biotrade (UEBT) (Ethical bioTrade standard) www.ethicalbiotrade.org/resources/
- Fair Wild Standard: https://www.fairwild.org/the-fairwild-standard

3.2. VERY good agriculture practices to ensure more biodiversity

Biodiversity supports natural ecosystems. The loss of natural ecosystems is a threat to the sustainability of agricultural production systems because the benefits they provide can be lost. These benefits include enhanced

water and ecosystem conservation, soil fertility, potential alternative crops, promotion of beneficial organisms. Natural ecosystems also provide a buffer to mitigate and adapt to the effects of climate change.

Agriculture can negatively affect surrounding ecosystems by water use and pollution (e.g through nutrient overloads and corresponding eutrophication, pesticide buildup in soils and water supplies), compaction and erosion and by introducing invasive species.

In general, agricultural policies and standards promote good agricultural practice, but the ongoing dramatic decline of biodiversity shows that this is not enough to stop the loss of biodiversity. The following measures are a selection of VERY good agricultural practices to ensure more biodiversity.

3.2.1. Soil and Fertilization

Soil Erosion

Why?

Soil erosion is mainly caused by run-off rainwater or wind caused by improper human land use, e.g. removal of protective vegetation by overgrazing or deforestation, as well as too short fallow periods. The loss of the topsoil is particularly problematic. Continuing soil erosion initially results in a deterioration of the quality of the soil (soil degradation). The degradation can eventually lead to the complete loss of the agricultural usability of the soil.

What to do? ….. Examples…..

- Mapping of areas with erosion risk: European farmers are to use the official maps for erosion risks and conduct an erosion risk assessment if they are located in an erosion risk area.
- Where risk of erosion is high, soil protection measures must be implemented i.e.
  - reduced tillage
  - terracing
  - slope parallel crop cultivation
  - perennial vegetation
- The ground cover on agricultural land is kept as long as possible, at least during the periods prone to nutrient leaching
- An annual inspection of the soil protection measures is done in order to adopt them in case of damage

Soil Fertility and crop rotation

Why?

Soil organisms act as the primary driving agents of nutrient cycling, regulating the dynamics of soil organic matter, soil carbon sequestration and greenhouse gas emission, modifying soil physical structure and water regimes, enhancing the amount and efficiency of nutrient acquisition by the vegetation and enhancing plant health (FAO). Diversified crop rotations improve soil biodiversity and thus soil fertility while also reducing the intensity of pests.

What to do? ….. Examples…..

- On the total utilized agricultural area (UAA) of the farm, a minimum of three different crops are grown. The main crop is grown at a maximum of 75 % of the total UAA. The first two main crops make up a maximum of 90 % of the UAA. Legumes and mixtures with

legumes are grown on at least 10 % of the UAA.

- Identification of negative impacts of the agricultural activities/sourcing on the soil quality.
- In temperate climatic regions, a crop rotation of at least four years on the same plots is followed. This includes the cultivation of four main crops as well as cover crops.
- In semi-arid regions, a crop rotation of at least three years on the same plot is followed. This includes the cultivation of three main crops and cover crops.
- The main crop is rotated annually and belonging to different functional plant groups.
- Catch crops or intertillages such as grasses, oilseed, or legumes are integrated into the crop rotation.
- Implementation of a balanced crop rotation which includes > 10 % grain legumes or other crops with recognized positive impacts on soil.
- Cultivated land is fertilized with organic matter in the form of manure, compost. Cover crops are grown whenever possible.
- On agricultural land, an annual humus balance is performed and backed up with a humus inspection every six years. The humus balance must never be negative and follows a conventional approach.
- Semi-natural habitats and fallow land is not fertilized.

Nutrient Balances and Fertilizer Management

Why?

Nutrient balances on farm-level are crucial to avoid over-fertilization and thereby run-offs in water and groundwater. Farmers should establish nutrient balances with a proven method.

What to do? ….. Examples…..

- Documentation of the fertilizer applications and nutrient values of the fertilizers (at least N and P) in detail.
- Prior to the application of essential amounts of nutrients (N=50kg/ha; P=30kg/ha) the exact nutrient requirement of a crop is assessed by a nutrient demand determination.
- Fertilizers are applied in a way that is proportionate to the growth stage of the specific crop (timely fertilization)
- Prior to crop growth, no more than one third of the total nitrogen is used.
- An annual `farm gate` nutrient balance is performed by the method provided by the standard/company.
- Soil testing for nutrient contents is carried out with a reliable method every three years.
- Crop specific nutrient limits are defined in accordance with the plant's requirement and – where necessary and applicable - site-related and with tolerance thresholds.
- Post-harvest nutrient balances are performed with documented figures and by an approved method.
- Organic fertilizers in place of mineral fertilizers is preferred

A continuous improvement in the efficient use of organic and mineral fertilizers up to a minimum level is demonstrated.

3.2.2. Livestock

Why?

The production of animal food and animal husbandry in general depends on biodiversity and at the same time play an important role in shaping it. On the one hand, agriculture and animal husbandry led to the decline of many wild species in Europe, whereas on the other hand, in some instances these activities allowed for an increase in landscape and species diversity, at least at the local scale. Notwithstanding the role that livestock has played and still plays in shaping part of Europe's biodiversity, the main impacts highlighted are negative and include the conversion of primary forests to pasture land or for feed production, vast areas for soy production, degradation of soil due to overstocking and eutrophication of soil and water bodies due to inadequate animal waste disposal/excessive fertiliser use.

What to do? ….. Examples…..

- Origin of feed stuff to prevent the destruction of ecosystems in other countries
- Animal feedstuff is produced sustainably and is certified.
- No genetically modified feedstuff is used.
- Animal feedstuff is only imported from tropical regions if it is purchased from a certified producer with a proven neutral effect on native habitats.

Prevent overgrazing and destruction of agro-forestry ecosystems

- The livestock density shall not exceed 1.4 livestock units/ha fodder area. A period is defined by reducing the stocking density to this maximum.
- The farm is self-sufficient in feed, with at least 30 % of the feed consisting of dry matter (calculated on an annual basis). The feed comes mainly from direct grazing.
- Ensuring that fenced-in pastures are large enough to prevent damage to biodiversity.
- In wood pasture ecosystems, grazing by sheep, goats and autochthonous races is preferred to grazing by cattle, pigs or non-autochthonous races.
- To prevent soil degradation grazing by pigs is reduced to a minimum or not carried out at all. This measure is not relevant in extensive forms of farming where food resources are sufficiently abundant (e.g. acorns in Dehesas/Montados).

Reduce the amount of imported feedstuff

- Implementation of suitable rotation combining annual crops (e.g. winter cereals) and temporary grasslands (e.g. alfalfa, seed mixtures) in order to reduce the purchase of feedstuff.
- The quantity of concentrate consumed by the ruminants is reduced by promoting and increasing grazing and hay quality or by reducing production objectives (e.g. liter of milk per cow)

3.2.3. Pest Management

Why?

Chemical treatments are the most common pest management tools worldwide. Many of the chemicals are highly toxic and either already banned in northern hemisphere countries, or require protective equipment and conditions for use.

Pesticides have a major effect on biological diversity and habitat loss. Pesticides can have short-term toxic effects on directly exposed organisms but also long-term effects on ecosystems and the food chain.

The reduction of the amount of pesticides used and the exclusion of very harmful substances are the main strategies to reduce the negative impacts on biodiversity.

What to do? ….. Examples…..

- Consequent implementation of all principles of the integrated pest management (IPM)
- Adaptation of the cultivation to the local conditions.
- No preventive use of Pesticides
- At first, application of preventive and alternative measures to reduce pests and the needed pesticide input:
    - Use adequate cultivation techniques, such as:
        - Crop rotation
        - Intercropping
        - Seedbed sanitation
        - Adjusted sowing dates and densities,
        - Conservational tilling,
        - Substitute pre emergence herbicides by mechanical weeding
        - Plant pest resistant/tolerant cultivars
        - Use standard/certified seed and planting material
        - Balanced soil fertility and water management, making optimum use of organic matter
        - Prevent spreading of harmful organisms by field sanitation and hygiene measures (e.g., by removal of affected plants or plant parts, regular cleaning of machinery and equipment)
    - Prioritization of biological pest management over the use of any chemical alternative.
    - Protection and enhancement of important beneficial organisms, e.g. by the development of semi-natural habitats inside and outside production sites (see also Chapter “Biodiversity Management”)
- Elaboration of monitoring plans for arthropods. Pest and beneficial organism populations are monitored weekly during their peak season.
- Participating on trainings to identify both, pest and positive effects of beneficial organisms as well as be able to calculate the related damage threshold.
- Usage of appropriate forecasting and diagnostic methods for pathogenic germs (fungal, bacterial germs, virus)
- The application of preventive and alternative measures to pesticides is documented.
- Pesticides have been applied only after all preventive measures have been implemented and defined thresholds exceeded.
- When pesticides are applied the following principles have been followed:
    - Apply the lowest practical rate of pesticides
    - Apply pesticides uniformly
    - Avoid double coverage (shut off the applicator when turning)

  - Rotate herbicides to prevent weed resistances
  - Spot treat when using high rates of herbicides
  - Choose pesticide with less potential for leaching
  - If rain is predicted, do not apply pesticides
  - Minimize drift during application
- Using seeds treated with chemical pesticides only if necessary (depending on the crop and the region). A clear documentation detailing the reasons for using treated seeds are available.
- Only local spraying devices are used and spraying equipment is calibrated at least every three years
- Burning of vegetation as a plant protection method is only used if no other alternative measure exists. To explain the necessity all implemented and possible preventive and alternative measures are documented.
- Burning in or close to protected areas is followed by the rules of the responsible nature conservation authorities.
- No burning of vegetation in order to create new agricultural land.

Handling of very critical substances for biodiversity

- Pesticides from the current negative list (pesticides that are NOT allowed) of the standard/company is not used. For information see: https://pan-germany.org/download/pan-international-list-of-highly-hazardous-pesticides/
- Pesticides proven to have damaging effects on bees, pollinating insects, beneficial organisms, amphibians or fish are not applied.
- Very harmful substances e.g. Glyphosat, Diquat, Paraquat, Glufosinate ammonium, Indaziflam and the salt equivalent versions are not applied.
- Pre-emergence herbicides are not applied and are substituted, e.g. by mechanical weeding in early stages.
- Herbicides are not applied in the interrow of permanent crops (e.g. vineyards, fruits, hop).
- Creation and maintenance of crop and application specific riparian buffer zones along the edges of aquatic ecosystems such as streams, rivers or wetland where fertilizers and pesticides are not applied. Minimum distance is 10 meters.
- Only max. 80% of very large cultivation areas (the standard organisation/company has to define the critical cultivation size, suggestion for arable farming in Europe: >20ha) are treated with pesticides per annum. 20 % of the area is free of pesticide application and can be managed with alternative techniques (mechanical and/or biological pest control. The 20% surface ratio can rotate annually.
- Continuous improvement and documentation of pesticide use (Treatment-Index, Toxicity-Index)
- Documentation of any pesticide application (at least the name and the amount of the substances used) and a continuous improvement in the reduction of applied pesticides, up to a minimum level, is demonstrated
- Use of the “Treatment Index” as a quantitative measure to describe the intensity of chemical pest management.
- “Treatment Index” is supplemented with a Toxicity-Index (e.g. Toxic Load Indicator).
- Step-by-step reduction of the use of substances that are harmful to humans and environment as well as the applied quantity of allowed substances. The objective is to exclude high risk pesticides step by step. The PAN list for highly hazardous pesticides is used to identify such pesticides.

Appropriate use of pesticides

- The farmer follows instructions for the proper use of pesticides: storing, application technology (e.g. maintenance and proper equipment settings), cleaning of equipment and disposal of residual materials / packaging.
- Fertilizers and pesticides are stored separately

Consultancy / Information / Training

- The farmer must inform himself on the topic of pesticides. Contents should include biodiversity impacts and reduction strategies.
- The farmer and workers participate in capacity building activities on the topic of pesticides.
- Only authorized and regularly trained staff uses the machinery and can spray.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Guideline on Pesticide Management
- Action Fact Sheets for Very Good Agricultural Practices

Urgent need for action

At the latest since studies in Europe and worldwide have shown the dramatic decline of insects in biomass and number of species, the pressure on politicians for stricter measures to significantly reduce the use of pesticides has been growing. Some examples:

On 12 February 2019, the European Parliament adopted an initiative report on the implementation of EU Directive 2009/128/EC on the sustainable use of pesticides.

http://www.europarl.europa.eu/doceo/document/A-8-2019-0045_EN.pdf?redirect

In September 2019, the German Federal Cabinet adopted the "Action Programme Insect Protection". With measures in nine areas of action, the programme addresses all the main causes of insect mortality, including significantly stricter rules on the use of pesticides.

https://www.bmu.de/publikation/aktionsprogramm-insektenschutz/

The food retail industry is also increasing its demands for the reduction of pesticides. An example: Tesco, the UK food retailer requires all their fresh products to be produced according to Integrated Pest Management. Moreover, the products must have a Global G.A.P. certification internationally and a Red Tractor certification in the UK. As a next step, TESCO plans to extend pesticide reduction to their frozen and canned food.

https://www.tescoplc.com/sustainability/downloads/our-approach-to-pesticides/

3.2.4. Sustainable Water-Use

Why?

Water is crucial for agriculture and biodiversity. Farming accounts for around 70 % of water use in the world and contributes to water pollution from nutrients run-off, pesticides and other pollutants. In the last 50 years, irrigated agricultural land has more than doubled. Overexploitation of water sources by agriculture is the main driver for the destruction of aquatic ecosystems such as rivers and wetlands.

The problem of overuse of water resources is exacerbated by climate change - see the dramatic facts in the August 2019 report of the Intergovernmental Panel on Climate Change (IPPC).

Sustainable management of water in agriculture is critical to secure the sustainability of the agricultural production as well as intact ecosystems.

What to do? ….. Examples…..

Linking water source and water use (ecosystem and ecosystem service)

- Documentation of the amount of withdrawn water
- The farmer is informed about the situation of water ecosystems in the relevant watershed.
- Yearly prove and documentation that the water quality (nitrate and pesticide levels) of relevant water sources, streams and ponds is in accordance with legal compliance. Annual control is carried out if the local water authority does not control the water quality.
- Water use does not interfere with the quality and functioning of protected aquatic areas.
- To support the sustainable use of water, the certified farm cooperates in a region wide monitoring system and participates in regular information exchanges with regional experts who are concerned with ensuring good water quality and water quality of lakes, rivers and other water ecosystems.
- Certified farmers should collaborate with regional nature protection authorities and authorities responsible for the management of watersheds and request the elaboration of sound and realistic watershed management plans (or similar), which takes into account the impact of climate change. Indications of those management plans with relevance for agriculture – such as the maximum volume of water per year as well as per certain time periods – should be communicated by the standard organization to the certified farms

Orientation values for water consumption and efficient irrigation systems

- The certified farm develops, implements and follows a water management plan.
- Negative impacts on water resources from agricultural activities or sourcing are identified and the farmer ensures that agricultural cultivation and animal husbandry is adapted to the regional and climatic conditions, so that no overuse or damage to local or regional water resources, natural wetlands or regional protected areas occurs.
- The most efficient irrigation techniques is used and irrigation methods are continually optimized (e.g. reduced evaporation at evening irrigation) taking into account the actual water need of the plants.

- Decision support tools (meteorological stations, dedicated software, tensiometric probes etc.) are used for improving the irrigation performance.

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Guideline on Water Use

3.2.5. GMO

Why?

Since the first commercially offered genetically modified organism (GMO) was authorized for sale as food in 1994 (a delayed-ripening tomato in the USA), the international community has been divided over the costs and benefits of genetic modification (GM).

Regarding biodiversity, many years of experience have shown that the use of pesticides in the cultivation of GMO-manipulated plants has increased enormously, for example the use of glyphosate in the cultivation of cotton, soybeans, rape and maize. Against the background of the increase in resistant weeds, an arms race is taking place on the fields in the countries where GM soy is cultivated. In addition to the increasing use of glyphosate, there is now a whole range of other genetically modified soybeans that have been made resistant to several herbicides and are approved for cultivation in Argentina and/or Brazil (Food Watch, 2018).

Also in view of the uncertainty about possible further effects on biodiversity, it is recommended not to cultivate GMO-manipulated plants.

What to do? ….. Examples…..

- GMO´s are prohibited at all stages of the production
- The agricultural activities/sourcing does not introduce or cause the introduction of GMOs

3.2.6. Diversity of production systems

Why?

Crops and animals are farmed in a variety of production systems. Some being closely adapted to the regional landscape and climate conditions e.g. agro-forestry. Others aiming at safeguarding nutrient cycling e.g. permaculture and some are resigning from chemical inputs e.g. organic farming. All of them are highly valuable for biodiversity and should be promoted.

What to do? ….. Examples….

- Establish and protect an appropriate tree density (max. 49 trees/ha in silvopastoral systems1) and ensure regeneration in agroforestry areas through natural or artificial means (e.g. grazing management, protection of young trees, etc…)

3.2.7. Agro-Biodiversity

Why?

The diversity of plants and animals used in agriculture, forestry, fisheries and food production - known as agrobiodiversity - is an essential part of the total biological diversity on Earth.

The great regional diversity of crop species, varieties and breeds of farm animals, fish, microorganisms and other useful small organisms, which used to predominate mainly in agriculture, is in sharp decline. Worldwide, 20% of all 7,616 animal breeds recorded by the Food and Agriculture Organization (FAO) are considered acutely endangered, while no population data are available for more than 30%. In Germany, 52 of the 74 indigenous breeds of cattle, horses, pigs, sheep and goats, the most important species for agriculture, are classified as endangered.

Even today, over 50% of the food energy required for human nutrition worldwide is produced from just three plant species (maize, rice, wheat). Other crop species are used correspondingly less (BMEL, 2019).

Traditional varieties and breeds represent a very important element of agro-biodiversity. They have the potential to thrive in the original territories and to adapt more successful to climate change. Moreover, they are key to food sovereignty and local development.

What to do? ….. Examples…..

- The farmer can obtain information about traditional varieties and breeds in his region from organisations such as Pro Species Rara or Slow Food. These organisations can usually also provide information about support programmes.
- Support local seed banks of traditional varieties
- Together with companies and standards, approach the cultivation/breeding of traditional varieties and breeds. Influence companies to create market access for products from traditional varieties and breeds.
- Convince buyers in the region that the promotion and protection of traditional varieties/breeds is important for sustainability and (agro-) biodiversity. Initiate regional projects or join existing ones, e.g. with the tourism sector and/or the regional association of restaurants (e.g. initiate the "Forgotten pleasures" project).

Further Information: www.business-biodiversity.eu/en/biodiversity-training

- Guideline on Agro-Biodiversity
- Action Fact Sheets for Very Good Agricultural Practices

1 http://www.agroforst.uni-freiburg.de/download/Agroforstsysteme%20in%20Deutschland-%20Landinfo.pdf (Date of access: 04.12.2019)

3.2.8. Climate protection and adaptation

Why?

Climate change is one of the five main causes of biodiversity loss. The consequences of climate change and the loss of biodiversity are considered by scientists to be the two greatest challenges facing our society.

Both influence each other. For example, climate change is causing the distribution areas of wild plants and wild animals to shift northwards and to higher altitudes. Crop plants are also affected, for example coffee cultivation. Since different species do not react to climatic changes in the same way and at the same speed, species communities may change or disappear completely. Ecosystems and functional interrelationships can be significantly altered.

Heat-loving exotic species are spreading - including invasive species or plants and animals that cause problems for humans (e.g. the highly allergenic mugwort ambrosis). Pests prosper better at warmer temperatures. Harvest losses due to insect pests would increase with every degree of warming, especially in the temperate climate zones. Two degrees warmer, and wheat crop losses would increase by almost 50%.

Protection of biodiversity as a contribution to climate protection and adaptation to climate change

A crucial element of biological diversity is the diversity of ecosystems. They play a special role because they form the basis of our lives with their diverse functions (water and climate regulation, air pollution control, food production, provision of recreational areas, etc.).

All ecosystems store CO_2. Forests store about half of the carbon bound on earth. They contain 20 to 50 times more carbon in their vegetation than other ecosystems. Tropical rainforests are of particular importance in this respect. Although they cover only 7% of the Earth's surface, they are home to 50% of all animal and plant species worldwide. Their trees store half as much carbon as trees outside the tropics. Moors, wetlands and savannahs are also CO_2 reservoirs - as long as they are intact. Degraded ecosystems emit greenhouse gases.

Ecosystems also have to adapt to changing temperature and precipitation conditions in the long term, which can only succeed if they remain intact and stable overall. The conservation, restoration and sustainable use of ecosystems therefore form the basis of the "nature-based approaches" to climate protection and adaptation to climate change.

What to do? ….. Examples…..

- Conservational tilling (e.g. reduced tillage, direct sowing) to avoid soil turnover
- Integration of legumes in crop rotation or grassland
- Improvement of soil structure through the cultivation of versatile intercrop mixtures after the harvest of the main crop
- Planting trees or hedges on agricultural land - a combination of forestry and agriculture
- Conversion to organic farming (varied crop rotation, legumes, organic fertiliser, no mineral fertilisers or pesticides)
- Preparation of individual company energy and greenhouse gas balances as a basis for the development of climate protection action plans (e.g. with the ACCT tool of the Lake Constance Foundation)
- Implementation of a climate change check for agricultural farms to analyse the vulnerability of individual farms and to develop sustainable adaptation measures (e.g. with the newly developed climate change check of the Lake Constance Foundation, see www.agriadapt.eu)

4. Monitoring

On page 3 of the guideline, the Biodiversity Performance Tool (BPT) is explained. Farmers who use this tool to develop and implement a Biodiversity Action Plan (BAP) can also use the BPT for monitoring at farm level. When the BPT is used for the first time, the baseline is recorded. Collecting this data takes time (about 4-6 hours), but much of the information requested by the BPT must be kept available by the farmer for other purposes (e.g. audits). In the following applications of the BPT, the implemented measures are recorded and thus the action plan is updated. The evaluations of the BPT show the farmer where he has improved and where there is further potential for biodiversity. The BPT is not only helpful for the farmer, but also helps the agricultural advisor and the auditor to assess the quality and progress of the Biodiversity Action Plan.

Other tools, such as the Cool Farm Tool, the SMART Tool or the FSA Tool from Sustainable Agriculture Initiative, can also be used to monitor biodiversity. Alternatively, a simple but meaningful monitoring system can be set up.

Generally, there are two levels of monitoring which should be conducted once a year each:

1. Process monitoring:

- Have the selected measures been implemented timely? Yes/No
- Have they been implemented according to these guidelines? Yes/No
- Have corrections been agreed in case the measures have not been implemented? Yes/No

2. Performance monitoring:

Key data and indicators which cover the following two fields of action:

- Creating potentials for biodiversity, e.g. creating/restoring habitats, measures to protect threatened species, establishing a biotope corridor
- Reducing negative impacts on biodiversity – see VERY good agricultural practice

Within the framework of an EU initiative, Global Nature Fund and the Lake Constance Foundation have compiled a set of 25 key data and indicators and discussed them with numerous companies and standards. This set was compiled from multiple sets, study results and model projects and is a good compromise between scientific demands and practicability.

The set is part of a **biodiversity monitoring system** for monitoring at a higher level = regional, national, for farms producing a specific product. The 25 key figures and indicators are also included in the Biodiversity Performance Tool and a database has been developed to record and evaluate the key figures and indicators. The system is primarily intended for standards and food companies and is cross-standard and cross-company.

Training for farmers, advisors and staff

The interaction between ecosystems and species is complex. Successful protection of biodiversity depends not only on the quantity but also on the quality of the implementation of measures. Training in biodiversity is therefore particularly important - for the farmer, for the agricultural advisor, but also for the manager responsible for product quality or purchasing.

Within the framework of the EU initiative "Biodiversity in Standards and Labels for the Food Sector" three training modules have been developed for farmers and advisors, for certifiers and for product and quality managers in food companies. The modules can be implemented as seminars or webinars and are freely available in several languages. The supplementary knowledge pool contains background information, action fact sheets with precise descriptions of measures and guidelines.

www.business-biodiversity.eu/en/biodiversity-training

Figure 4: Screenshot of the website www.business-biodiversity.eu (source: Lake Constance Foundation

Naturnahe Firmengelände und Liegenschaften

The management of agricultural land is crucial for the impact on biodiversity. But suppliers and farmers can also do something positive for local biodiversity on the land around their production, packaging and storage buildings, as well as on and around their buildings. The central goal should be to increase the proportion of semi-natural areas. To this end, design elements are available with which numerous companies have already had good experience in the past. Some examples:

- Native shrubs and trees (orchard meadows, hedges, other groves)
- Flower or herb meadows, flowering seams or near-natural grassland (1-2 mowing cycles per year, no fertilization or irrigation, removal of the mown material)
- ruderal locations, gravel lawn
- dry stone walls, dead wood heaps
- Close-to-nature designed infiltration ditches and infiltration troughs not only provide habitats for certain species, but also have a higher seepage capacity. Retention basins with shallow and deep areas and a shallow bank develop into valuable habitats for amphibians.
- Facade greening and/or green roofs. They reduce the energy requirement for air conditioning. Green roofs also provide increased resistance to hail and reduce the risk of flash floods by delaying the release of rainwater into the environment. Critical to this are "living walls" that depend on irrigation and fertilization.
- Traffic areas with infiltration-capable surfaces
- Nesting aids for birds, insects or bats - please of good quality

- Insect-friendly outdoor lighting and reduction of light emissions

A near-natural design is possible on almost all company sites and properties - even if hygiene and safety regulations must be taken into account. Sometimes companies are concerned that protected species will settle and thus limit the future use of an area (EU Habitat Directive, Art. 30 Para. 2 of the German Nature Conservation Act). However, possible problems can be avoided by careful planning. For example, particularly high-quality habitats should only be established on areas that are available in the long term. The Federal Environment Ministry is also working on a regulation for "temporary nature conservation".

Figure 5: Example 1 of near-naturally designed premises (source: Lake Constance Foundation)

Numerous companies have had positive experiences with the involvement of employees in the design of the areas and the monitoring of biodiversity at the site. There are often experts in birds, insects or certain plants among the employees who are happy to contribute their specialist knowledge. Here too, monitoring can be simple yet meaningful if one focuses on the potential that has been created for biodiversity (habitats, nesting aids, etc.). The actual impact can be recorded or observed by developing 1 - 3 key species.

Figure 6: Example 2 of near-naturally designed premises (source: Lake Constance Foundation)

The Lake Constance Foundation coordinates the EU initiative LIFE BooGI BOP. The aim is to make the natural design of the company's premises mainstream. For example, BooGI BOP offers free initial consultations so that a company can gain an overview of the potential for more biodiversity. Further information and positive examples can be found at:

https://www.biodiversity-premises.eu/

Overview of the Project EU LIFE Food & Biodiversity

Food producers and retailers are highly dependent on biodiversity and ecosystem services but also have a huge environmental impact. This is a well-known fact in the food sector. Standards and sourcing requirements can help to reduce this negative impact with effective, transparent and verifiable criteria for the production process and the supply chain. They provide consumers with information about the quality of products, environmental and social footprints, and the impact on nature caused by the product.

The LIFE Food & Biodiversity Project "Biodiversity in Standards and Labels for the Food Industry" aims at improving the biodiversity performance of standards and sourcing requirements within the food industry by:

- Supporting standard-setting organisations to include efficient biodiversity criteria into existing schemes; and encouraging food processing companies and retailers to include biodiversity criteria into respective sourcing guidelines;
- Training of advisors and certifiers of standards as well as product and quality manager of companies;
- Implementation of a cross-standard monitoring system on biodiversity;
- Establishment of a European-wide sector initiative.

Within the EU-LIFE Project Food & Biodiversity, a Knowledge-Pool with background information linked to agriculture and biodiversity is provided. You can access the Knowledge Pool under the following link:

www.business-biodiversity.eu/en/knowledge-pool

Editor: LIFE Food & Biodiversity; Lake Constance Foundation

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