Del campo al plato

Baseline Report Biodiversity in Standards of the Banana and Pineapple Sector

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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

minae

Global Nature Fund

Bodensee Stiftung

Authors
Global Nature Fund and Lake Constance Foundation, within the framework of the project *„From Farm to Fork: Integrating Biodiversity into Agri-food Value Chains“*, commissioned by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Global Nature Fund (GNF)
International Foundation for Environment and Nature
Fritz-Reichle-Ring 4
78315 Radolfzell, Germany
Website: www.globalnature.org

Lake Constance Foundation
Fritz-Reichle-Ring 4
78315 Radolfzell, Germany
www.bodensee-stiftung.org

Graphic design and layout: maucherdesign

Photo credits: GNF, giz

Edition: Global Nature Fund. July, 2019

TABLE OF CONTENTS 00


© GNF


© GNF

This baseline report summarizes the results of the analysis of 14 sustainability and quality certification standards that are relevant for the supply chains of the banana and pineapple sector. The analysis includes 12 international standards and 2 national standards for Costa Rica. The analysis was carried out within the framework of the project "From Farm to Fork" (BMU IKI 17.9047.6-003.00) financed by the IKI Programme of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The report assesses how biodiversity protection is currently addressed in these international and national standards. Therefore, the effectiveness of their criteria and requirements regarding the protection of biodiversity, their importance within the certifications, their transparency and their verifiability have been reviewed.

In addition to the results obtained in the screening, the report contains first conclusions on the needs and opportunities for standards and food companies to achieve effective criteria for the protection of biodiversity – and to make with this an important contribution to stop the dramatic loss of biodiversity.

To whom is the document addressed and why?

The present baseline report informs about the status of biodiversity protection within standards used in the banana and pineapple market. The main target group of this document are the people responsible for the design, management and revision of agro-food standards. Furthermore, the information is relevant for experts working on issues related to agriculture, the agro-food sector and biodiversity such as advisors of farmers, quality and product managers of food companies, certifiers of agro-food standards, scientific institutes, environmental NGOs, agricultural or nature protection administrations, etc.

Next steps

This report is the basis for the development of *„Recommendations for effective criteria for biodiversity protection in standards and requirements of food companies in the banana and pineapple sector"*. Representatives of standard organizations and companies, scientific institutes, environmental NGOs and agricultural and/or environmental administrations will participate in the elaboration of the recommendations.

If your organization/company is interested in participating in the elaboration of the recommendations, please contact the Global Nature Fund, coordinator of this task.

02 GENERAL PRESENTATION OF THE PROJECT

2.1 Objectives of the „From Farm to Fork" project

The project activities take place in two countries: Costa Rica and the Dominican Republic. They support the integration of conservation, protection of natural capital and valuation of ecosystem services in banana and pineapple value chains, increasing sustainability in production through biodiversity-responsible measures.

From Farm to Fork promotes the participation of key players along value chains, including plantation owners and managers, cooperatives, standard organizations and certification bodies, exporters, importers and traders, agricultural education centres, as well as the final consumers.

2.2 Expected results

Spread over five different levels, the project seeks to:

1. Include effective criteria for biodiversity protection in national and international standards and procurement guidelines for food companies
2. Facilitate the analysis of the baseline and opportunities for biodiversity on banana and pineapple plantations by implementing Biodiversity Checks and improve the biodiversity performance with sound Biodiversity Action Plans
3. Develop a Biodiversity Innovation Fund to support the conception and implementation of measures for effective biodiversity protection on the farm
4. Establish a Payment for Ecosystem Services (PES) model for the financing of structures of biological connectivity in areas of intense production by the actors of the value chain of banana and pineapple
5. Increase the level of awareness of the food sector and end consumers of the value of biodiversity
6. Disseminate and systematize experiences at national, regional and international level. The good practices generated and documented will be presented in regional and international networks and forums.

The present publication is part of the activities to achieve the first objective.
The political counterparts of the project are the Ministry of Environment and Energy of Costa Rica (MINAE) and the Ministry of Environment and Natural Resources of the Dominican Republic (MIMARENA).
The project is funded by the International Climate Initiative (IKI), with support from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It is implemented by the German Development Cooperation (GIZ), the Global Nature Fund (GNF) and the Lake Constance Foundation.

Implemented by: giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of: Ministerio Federal de Medio Ambiente, Protección de la Naturaleza y Seguridad Nuclear

In cooperation with: minae, Ministerio de Medio Ambiente y Recursos Naturales, Global Nature Fund, Bodensee Stiftung

3.1 About pineapple and banana

Globally, about 40% of the planet's surface is used for agricultural purposes. According to the FAO[1], agriculture is responsible for 70% of biodiversity loss, a situation that mainly affects developing countries, where 72% of species of flora and fauna are endangered due to agriculture. The degradation of ecosystems and the consequent loss of habitats for many animals, plants and micro-organisms are especially dramatic in regions where agricultural crops are sown in intensive monoculture production systems.

Monocultures of pineapple and banana can negatively influence climate and biodiversity. Intensive production can degrade ecosystems, contribute to soil erosion, affect the availability of water sources, and contaminate water, soil and air.

Both crops are highly demanded in the European Union (EU), particularly in Germany. Among the largest exporters to the European market in 2015 were Costa Rica (940,000 tonnes) and the Dominican Republic (330,000 tonnes). The three main importing countries were Belgium, the United Kingdom and thirdly Germany (698,000 tonnes)[2].

Bananas and pineapples are Costa Rica's main agricultural export products. Together, their production occupies almost 90,000 hectares of the territory[3]. In the Dominican Republic, about 49% of the country's 48,000 square kilometre area is used for agricultural purposes[4].

Compatibility between highly productive agriculture and biodiversity conservation is possible and indispensable to guarantee, on the one hand, a secure food supply and, on the other, the protection of the diversity of ecosystems, species as well as ecosystem services that are created through their interrelation.

3.2 About biodiversity and standards

Biodiversity loss is one of the greatest challenges we face today. Human activity is causing a loss of species a thousand times faster than it would have been in natural evolutionary circumstances. Many ecosystems that provide us with essential "services" are in danger of destruction. The conservation and sustainable use of biodiversity is not merely an environmental problem, but a key requirement for our nutrition, production processes and quality of life.

With the agricultural sector as the main supplier, the food sector has a major impact on ecosystems, species and genetic varieties. Unfortunately, the protection of biodiversity is not yet among the interests of the sector. In general, the interactions between human activity and biodiversity are complex, but there is sound knowledge available on how to reduce negative effects.

The standards and labels of the food sector help to qualify certain characteristics of a product and the production process itself, while guiding the consumer with information on the quality of products and their impact on the environment, society and nature. Therefore, they are a tool with great potential to increase biodiversity protection and the sustainable use of natural resources.

1 http://www.fao.org/3/i3347e/i3347e.pdf
2 http://www.fruchtportal.de/news/artikel/022720/belgien-und-uk-sind-grossten-eu-bananen-importeure
3 http://www.infoagro.go.cr/BEA/BEA27/superficieProduccion.html#c_01
4 http://www.fao.org/countryprofiles/index/en/?iso3=DOM

04 METHODOLOGY: Analysis of Food Standards of Pineapple and Bananas

4.1 Selection of standards

The food sector is one of the economic sectors with highest regulation through norms and standards. There are more than 400 standards relevant to the European market and an unknown number of procurement guidelines of food companies. Many of these standards include general criteria for all types of agricultural products, while some standards also have specific requirements for the production of tropical fruits and/or banana and/or pineapple.

The few major companies that sell bananas and pineapples to the European market request at least one external certification for their products. For the screening of the procurement guidelines, we contacted 20 relevant companies in the producing countries and Germany/Europe. According to information from various sources, bananas for the European market are either GlobalG.A.P. or organic certified. Rainforest Alliance has become the main standard for the German market, with around 90% of bananas being RA-certified. The remaining bananas are mainly certified with a combination of Fair Trade and EU-Organic. The circumstances in the pineapple industry is not as clear, even though the players are mostly the same. Half of the pineapples on the German market come from Costa Rica and often they are GlobalG.A.P. or Rainforest Alliance certified.

By reviewing the criteria of the most relevant certification schemes for pineapples and bananas required by the companies of the food sector in Europe and in the USA, we provide a comprehensive overview on the level of biodiversity performance.

Therefore, the analysis focused on the most commonly used standards in order to have a representative sample of the requirements applicable to suppliers to EU food businesses and retailers. In total, 12 international standards were selected for banana and pineapple production in Costa Rica and the Dominican Republic plus the Costa Rican „Manual of Good Agricultural Practices for the Sustainable Production of Pineapple Cultivation“ and the country brand “Essential Costa Rica”.

STANDARDS AND REQUIREMENTS OVERVIEW	
TYPE OF STANDARD	N° SCREENED
Standards of public entities	3
Standards of private organizations	11
SCOPE	
National	2
European/International	12
PRODUCT GROUP	
All types of products	13
Only pineapple	1
PRODUCTION SYSTEM	
Organic production	6
Conventional	8
Includes social requirements	12

Table 1: Standards and requirements overview

4.2 Screening Methodology

As the project “From Farm to Fork” is not a research program, the screening of the standards was not carried out as a scientific study, but based on the long term practical experience of the project partners and the lessons learned of previous projects carried out in the European Union. The focus dominating the screening was biodiversity protection.

The screening matrix elaborated for this purpose is divided into three parts:

» Information about the standard
» Policy of the standard organizations in relation to biodiversity
» Criteria and their relevance for the main drivers of loss of biodiversity

The matrix was completed for each standard based on the criteria published online and additional information provided by the organizations upon request. The individual screening results will be shared with the organizations and entities together with the invitation to discuss the results and elaborate on first recommendations. This dialogue with standards and companies is an ongoing process.

Policy of standards/norms: The following questions were raised:

» Does the standard contain definitions of biodiversity and/or related terms?
» Do they focus only on certain ecosystems?
» Are there references to the mitigation hierarchy?
» Does the standard refer to No-Net-Loss or Net-Gain of biodiversity?
» Does the standard refer to international conventions with relevance to biodiversity?

Criteria of standards/requirements:

Criteria with relevance for the following main causes of the loss of biodiversity were identified:

» Destruction/degradation of ecosystems
» Overexploitation of natural resources
» Loss of genetic diversity
» Invasive species
» Climate change

Also identified have been criteria which are relevant to:

» Protection of species
» Contamination
» Management

Important remarks:

» Criteria with relevance to avoid contamination: The focus of the screening was on contamination of water, contamination of soil and waste management (e.g. storage and recycling of pesticide container). These criteria are included mainly in the section of “overexploitation of natural

» Criteria with relevance to avoid climate change: Criteria addressing climate change have been limited to „land use for biomass energy production” and “greenhouse gas emissions”. „Use of fertilizers“, „reduction of water use“ and „crop rotation“ are included within the driver of “Overexploitation of natural resources”. With this, important components of the contribution of agriculture to climate change are covered.

Screening matrix:

For each driver responsible for the loss of biodiversity, relevant agricultural aspects have been specified in order to have a more detailed cluster for the baseline report and the recommendations elaborated in a second step. Furthermore, the matrix includes four key aspects to assess the standard criteria.

4.3 Key aspects to assess the criteria

The assessment of each criteria and requirement was made considering its Weighting, Effectiveness, Transparency and Verifiability, which were all given scores.

Weighting (Kind of criterion):

A criterion may be a mandatory (M), an optional criterion (O) or a recommendation (R). Criteria that are not mandatory from the beginning, such as improvement criteria that become partially mandatory within a certain timeframe, were also weighted as optional (O), as their implementation is not guaranteed. If according to the assessor a weighting should be changed, this recommendation is included in the assessment.

Effectiveness: evaluated is the potential effect of the criterion on biodiversity protection:

1 Very effective because of the high positive effect on the biodiversity aspect;
2 Effective because of the average positive effect on the biodiversity aspect;
3 Less effective because of the low positive effect on the biodiversity aspect;
4 No evaluation possible.

Transparency: evaluated is whether a criterion is clearly defined or can be interpreted:

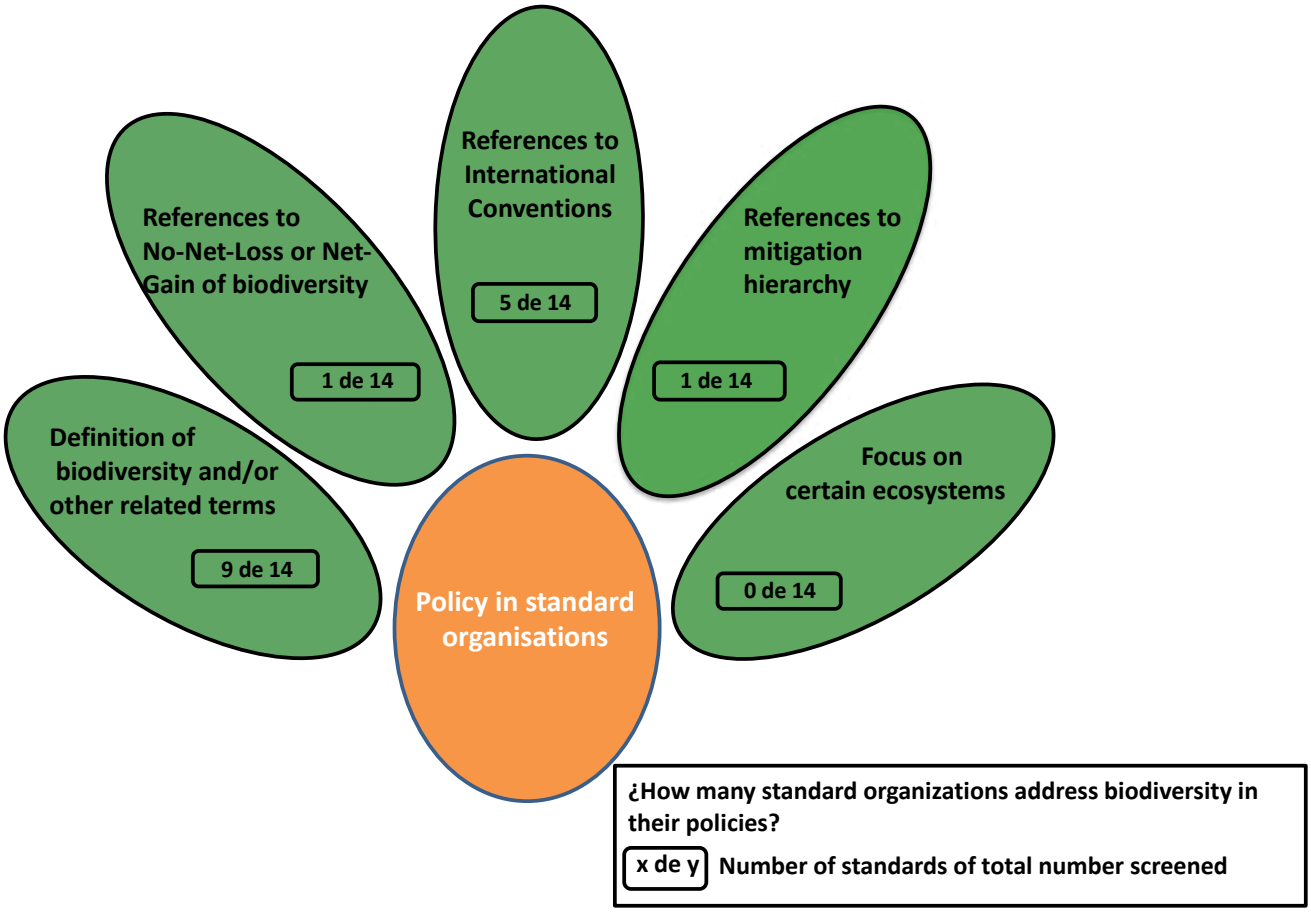
1 Criterion is clear defined and the certified farm has clear instructions for implementation.
2 Criterion can be interpreted.

Verifiability: evaluated is the verifiability of the criterion:

1 Implementation of criterion can be checked easily as indicators or methods are available;
2 Implementation of criterion is verifiable to a limited extent, as only documents and written evidence is required;
3 No assessment possible;
4 Verification needs special expertise of the auditor.

5.1 Biodiversity in the policy of standards

Biodiversity related policy aspects in 14 analized standards



Graph 1: Biodiversity related policy aspects in 14 analyzed standards

To assess the extent to which the concept of biodiversity is an integral part of standard organizations, the following aspects of their policies have been analyzed:

- » Definition of (aspects of) biodiversity and other related terms
- » Priority for the protection of certain ecosystems
- » Mention of the mitigation hierarchy
- » Mention of the concept of No Net Loss or Net Gain of Biodiversity
- » Mention of international conventions relevant to biodiversity

Nine of the 14 standard organizations define biodiversity terms used in the standards. Mainly they define the terms „biodiversity," „protected areas," and „areas of high conservation value". Very few standards provide a complete glossary of terms used and related to biodiversity. Five standards do not explain the terms used or do so vaguely.

Most standards have expanded the ecosystems listed for protection. While five or six years ago many standards mentioned only the protection of primary forests, now the 14 standards analyzed demand also the protection of aquatic ecosystems, tropical forests, savannas, swamps and semi-natural habitats.

Only one of the fourteen standard organizations mentions the hierarchy of mitigation that seeks to avoid, minimize, and ultimately compensate for negative impacts on its policies and criteria.

One third of the standard organizations (5/14) include at least one reference to an international convention related to biodiversity. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on Biological Diversity (CBD) are mainly cited.

The concepts of „No Net Loss“ or „Net Gain“ of biodiversity have gained some relevance in recent years, following their inclusion in Action 7 of the 2020 Biodiversity Strategy of the European Union („...ensure that there is no net loss of biodiversity and ecosystem services“). Some economic sectors, such as the extractive industry, have taken on one of the two objectives - at least in their environmental or sustainability policies. However, in the policies of food certification schemes the „No Net Loss“ or „Net Gain“ objective is not yet present. Only 1 out of 14 standards analyzed includes it in its policy.

Observations

✓ Complete Glossary

All standards should have a complete glossary of terminology used and related to biodiversity. The definition of terms is basic to ensure that all stakeholders talk about the same thing. It is recommended to use the internationally recognized UN/WCMC glossary: https://www.biodiversitya-z.org/themes/terms
If there is no commonly recognized definition, standard organizations could have their own concrete and transparent definition in the glossary.

✓ Continuous improvement and mitigation hierarchy

There is a development towards the objective of „continuous improvement“ in the world of food standards. This objective is very suitable for the protection of biodiversity that can only be achieved through continuous good management, increasing the potential for protection and promotion of biodiversity and reducing negative impacts.
For some aspects related to biodiversity, criteria with maximum or minimum values are useful. For example:

- Minimum percentage of ecological structures beyond legal requirements.
- Minimum width of buffer strips.
- Minimum number of shade trees/hectare.
- Maximum number of livestock/hectare.
- Maximum nitrogen balance: kg/N per hectare per year.

The criteria would be even more effective if standard organizations were to accompany these maximum or minimum values with reference points illustrating the best result obtained by other farms in the area and with the same production system (benchmarks).
For other aspects, especially those that are part of a Biodiversity Action Plan, such as habitat creation, ecological corridors or species protection measures, continuous improvement should be requested. Standards should ask for a baseline and request continuous quantitative (e.g. hectares of ecological infrastructure or meters of ecological corridors) and qualitative (e.g. increase of number of species on boundaries) improvement.
The objective of continuous improvement is closely related to the mitigation hierarchy. It can only be implemented if the farmer avoids and minimizes negative impacts - and compensates for unavoidable impacts through the creation of new habitats on the farm and/or in the region.

The standards should demand and motivate this process through their criteria and support in form of well-trained advisors, guidelines, training for farmers, etc. In addition, standard organizations - perhaps in collaboration with food companies - could develop regional biodiversity protection or restoration initiatives for ecosystems to offset the biodiversity footprint and invite certified farms to participate.

✓ Not-net-loss of biodiversity

The food sector - with agriculture as the largest supplier - is the sector that contributes the most to the main causes of biodiversity loss. In this context, it would be highly appropriate for the sector to agree on substantial targets such as no net loss of biodiversity. Standards claim to be pioneers of sustainability and should be the driving force behind these initiatives.

In many regions it would not be possible to calculate a baseline that would allow to check the progression of the biodiversity „No Net Loss“ target. But if standard organizations and companies would work along the mitigation hierarchy, they would contribute significantly to the overall objective of halting biodiversity loss.

Examples:

» **Avoid:** the standard does not certify (in the case of a standard) or the company does not purchase (in the case of procurement guidelines) produce originating from agricultural land that was won through the conversion of primary forests and semi-natural areas starting from a given reference year (2005 or 2007 as reference years). Avoid any impact, from farms or suppliers, on protected areas.

» **Minimize:** prove through monitoring the improvements in biodiversity on farms and/or actions developed with certified suppliers (Biodiversity Action Plan and implementation of best agricultural practices).

» **Compensate:** standard organizations and companies recognize their biodiversity footprint on farms or in the activities of their certified suppliers and make sure it is compensated (e.g. by financing ecological corridors or protected areas near mono-crops).

Normally, the impact of biodiversity enhancement measures can only be determined in the medium or long term. In addition, other factors affect the natural environment over which farmers have no influence. Monitoring should therefore be considered on a long-term basis, with key data and indicators at farm and landscape level.

5.2 Biodiversity in the criteria of standards

The evaluation of the criteria was based on a matrix, although not all criteria could be clearly related to one factor of biodiversity loss. If a criterion fit several causes of biodiversity loss, it was assigned to all aspects. This analysis focuses on the assignment of criteria to biodiversity loss factors. A total of 487 criteria relevant to biodiversity were found. Table 2.a indicates how many of the standards analyzed include criteria to address the main causes of biodiversity loss.

Table 2.b gives more details on the criteria assessed and how they are distributed according to the main factors of biodiversity loss. It should be noted that the number of criteria as an indicator is relative and does not necessarily indicate the level of importance the standard attaches to this aspect. Perhaps one standard has a very broad and comprehensive criterion for a biodiversity aspect and another standard has formulated three criteria to cover the same.

Requirements of national and international standards: Addressing drivers of loss of biodiversity

a) Nunber of standards that address the drivers of biodiversity loss

	National and international Standards Total = 14
Degradation/Destruction of ecosytems	13
Overexploitation of natural resources	14
Protection of species and invasive alien species	11
Climate Change	7
Loss of genetic diversity	11
Management	13

b) Number of effective criteria for addressing drivers of biodiversity loss

	Criteria loss of biodiversity in standards Total = 487	Percentage criteria of the total	Effective criteria Total = 230	Percentage effective criteria of factors' total
Degradation/Destruction of ecosytems	90	19 %	57	63 %
Overexploitation of natural resources	263	54 %	118	45 %
Protection of species and invasive alien species	30	6 %	19	63 %
Climate Change	23	5 %	3	13 %
Loss of genetic diversity	31	6 %	15	48 %
Management	50	10 %	18	36 %

Table 2: Requirements of national and international standards: Addressing drivers of loss of biodiversity

According to the analysis, most of the criteria (263 criteria, 54% of the total) are aimed at preventing or reducing overexploitation of natural soil and water resources. 90 criteria (19% of the total) aim to avoid or reduce the destruction or degradation of ecosystems.

For all other factors, namely loss of biodiversity, lack of protection of species and prevention of invasive species, climate change and loss of genetic diversity, only few criteria have been found - between 5 and 6 % of the total.

The 50 criteria found which require an environmental management system are, in theory, relevant to all factors of biodiversity loss. Criteria on capacity building of staff are also considered in this category.
Nevertheless, it is less the quantity of criteria rather than the quality of compliance with these criteria that counts.

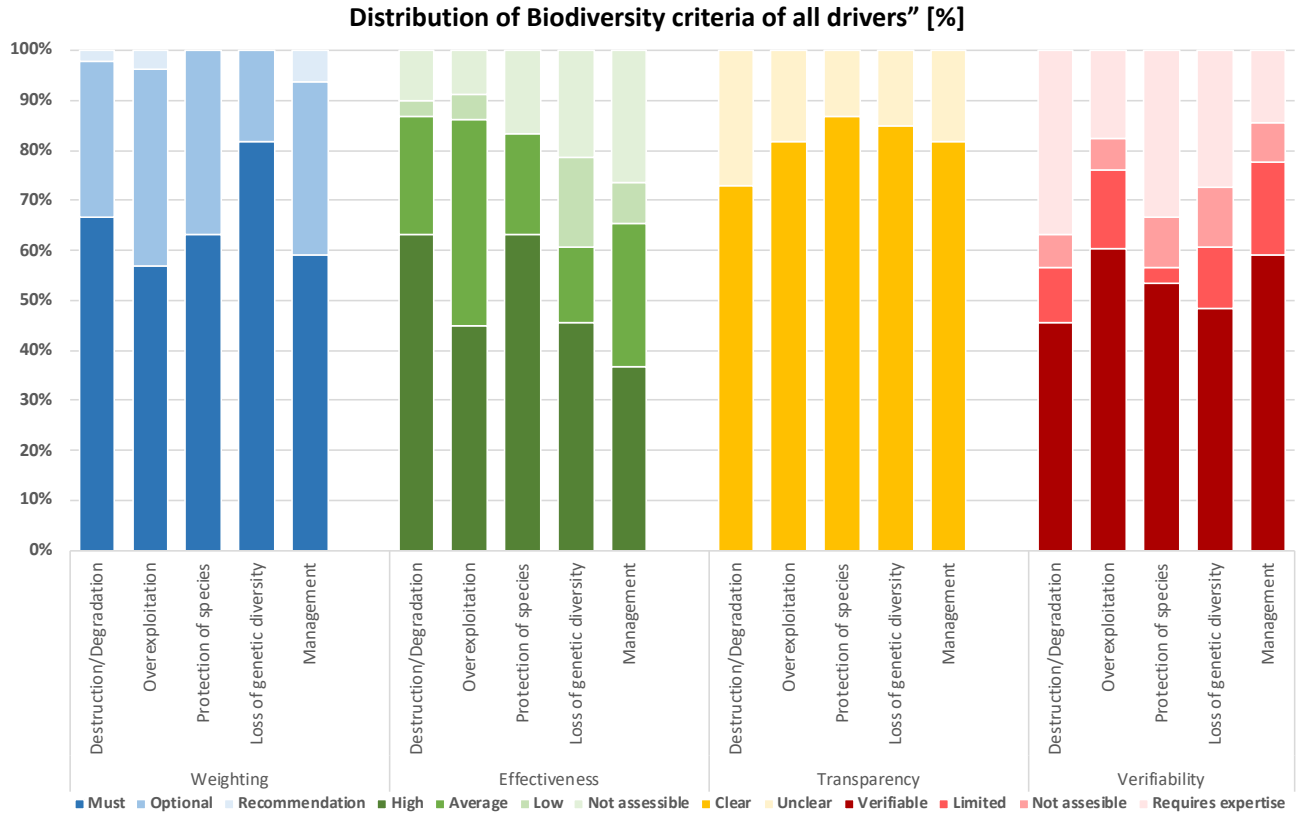
Effectiveness of the criteria

In total, 230 of the 487 criteria found were considered to be effective. The highest percentage of criteria considered effective (63% of the total) are assigned to the factor „Degradation and destruction of ecosystems“. Also 63 % of the (few) criteria for the protection of species and the prevention of invasive species are considered effective.

Only 45% of the criteria to combat overexploitation of natural resources are considered effective, and 48% correspond to the loss of genetic diversity. Only three effective criteria have been found to combat climate change.

Evaluating the effectiveness of the criteria that demand an environmental management system and/or training is very difficult, because it depends on the quality of the system and the training programs. A third of the criteria (36%) have been evaluated with a „1“ in effectiveness.

Graph 3 provides an overview of the criteria found to be relevant to biodiversity and their evaluation according to the key aspects used in the Screening matrix (see 4.3).



Graph 3: Distribution of Biodiversity criteria of all drivers” [%]

Some observations:

Most of the criteria for reducing the loss of genetic diversity are mandatory. The reason is that the prohibition of genetically engineered plants and/or seeds is a mandatory criterion in organic and in most sustainability standards. 68% of the criteria against the degradation/destruction of ecosystems are mandatory, and so are 62% of the criteria for the protection of species. This means that about a third of the criteria found are only optional. In the case of criteria to reduce overexploitation of natural resources, 42 % of the criteria are optional.

Most of the criteria found and considered are transparent in their wording - both the farmer and the auditor know what to do. To verify compliance, it becomes clear that the auditors need specific knowledge - especially in the case of criteria against the degradation or destruction of ecosystems and criteria for the protection of species. In the case of criteria to avoid or reduce the overexploitation of resources, it can be observed that aspects such as the use of pesticides and fertilizers already are a common topic within standards and that there is lots of experience regarding their formulation and certification.

The following chapters go into detail on each of the factors for biodiversity loss and the corresponding criteria.

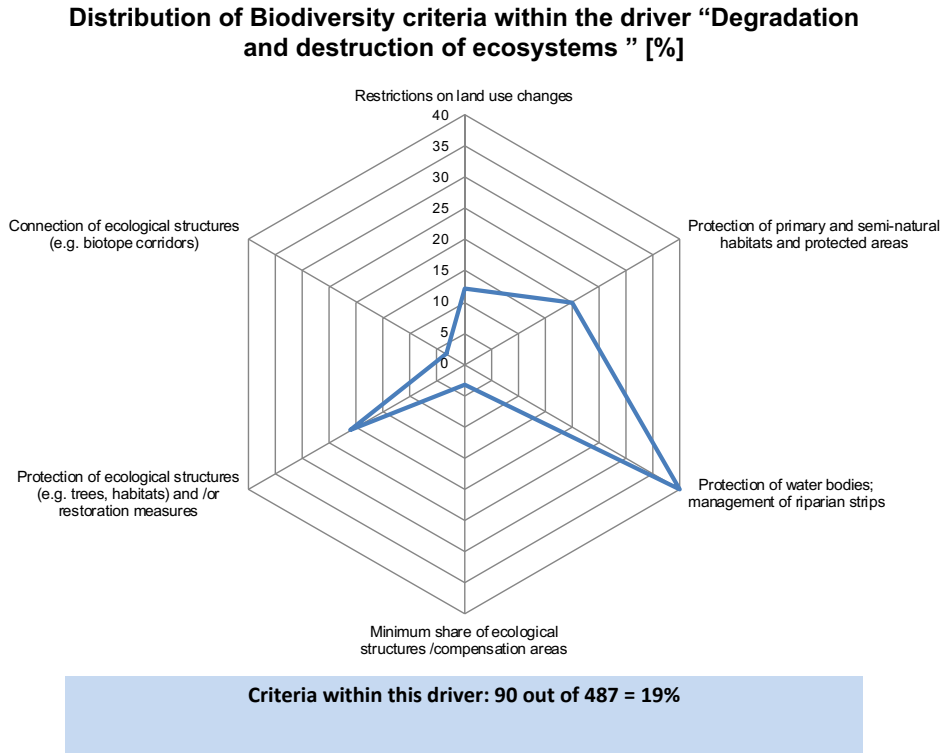
5.2.1 Degradation and destruction of ecosystems

The high number of criteria for this important driver of biodiversity loss shows that the standards screened give importance to this driver. Special attention is given to the protection of water bodies, which is positive, as water bodies are much affected by negative agriculture impacts. The protection of ecological structures such as trees, hedges and the restoration of such structures on farms is also included in the criteria. The protection of primary and secondary habitats and protected areas, as well as restrictions on the conversion of such areas, are usually guaranteed by effective criteria. Striking is that minimum proportions of ecological structures, compensation areas and the connection of existing habitats are only mentioned as criteria in a few standards.

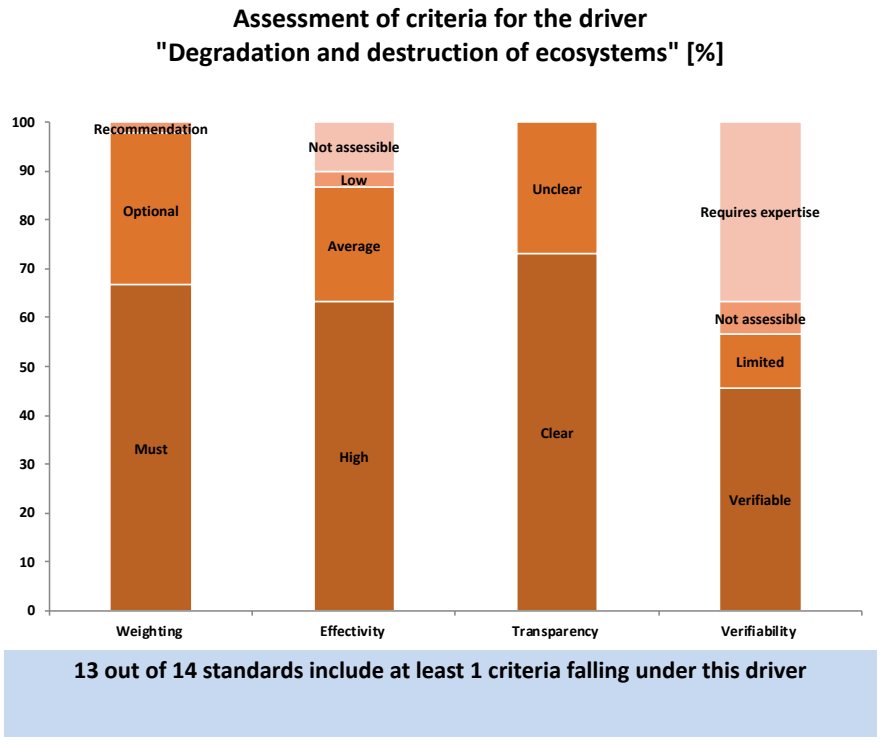
Approximately half of the criteria were classified as „exemplary“. This is positive, as much work is being done in this area. At the same time, there is still a great need for action: Optional criteria with relevance for biodiversity should be made mandatory. The effectiveness criteria must also be improved. Only 60% of the criteria within this important driver are effective, which is not satisfactory. The verifiability depends widely on the knowledge and experience of the auditor. Sound training must be provided as well as guidance and other supporting information for the farmers.

New criteria should urgently be introduced to request minimum proportions of ecological structures and compensation areas as well as the connection of existing habitats. Only two organic and one conventional sustainability standard demand a minimum percentage of ecological structures.

We noted that most of the organic standards do not cover well the topic of destruction and degradation of ecosystems. Within the EU there is a good nature conservation legislation and can control compliance to a certain degree. However, in many developing countries this is not the case and a module of mandatory conservation regulations for non-EU countries should be included.



Graph 4: Distribution of Biodiversity criteria within the driver "Degradation and destruction of ecosystems" [%]



Graph 5: Assessment of criteria for the driver „Degradation and destruction of ecosystems „ [%]

Exemplary Criteria:

Rainforest Alliance, 2017: 2.5
Existing native vegetation outside natural ecosystems is maintained, including:
- Existing agroforestry shade tree cover;
- Existing vegetated zones adjacent to aquatic ecosystems; and
- Large native trees, except when these pose hazards to people or infrastructure.

Rainforest Alliance 2017: 2.2
Farms conserve all natural ecosystems and have not destroyed forest or other natural ecosystems in the five year period prior to the date of initial application for Rainforest Alliance certification or after January 1, 2014, whichever date is earlier.

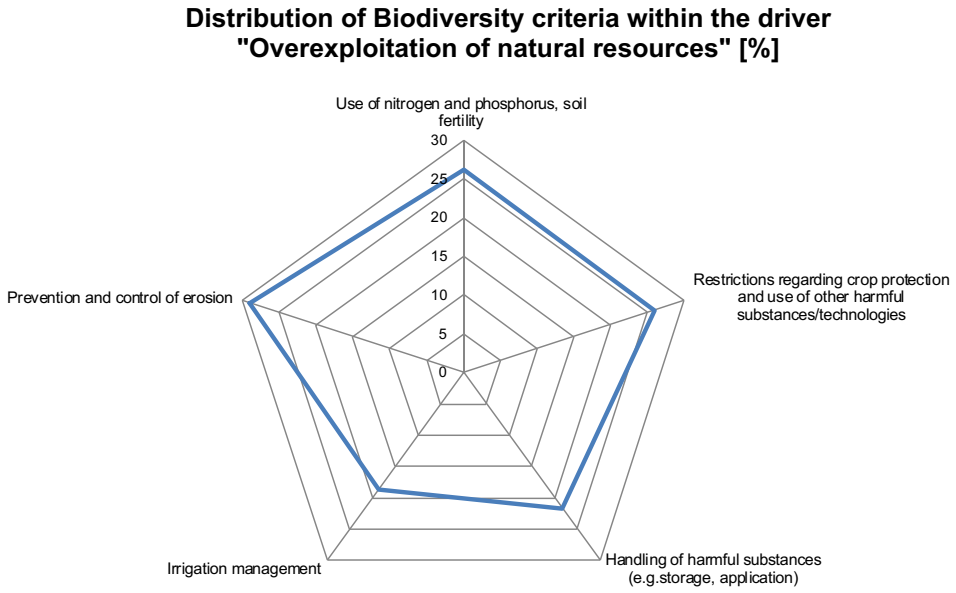
GlobalG.A.P.: AF. 7.1.1
Does each producer have a wildlife management and conservation plan for the farm business that acknowledges the impact of farming activities on the environment?
There shall be a written action plan that aims to enhance habitats and maintain biodiversity on the farm. This can be either an individual plan or a regional activity that the farm is participating in or is covered by. It shall pay special attention to areas of environmental interest being protected and make reference to legal requirements where applicable. The action plan shall include knowledge of integrated pest management practices, nutrient use of crops, Conservation sites, water supplies, the impact on other users, etc.

5.2.2 Overexploitation of natural resources

The negative influence of conventional agriculture on natural resources is more and more considered by the international standards in the food industry. More than half of the criteria evaluated, and within them almost all the criteria of the organic standards, refer to this driver. The results are especially influenced by the organic standards screened, in which the criteria of how to cultivate play an important role.

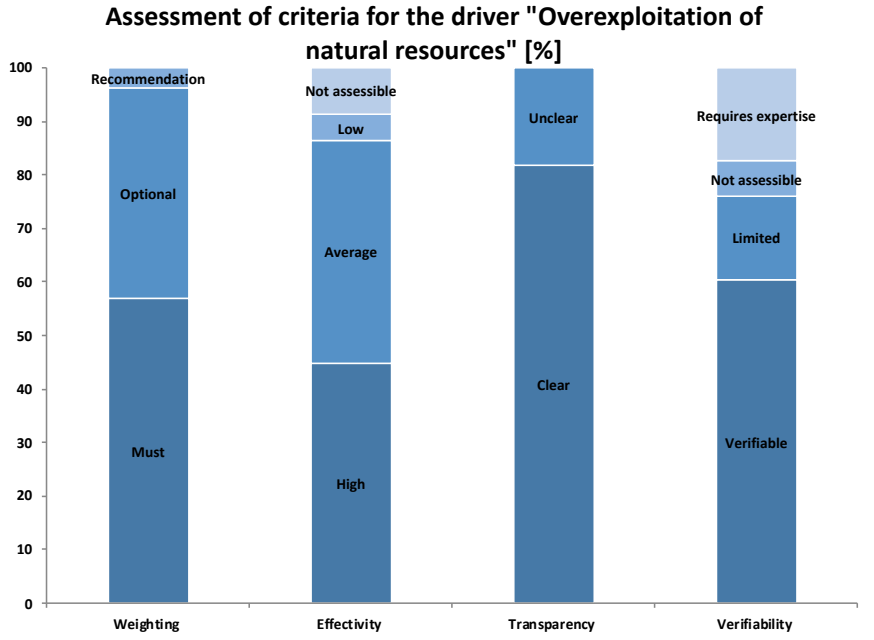
The issues of fertilization and soil fertility, restrictions on the protection of plants, the handling of dangerous substances and the control and prevention of erosion are dealt with in a balanced and appropriate way. References are also made to the obligations required by labor law, as well as other more economic aspects, such as cost savings, which are generated almost automatically through integrated production. The criteria for irrigation management are formulated rather vaguely. Due to the high water needs of bananas, and impacts of climate change, effective requirements for better irrigation management are needed.

The criteria are usually formulated in a transparent manner and can be easily verified. Regarding the effectiveness, much remains to be done. Less than half of the criteria were assessed as truly effective in terms of biodiversity protection. The weak relationship between mandatory criteria and optional criteria/recommendations should also be reviewed. Leaving too much open and at the discretion of the producer is not appropriate in view of the considerable negative impacts that can be generated on biological diversity.



Criteria within this driver: 263 out of 487 = 54%

Graph 6: Distribution of Biodiversity criteria within the driver „Overexploitation of natural resources“ [%]



14 out of 14 standards include at least 1 criteria falling under this driver

Graph 7: Assessment of criteria for the driver „Overexploitation of natural resources“ [%]

05

Exemplary Criteria:

Fairtrade Standard Fresh Fruit: 4.1.1.
Integrated Weed Management
Banana Companies
If you use herbicides in the production process, you implement the following elements of an integrated weed management approach:

- Gain knowledge of the weeds that affect the productivity of the crop and of the conditions that favour and hamper the development of the weeds. […]
- Use of alternative control techniques, mulches or cover crops in order to control and reduce the weeds.
- Application of herbicides focused on areas where the weeds are present and affect the crop.

Fairtrade Standard for Small Producers: 3.2.25
You are informed about the situation of the water sources in your area. In case local environmental authorities or other entities consider that your water sources are being depleted, or are in a critical situation, or under excessive pressure, you must engage in a dialogue with the authorities or local existing initiatives in order to identify possible ways to be involved in research or solution finding.
Guidance: You may find it difficult to know if a water source is sustainable or if it has replenishing capacity, but you may monitor the existing knowledge about the sustainability of the water sources for related information and/or claims with local authorities, universities or organizations that are working in your region.

Fairtrade Hired Labor Standard: 4.3.11
Your company keeps informed about the status of the water sources in the area. In case local environmental authorities or other entities consider that water sources are being depleted, are in a critical condition or under excessive usage, your company engages in a dialogue with the authorities or local initiatives in order to identify possible ways to be involved in research or solution finding.
Guidance: It may be difficult to know if a water source is sustainable or if it has replenishing capacity, but the existing knowledge about the sustainability of the water sources can be monitored for related information and/or claims with local authorities, universities or organizations that are working in the region.

Rainforest Alliance:
3.20 Greywater is collected and managed through treatment or drainage systems, and is not discharged into aquatic ecosystems.
3.21 Farms map all pit latrines and sewage disposal sites and their drainage systems. These systems are sited, designed and managed to minimize risks to aquatic ecosystems and drinking water supplies.

Manual de Piña: 6.3.22
During the rest of the land or fallow areas, it is recommended to sow legumes [...], incorporate them into the soil [...], provide organic matter and nitrogen, collaborate with the control of arvenses and pathogens, improve soil fertility and reduce rest time.

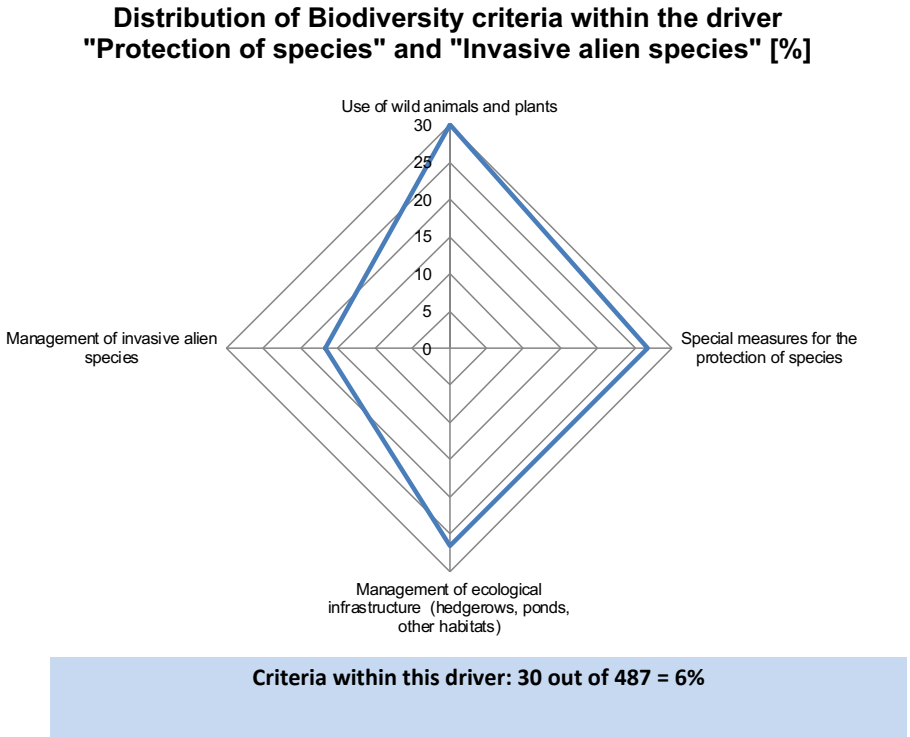
5.2.3 Protection of species and prevention of invasive alien species

Species protection is core of preserving biodiversity. 11 out of 14 standards address the topics species protection and prevention of invasive species. However, in total only 30 out of 487 criteria (6%) are directly related to these topics. The low number of criteria in combination with moderate effectiveness shows that species protection as one of the main objectives of biodiversity protection does not receive sufficient attention by the standards. This might also result from missing awareness regarding the importance of native species for the environment and even the cultivated crops as well as regarding the negative impacts of invasive non-native species on biodiversity. It is important that standard organizations have effective criteria as well as guidance on these topics.

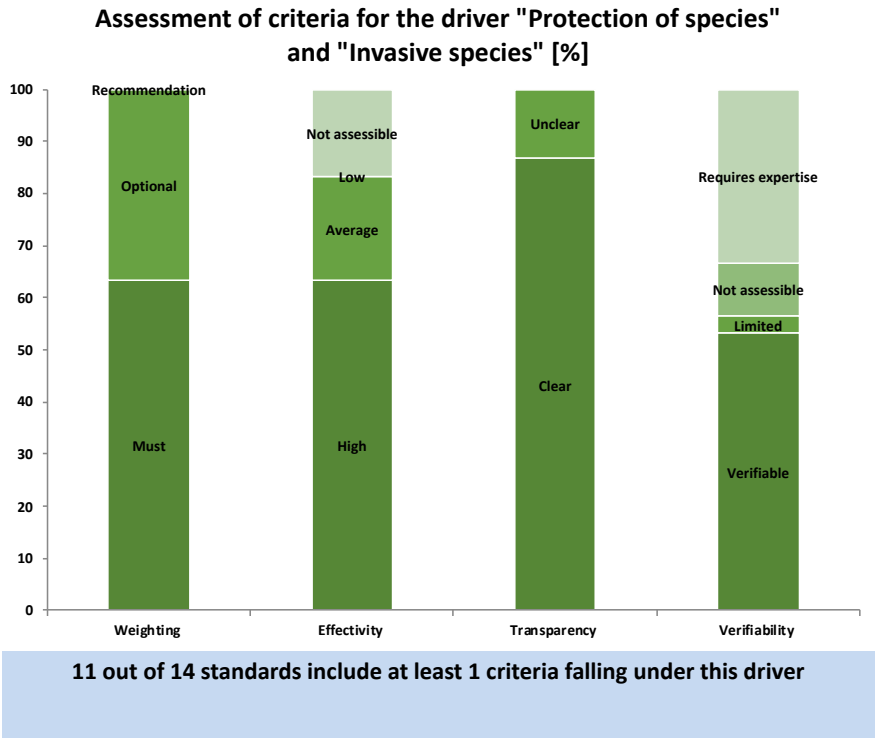
Standards also include the management of ecological structures, which has a positive effect on semi-natural habitats and native vegetation and therefore may counter the destruction of ecosystems.

Specifications on the issue of invasive species are included in only four standards, none of them are organic standards. Since invasive species can change the ecological balance and displace native species, greater attention should be paid to this issue.

While most criteria are clearly formulated, 63% of the criteria have been assessed as highly effective, the same goes for the percentage of mandatory criteria. On the other side, less than half of the criteria are easily verifiable. Often special expertise about flora and fauna is required from the auditor (>30%) or the verification of the criteria is either limited or not possible. This shows a challenge in terms of providing good criteria and verification for this issue and specific training for auditors is required.



Graph 8: Distribution of Biodiversity criteria within the driver „Protection of species“ and „Invasive alien species“ [%]



Graph 9: Assessment of criteria for the driver „Protection of species" and „Invasive species" [%]

Exemplary Criteria:

Manual de Piña:

Annex 1: Endangered tree species (prohibition of cutting)

In the national pineapple handbook a clear list of endangered tree species are presented in a table that are not allowed to be deforested. This is important for a good guideline, otherwise this shall not indicate that ALL other tree species are free to be used and be cut.

Sustainable Agriculture Initiative Farm Self Assessment: FSA15

Do you avoid the cultivation and use of invasive species? Invasive species are those that can come to dominate an area and may result in a loss of native species. It is important to assess the invasiveness of a species before use. […] Possible sources for information about invasive species are legislation and the Global Invasive Species Database (GISD).

Rainforest Alliance: 2.4

Animals that are endangered or protected are never hunted or killed. Animals are not hunted on the farm, with the following exceptions:

- Smallholders may hunt non-endangered species for non-commercial use only; and
- Vertebrate pest wildlife may be hunted only in accordance with the farm's integrated pest management (IPM) plan, and only as a measure of last resort. Control of rodents follows Rainforest Alliance rodenticide risk management requirements.
- Explosives or toxic substances are never used for hunting, fishing, or control of wildlife pests.

Fairtrade Standard for Hired Labour: 4.6.4
Your company ensures that no collecting or hunting of rare or threatened species is undertaken and that no alien invasive species is introduced.
Guidance: Initial classification of rare and threatened species and identification of alien invasive species is made by your company based on its own knowledge. With time your company is expected to contact a local expert who would provide support in identifying rare and threatened species and in adjusting the initial classification, and who could provide support in identifying alien species and ways in which their introduction and propagation may be avoided.
In addition to local and regional information, your company may want to look at IUCN red list of threatened species at www.iucnredlist.org.

For further information on alien invasive species see the Convention of Biological Diversity at www.cbd.int/invasive/

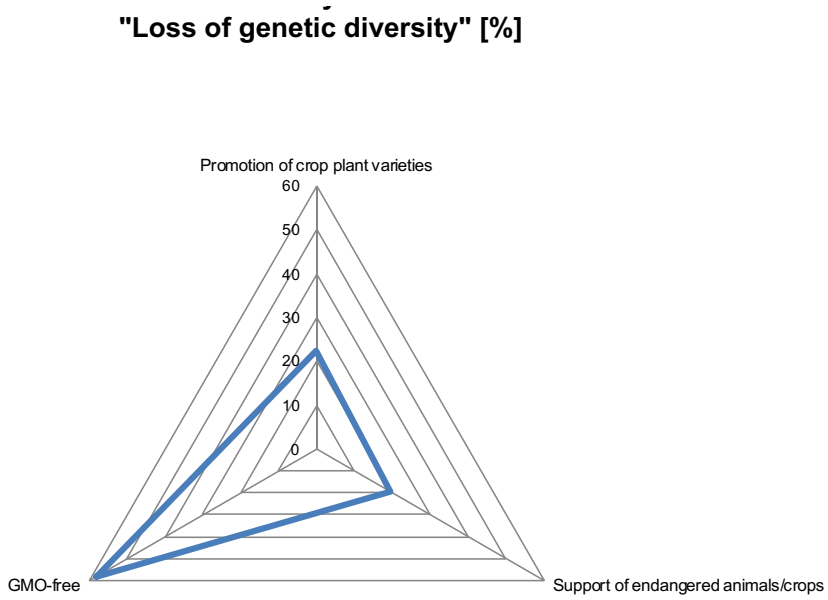
5.2.4 Loss of genetic diversity

The issue of genetic diversity is included in 11 of the 14 revised standards. About 75% of the 31 criteria require a ban on the use of genetically modified plant material. This is influenced by organic regulations, which ban genetically modified organisms without exception. In addition, the legal situation in many importing countries and in Europe means that many of the conventional regulations also require the absence of GMOs.

Genetic diversity in varieties and in the field is generally not yet relevant for international standards. Only five of the revised standards require the protection of endangered varieties and the promotion of plant diversity in cultivation. This small number is surprising, especially after the tragedy experienced with the banana variety Gros Michel, which failed worldwide in the 1970s due to Panama disease, and today many fear the same thing could happen with the variety Cavendish through infestation by the current virulent strain of Panama TR4 disease. The use of different varieties, native seeds and increased cultural biodiversity helps mitigate such catastrophes.

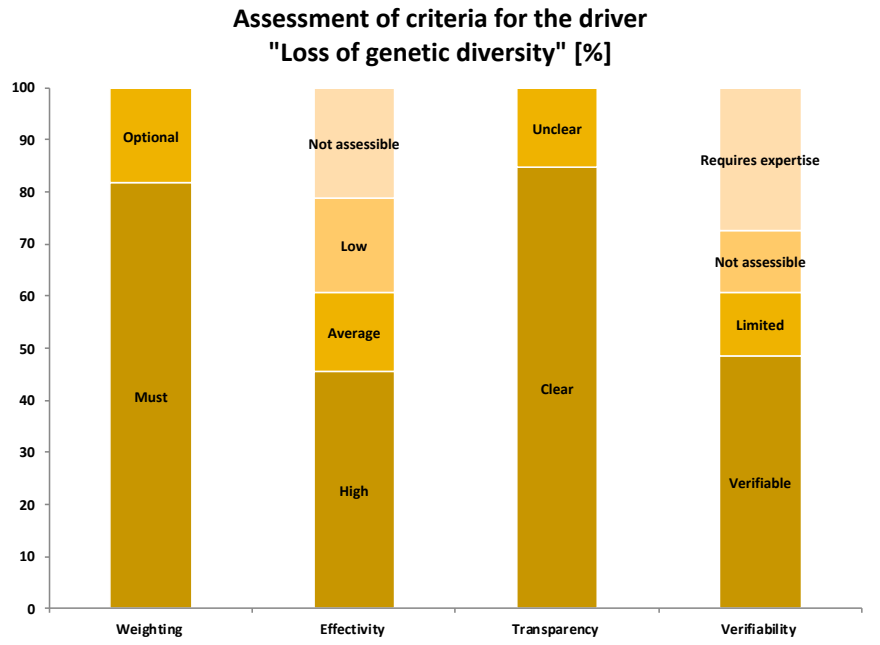
80% of the criteria mentioned here are verifiable. The criterion on the absence of GMOs is highly effective, and can be easily adjusted and controlled. The effectiveness of the other criteria could be improved, as only half of them are classified as effective. With regard to transparency, the criteria are formulated in a sufficiently transparent manner.

The examples given above show how this issue can be included in international standards.



Criteria within this driver: 31 out of 487 = 6%

Graph 10: Distribution of Biodiversity criteria within the driver „Loss of genetic diversity" [%]



11 out of 14 standards include at least 1 criteria falling under this driver

Graph 11: Assessment of criteria for the driver „Loss of genetic diversity" [%]

Exemplary Criteria:

Fairtrade – Hired Labour Standard: 4.6.6
Your company evaluates the implementation of agro-forestry systems as well as agricultural diversification, as applicable.
Guidance: Agro-forestry crops or crops from species originally living under shade or forest ecosystems may benefit from being produced under their original conditions. This may improve soil conditions and the local environment, as long as it is economically feasible. 'Agricultural diversification' refers to growing different crops that will enable the company to have alternative income sources. This may be preferred, as long as it is economically feasible.

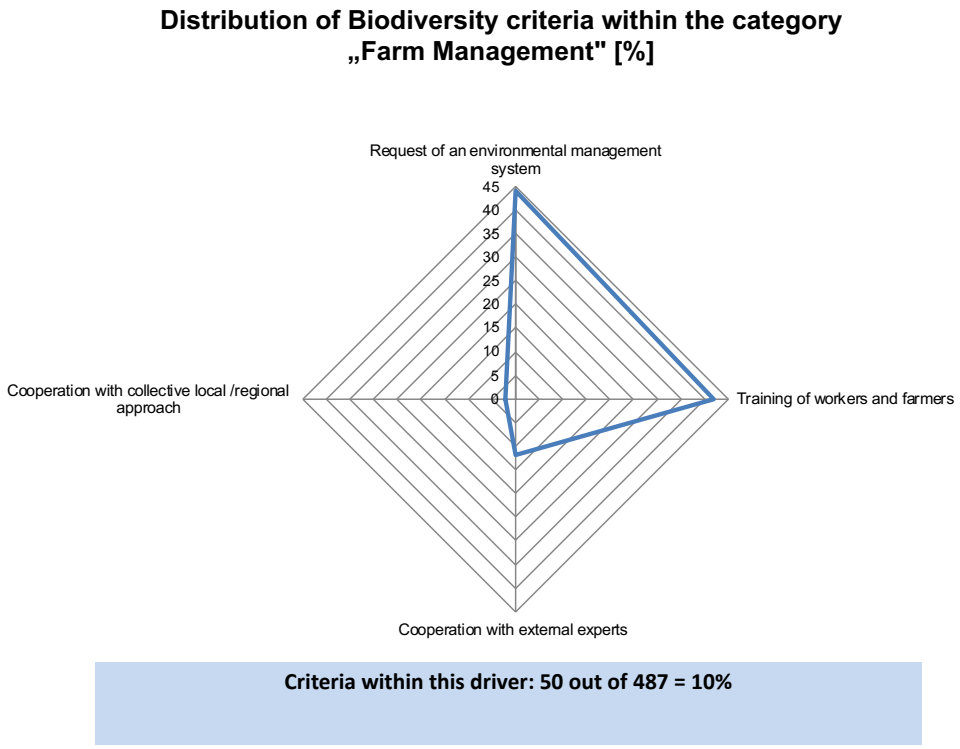
Sustainably Grown: Indicator 4.1.1.4.
The Producer of perennial crops grows at least one additional commercial perennial crop type, annual crop, or cover crop.

Sustainable Agriculture Initiative - Farmer Self-Assessment: FSA13
When selecting and using varieties, do you make an informed choice?
Guidance: Varieties include seed and planting material as well as grafting material.
An informed coice can take into account any of the below:

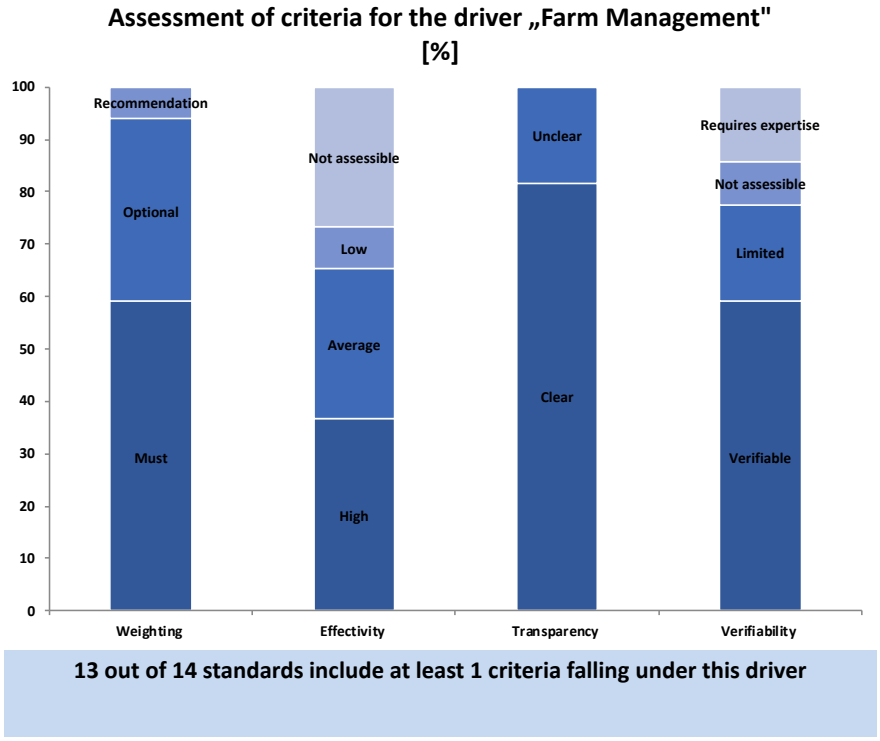
- Yield performance;
- Disease resistance of the varieties (resistance or tolerance to commercially important pests and diseases);
- Adaptation tolocal climativ and geographic conditions;
- soil characteristics and crop rotation;
- Customers´requirements;
- Pest, disease and weed pressure;
- Fertilization needs;
- Water needs;
- genetic diversity on the farm;
- Impacts on the adjacent cultivated area;
- Recommendations by extension officers;
- Results from variety trials.
-

5.2.5 Farm management

All the standards analyzed - except one - have criteria on farm management. Of the total of 487 criteria found, 50 refer to this topic. Most of these criteria require the establishment of an environmental management system for the farm (44%) and/or staff training (41%).
On a positive note, most of the standards require the assignment of a person responsible for the management system. Some criteria mention elements of biodiversity management, but not all include biodiversity within the aspects which should be considered.
Unfortunately, in the case of water resource management, only two standards require collaboration with experts, stakeholders and/or regional initiatives.
Evaluating the effectiveness of the criteria by requiring an environmental management system and/or training is very difficult, because it depends on the quality of the system and the implemented training programs. A third of the criteria (36%) have been evaluated as „1" in effectiveness.
59% of the criteria are mandatory and more than 80% are considered transparent.



Graph 12: Distribution of Biodiversity criteria within the category „Farm Management" [%]



Graph 13: Assessment of criteria for the driver „Farm Management" [%]

Exemplary Positive Criteria:

Rainforest Alliance, 2017: 1.1 A farm baseline assessment is conducted and documented.
The assessment is reviewed and updated at least once per year. The assessment includes:

- A farm map indicating the location of each production plot, roads, buildings, other infrastructure, natural ecosystems, and abutting land uses including protected areas.
- A boundary delineation of the certificate's geographic extent;
- Information on each production plot, including type of crop or pasture, crop or pasture varieties and crop or herd density, crop age or renovation stage for perennial crops and rotation cycle for annual crops; and production level.
- A tabulation of the total farm area, total production area, and total area of natural ecosystems.

Rainforest Alliance, 2017: 1.6
The farm management and group administrator demonstrate commitment to certification and to complying with this standard:

- Resources are dedicated and responsible personnel is designated to the development and implementation of social and environmental management plans;
- Applicable laws are identified within the scope of this standard, systems for compliance are maintained and written affirmations of this compliance are provided;
- Regular assessments are conducted to measure compliance with this standard;
- Social and environmental management plans are adjusted accordingly.

Naturland: 7.2.3 Specific management conditions
Naturland may impose specific management conditions for certain regions, especially as to the respective con-centration of farms or as to farms of a respective size, upon consultation with regional experts. These are to be included in the water management plan and are relevant for certification. When consulting experts, the specific problems and challenges of a catchment area, including any beyond the borders of an individual farm, are to be taken into account, especially

- the water balance of the catchment area,
- tassessment of water risks oft he catchment area (physical, regulatory and reputational risks)
- sustainability of water abstraction (reasonable quantities, critical level; short, medium and long term)
- measures designed to reduce water risks, to establish sustainable water management and to protect eco-systems.

Whenever necessary, the experts will be consulted again before specific management conditions are updated.

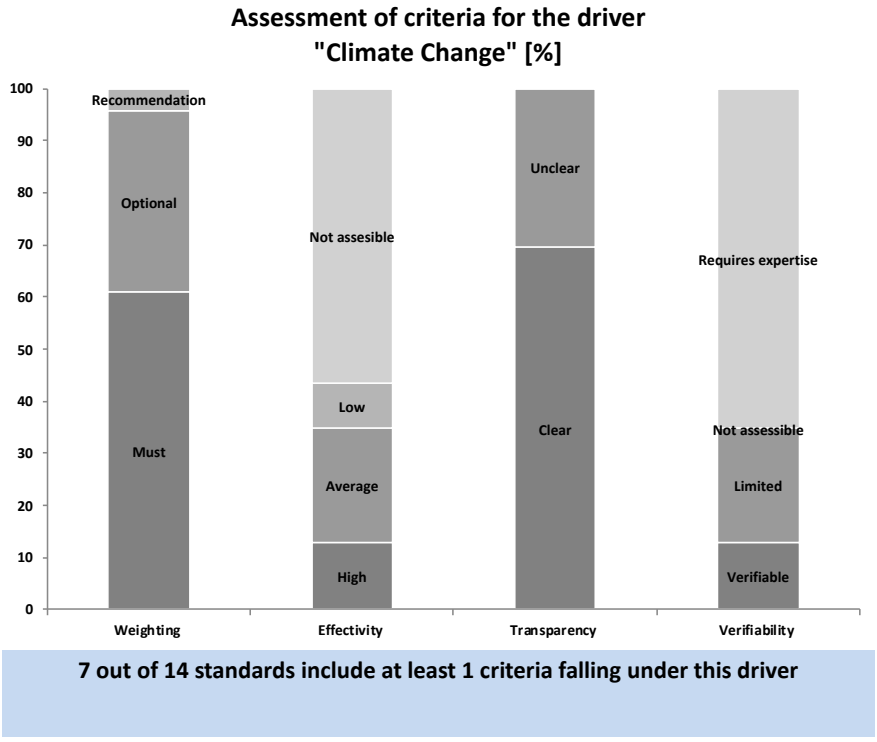
Naturland 7.2.4 Use of non-renewable and fossil water resources
The use of non-renewable and fossil water resources for agricultural production is only possible if consultation with experts has furnished credible proof that this use does not conceal any significant ecological or social risks. In this case, the analysis must cover the whole catchment area as well as any possible social and ecological consequences for other parts of the country or in other countries. Both short and long-term risks are to be assessed. The results are to be presented to Naturland prior to (possible) certification.

5.2.6 Climate Change

Today, sound scientific evidence concludes that global warming is in large part caused by human activities. Therefore, climate change marks an integral part of the international political agenda. However, the willingness to take concrete actions in order to minimize the negative effects of climate change on nature and the vulnerable human populations remains a challenge.

It was no surprise that the topic found its way into the policies of standards for agriculture, one of the contributors to the rising CO_2 level. At the same time, it still has no central position within the requirements. Merely 7 out of 15 standards included at least one criterion limiting negative impacts of biomass energy production on ecosystems or the calculation or the management and monitoring of greenhouse gas emissions. Only one standard intensively covers the topic of carbon emissions with up to 10 mandatory and optional criteria, describing how to establish an emission monitoring and reduction system. Beside this, only one standard includes a criterion with measures for the adaption to climate change.

Even if the larger part of the mentioned criteria are mandatory, the effectiveness of climate change related requirements is regarded either as average or as not assessable. This is due to the complexity of collecting data and delivering a qualitative high evaluation of CO_2 emissions. Especially smallholder farmers will most likely not have the financial and human resources to carry out such data collection and analysis. The same goes for the verifiability. Even if most requirements are clearly defined, auditors will need an in-depth knowledge to decide when such criteria are sufficiently met. There is still a lot do to translate the vision of climate protection into effective requirements and include it appropriately into certification.



Graph 14: Assessment of criteria for the driver „Climate Change“ [%]

Exemplary Criteria:

Fairtrade – Standard for Small-scale Producer Organizations: 3.2.42

You implement measures on adaptation to climate change.

Guidance: The adaptation measures and activities depend on identified risks and existing practices in your region/product and are in line with the human and financial capacity of your organization and members.

Examples of adaptation practices include: adjustments in crop planting dates to avoid periods with high temperature stress, installation of facilities for rain water collection and use, soil cover/mulch application, use of drought resistant crop varieties, crops diversification, and improved pruning practices.

Members who are engaging in climate change adaptation activities are encouraged to share their experience with other members, using their field plots for demonstration of climate change adaptation practices for further replication of these practices by other members.

Rainforest Alliance, 2017: 3.45

If biomass energy is used, the farm management and group administrator minimize the direct or indirect effects of biomass use on natural ecosystems through actions such as:

- Planting trees to increase the availability of biomass energy from tree plantations.
- When biomass is purchased, ensuring that it originates from sources not associated with the destruction of forests or other natural ecosystems.
- Installing energy-efficient drying and processing infrastructure.
- Supporting increased energy efficiency in domestic fuelwood use by workers, farmers and their families through training, or facilitating access to energy-efficient cook stoves.

06 CONCLUSIONS AND CONSIDERATIONS

The growing number of criteria – as well as the number of exemplary criteria - shows that the protection of biological diversity has become of increasing interest in agriculture and in the food sector. International standards react to this and consider biodiversity protection as a basic commitment. In this context, one has to ask why the loss of biological diversity continues dramatically and in an accelerated manner - especially on agricultural land. The latest report of the Intergovernmental Platform on Biodiversity and Ecosystem Services shows that more than 70% of the insects that inhabit agricultural land around the world are at risk. In fact, the results of the analysis of fourteen food standards answer this question: many criteria are not mandatory, many criteria are not effective enough, and therefore many criteria do not produce the positive impact necessary for stopping the loss of biodiversity.

Another explanation can be found in the relationship between the exemplary criteria and the total sum of the criteria. If about one third of the criteria for the protection of biological diversity are exemplary, that means that 2/3 of the criteria needs improvements. One of the main potentials of improvement for the standards is to review the optional criteria relevant to biodiversity and make them mandatory. This step would be a breakthrough for effective protection of biodiversity.

As highlighted in the report, the effectiveness of the criteria is essential - and more than 50% of the criteria evaluated are considered as not effective. We have found many criteria that could be more effective only by expressing more clearly and / or more complete what is required. An example: Many standards already require a plan for the protection / conservation of nature or biodiversity - but they do not determine the minimum content of the plan (e.g. description of the baseline, measurable objectives, action plan with time table, monitoring). Thus, the auditor verifies if there is a plan or not, but has no indicators to assess whether the plan is of (high) quality - or not.

Verifiability is a basic requirement and a challenge for standards the internal procurement guidelines of companies. What can be audited? Can you determine if an ecosystem is intact and / or worth protecting? Auditors may not be experts in all matters that affect biodiversity for all types of regions and species, but they are experts in assessing the quality of processes. Therefore, certification bodies and companies in the food sector may require certain processes and methods for biodiversity management - and describe these processes and methods well.

Regarding the improvement of agricultural practices to reduce negative impacts on biodiversity, it would be useful to have a combination of processes and criteria with maximum or minimum values (e.g. minimum percentage of ecological structures beyond legal requirements, minimum width of buffer strips, maximum nitrogen balance: kg / N per hectare and year). Standards and companies should demand result based indicators such as nutrient balance and provide a valid method for their calculation, as well as soil and plant analysis. These are concrete and efficient measures with positive impacts to protect biodiversity and climate.

The good news is that we have found criteria that can be considered as positive examples. Perhaps they can be still improved in some aspects, but they go in the right direction and definitely contribute to protecting and managing biodiversity.

These exemplary criteria can be incorporated into the standards in different ways. Ecological standards are excellent when it comes to overexploitation of natural resources: use of natural fertilizers, renunciation of chemical pesticides, erosion control. These and other criteria of organic agriculture generally alleviate the biosphere. Genetically modified organisms are banned and species protection plays an important role. But there are also very advanced standards for conventional agriculture. For example: Fairtrade‘s list of prohibited pesticides is based on the recommendations of the PAN Pesticide Action Network.

Some sustainability standards especially take into account the protection of ecosystems in production areas and beyond. They underline the importance of connecting habitats through biological corridors and strongly recommend collaboration with authorities / NGOs / experts in the sustainable management of water sources.

The complete list of exemplary criteria as well as recommendations for effective biodiversity criteria can be found from November 2019 on the website:
https://www.business-biodiversity.eu/en/our-initiatives

We invite standard organizations, food companies, cooperatives, certifying companies and other players in the banana and pineapple sector, to review these documents, compare exemplary criteria and our recommendations with their requirements and incorporate improvements. We are very willing to support this process.

ANNEXES

Annex 1 - List of the certification standards and organizations screened

	ORGANIZATION / TYPE IF CERTIFICATION	PRODUCTION SYSTEM
	INTERNATIONAL STANDARDS	
1	BioSuisse	Organic
2	Demeter	Organic
3	EU Organic	Organic
4	Fairtrade - Hired Labour Standard	Conventional
5	Fairtrade. Standard for Small Scale Producer Organizations	Conventional
6	Food Plus GmbH - GlobalG.A.P.	Conventional
7	IFOAM - Coros	Organic
8	Naturland	Organic
9	Rainforest Alliance	Conventional
10	SCS Global Services - Sustainably Grown	Conventional
11	Sustainable Agriculture Initiative - Farmer Self-Assessment	Conventional
12	USDA	Organic
	NATIONAL STANDARDS	
13	Essential Costa Rica	Conventional
14	MAG- Manual de Piña*	Conventional

** The "Manual de Piña" of the Ministry of Agriculture and Livestock (MAG) of Costa Rica could be verified, but it is not clear whether it is an official standard or a simple non certifiable guide of good practices.*

Annex 2 - Glossary of terms

Alien species

A species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce. (Convention of Biological Diversity)

Biodiversity

The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (Convention on Biological Diversity)

Convention on biological diversity (CBD)

The Convention on Biological Diversity (CBD) is an international legally-binding treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; fair and equitable sharing of the benefits arising from the use of genetic resources. Its overall objective is to encourage actions which will lead to a sustainable future.

The conservation of biodiversity is a common concern of humankind. The Convention on Biological Diversity covers biodiversity at all levels: ecosystems, species and genetic resources. It also covers biotechno-

logy including through the Cartagena Protocol on Biosafety. In fact, it covers all possible domains that are directly or indirectly related to biodiversity and its role in development, ranging from science, politics and education to agriculture, business, culture and much more.

The CBD's governing body is the Conference of the Parties (COP). This ultimate authority of all governments (or Parties) that have ratified the treaty meets every two years to review progress, set priorities and commit to work plans. The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993. At the 2010 10th Conference of Parties (COP) to the Convention on Biological Diversity in October in Nagoya, Japan, the Nagoya Protocol was adopted.
http://www.un.org/en/events/biodiversityday/convention.shtml

Ecological infrastructures or farmland features

Farmland features are a critical environmental resource, forming the skeleton of the agricultural landscape or agriculture's 'green infrastructure'. They can be defined as spatially identifiable natural, semi-natural or man-made landscape elements. Some are integral to current farming systems, whereas others are relics of traditional systems long abandoned. They are classified in a number of ways, depending on the level of detail at which they are identified. A common classification of features is that developed by Bunce et al. (2005) which has been field tested in all of the major Environmental Zones in Europe (it is known as the BioHab classification system). It covers all habitats in Europe in a consistent manner and was developed to monitor changes in habitats and biodiversity.

Following the classical description of a landscape, the BioHab classification system clusters features in a farmed landscape into three categories:

- Point Features: individual landscape components which cover a small part of the overall landscape, for example, single trees, small clusters of trees, ponds, monuments, windmills, buildings, cairns, tumuli and other archaeological remains.
- Linear Features: landscape components that are linear in nature, for example, hedges, lines of trees, stone walls, terrace walls, banks, streams, ditches, margins and buffer strips, riparian strips, tracks, irrigation networks, drovers' roads and transhumance routes, fences and paths.
- Patch Features: landscape components covering larger areas, for example, semi natural grassland, orchards, woodlands, waterbodies, dehesas, montados and large areas of rocky ground.

Farmland features provide a range of environmental benefits and ecosystem services. These include the maintenance of biodiversity through the provision of habitats and food sources and natural resource protection. In some cases they contribute to the mitigation of climate change through carbon sequestration and facilitate adaptation to climate change by enhancing the resilience of species, whilst also enabling them to disperse in response to changing conditions.
http://ec.europa.eu/environment/agriculture/pdf/IEEP%20_2008_%20Final%20Report.pdf

Genetically Modified Organism (GMO)

An organism, the genetic material of which has been modified in such a way as is not possible in a natural manner by cross-breeding and/or natural recombination. (Naturland Standards on Production)

High Conservation Value Areas (HCVs)

Habitats, which are of outstanding significance or critical importance due to their high environmental, socioeconomic, biodiversity or landscape values. The HCV concept was originally developed by the Forest

Stewardship Council. It is now a keystone principle of sustainability standards as well as being widely used for landscape mapping, and in conservation in natural resource planning and advocacy. HCVAs may be part of larger habitats or may be an entire habitat. (HCV Network)

Indicator species

Species whose status provides information on the overall condition of the ecosystem and of other species in that ecosystem. They reflect the quality and changes in environmental conditions as well as aspects of community composition. (Biodiversity A-Z)

Invasive alien species

An alien species whose introduction and/or spread threaten biological diversity. (Convention of Biological Diversity)

IUCN Red List

The IUCN Red List of Threatened Species™ provides taxonomic, conservation status and distribution information on plants, fungi and animals that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those plants and animals that are facing a higher risk of global extinction (i.e. those listed as Critically Endangered, Endangered and Vulnerable).
The IUCN Red List also includes information on plants, fungi and animals that are categorized as Extinct or Extinct in the Wild; on taxa that cannot be evaluated because of insufficient information (i.e., are Data Deficient); and on plants, fungi and animals that are either close to meeting the threatened thresholds or that would be threatened were it not for an ongoing taxon-specific conservation programme (i.e., are Near Threatened). (www.iucnredlist.org)

Mitigation hierarchy

The mitigation hierarchy is defined as:

- Avoidance: measures taken to avoid creating impacts from the outset, such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity.
- Minimisation: measures taken to reduce the duration, intensity and/or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible.
- Rehabilitation/restoration: measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/or minimised.
- Offset: measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

A key principle is that offsets cannot provide a justification for proceeding with projects for which the residual impacts on biodiversity are unacceptable. This means that the avoidance options have to be considered seriously in harmful cases. (Glossary European Commisison and Business and Biodiversity Offsets Programme (BBOP))

No net loss; Net positive impact (gain) of biodiversity
See definition for Mitigation hierarchy.

Organism

Any biological unit capable of reproduction or passing on genetic material. (Naturland Standards on Production)

Semi-natural areas

Areas modified by human influence but retaining most natural features such as species diversity and species interrelation complexity. (INBio Costa Rica)

Soil biodiversity

Millions of microbial and animal species live in and make up soils, from bacteria and fungi to mites, beetles and earthworms. Soil biodiversity is the total community from genes to species, and varies depending on the environment. The immense diversity in soil allows for a great variety of ecosystem services that benefit the species that inhabit it, the species (including humans) that use it, and its surrounding environment.
http://www.globalsoilbiodiversity.org/?q=BackgroundSoilBiodiversity

The Convention on Biological Diversity (CBD) defines soil biodiversity as „the variation in soil life, from genes to communities, and the ecological complexes of which they are part, that is from soil micro-habitats to landscapes“.
http://eusoils.jrc.ec.europa.eu/library/themes/Biodiversity/

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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

minae

Ministerio de Medio Ambiente y Recursos Naturales

Global Nature Fund

Bodensee Stiftung