



BONSUCRO GUIDANCE FOR OPERATORS

DEVELOPING A BIODIVERSITY
MANAGEMENT PLAN v2.0

1. BACKGROUND

1.1 SCOPE

This guidance is designed to support operators on indicator 4.1.2 to develop and implement a Biodiversity Management Plan, using outputs generated in the mapping of biodiversity and natural ecosystems across the agricultural areas in the unit of certification under 4.1.1 (see “Bonsucro Guidance for Operators – Supply Base Mapping” for 4.1.1).

4.1.2 – The operator develops and implements a Biodiversity Management Plan (BMP)

The operator shall develop and implement a BMP. The BMP shall: a) Address threats and impacts that the cane production has on biodiversity, ecosystem services and High Conservation Value (HCVs) areas, identifying mitigation and restoration measures that must be taken. b) Have achievable actions and objectives, monitoring activities, agreed responsibilities, timeframes, and allocated resources. c) Reflect continuous improvement and organisational learning principles. d) Be revised at least every three years or sooner as per company procedures

1.2 BIODIVERSITY

Biodiversity and ecosystem services are linked to natural ecosystems, however as most areas of natural ecosystems lack formal protection over time, a large proportion of the world's potentially cultivable, natural lands have been cleared for agriculture. This is particularly the case for natural grasslands of which very little remains, and wetlands, many of which have been drained and ploughed. Forest have also been targeted, and today more than half of the original global forest cover is gone. Some of these areas are (more or less effectively) maintained in natural reserves and national parks, or protected from exploitation through multi-national conventions and treaties.

Yet biodiversity and natural ecosystems are important for a range of reasons including protecting water resources, reducing transmittable diseases, pest control, improving resilience against the impacts of climate change, and for the livelihoods of local communities. For this reason, the Bonsucro standard requires that biodiversity, natural ecosystems and High Conservation Values are maintained and enhanced.

1.3 HIGH CONSERVATION VALUES

High Conservation Values, HCVs, form a set of values of critical importance for humans and nature. The HCV concept is widely recognised by businesses, civil society organisations and development agencies, and HCVs are referred to by a range of international standard-setters, initiatives and platforms as well as by a number of governments and government agencies.

HCVs fall into six categories, spanning from species, ecosystems and landscapes, over ecosystem services, to key resources for local livelihoods and culture. The globally applicable definitions, adopted by Bonsucro, reads:

HCV 1, Species diversity: Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.

HCV 2, Landscape-level ecosystems and mosaics: Large landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes (IFLs) that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

HCV 3, Ecosystems and habitats: Rare, threatened, or endangered ecosystems, habitats or refugia.

HCV 4, Ecosystem services: Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

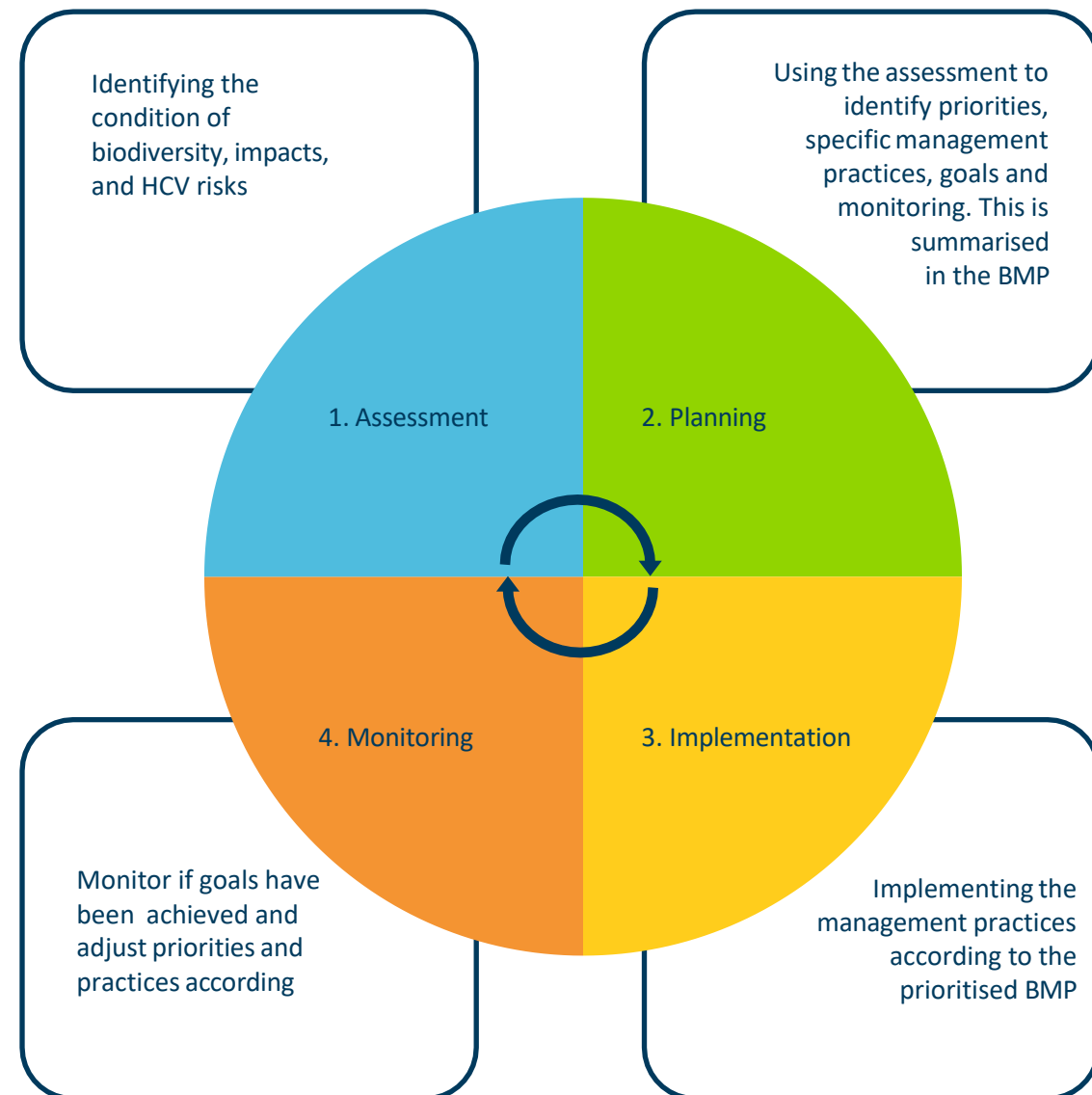
HCV 5, Community needs: Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

HCV 6, Cultural values: Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

As there is a lot overlap between wider biodiversity, natural habitats and HCVs, maintaining HCVs is integrated into developing and implementing the BMP as it relates to on-going cane production. In collaboration with the HCV Network, a simplified approach has been developed to allow operators assess whether HCVs may be present and implement precautionary practices, without the need for a detailed or stand-alone HCV assessment.

1.4 ADAPTIVE MANAGEMENT

A multi-step adaptive management process is used to assess if implementation of the BMP is achieving the desired goals, and to adjust or update the management plan accordingly. This guidance document outlines these steps and provides instructions and templates for completing the assessment and planning - leading to the BMP.



- 1. Assessment.** Operators access information compiled by the mill under 4.1.1 (mapping biodiversity across the unit of certification) on biodiversity, impacts and mitigation measures that are relevant to the growing area. This will support the operator in completing the *biodiversity questionnaire* for their cane production activities.
- 2. Planning.** Based on the assessment, mills and growers prioritise where to focus their biodiversity efforts, identify the appropriate management practices, define the goals and monitoring measures, and summarise this information in a BMP (a template is provided).
- 3. Implementation.** Operators identify resources needed, schedule for implementing the management practices, and determine how to document implementation.
- 4. Monitoring.** Operators monitor their biodiversity management practices as outlined in the BMP. Monitoring is used to assess if the specific goals presented in the BMP have been achieved or not. As goals are achieved (consider how to document this through photographs etc), growers can progress to implementing other lower priority measures. Monitoring will allow the grower to modify their BMP over time, and continuously improve the status of biodiversity on and around their farm.

2. ASSESSMENT

Information compiled by the mill under 4.1.1 (mapping biodiversity) is organized around Key Habitats and Focal Species relevant to the unit of certification.

- **Key Habitats:** easily distinguishable natural ecosystems on and around production lands
- **Focal Species:** a predetermined checklist of species of conservation concern, that are easily identifiable and potentially affected by farming practices.

This information is made available by mill operators, and presented as field guides, to support field identification, assessment of impacts and mitigation measures. A range of maps will also be available to support the grower in assessing biodiversity and HCV indicators on and near their farmlands.

The **Key Habitats** table provides information on natural ecosystems across the unit of certification, to support growers' identification of such areas on and around the farmlands. The table should also contain information on farming practices that may have potential negative impacts on these habitats, to help growers identify risks that are relevant in their contexts.

Growers should also consult the Focal Species field guide, and through walking around the farmlands and/or discussion with workers or neighbours, identify if any of the **Focal Species** currently - or in the past - occur on or near the farmlands. The Focal Species field guides contain information on potential negative impacts, including from farming practices, which can be used to guide management practices.

The Key Habitats and Focal Species field guides do not replace growers' own knowledge on local biodiversity and management practices, which should be incorporated into developing the BMP. Indeed, grower knowledge can be fed back into materials compiled by the mill, and support alignment and coordination between growers that provides wider landscape biodiversity benefits.

2.1 MAPPING

Maps generated at the unit of certification level by the mill (under indicator 4.1.1) are generally based on aerial or satellite imagery or conservation proxies rather than field observation. These:

- Should provide an indication of the major biodiversity features that are on or near the farms, such as natural habitats,
- identify current or potential habitat connectivity between neighbouring farms, and
- clarify whether the farm is near a 'priority conservation area'¹.

This information in turn informs the biodiversity priorities and opportunities at the farm level. The grower's knowledge and observations are necessary to verify and assess the biodiversity status at the farm level in more detail in order to develop their BMP. This involves developing a more detailed map of their production lands and surrounding areas using field observations. The grower is encouraged to walk around the farmlands either during the mapping, and/or while completing the biodiversity questionnaire to make more detailed observations.

GIS software can be used to develop the farm map, however where access to GIS resources or capacity is limited, sketching details onto a georeferenced base map (e.g. provided by the mill), is equally valid. The map should clearly show the boundaries of the farmlands and surrounding area.

The following features should be indicated on the map:

- The boundary of the farm,
- Areas of cultivation and agricultural activities, including fallow lands, farming infra-structure, roads, etc.,
- Natural ecosystems (supported by the **Key Habitat** table) on the farm, and the extent to which these connect to habitats in the area surrounding the farmlands,
- Permanent and temporary water bodies (rivers, streams, irrigation channels, ponds, lakes dams etc), and how these connect with areas surrounding the farmlands,
- Wind breaks, hedges, fences, treelines,
- Other areas that are used by wildlife or serve as corridors for wildlife mobility,
- Location and proximity to priority conservation areas.

¹ Priority conservation areas in the Bonsucro context refer to all of the following: Protected Areas, Key Biodiversity Areas, Ramsar sites, Intact Forest Landscapes, IUCN Threatened Ecosystems, UNESCO World Heritage Sites, any other nationally recognised protected areas (e.g. riparian buffer zones)

2.2 BIODIVERSITY QUESTIONNAIRE

There are 7 questions that are orientated around features relevant to maintaining and improving biodiversity and High Conservation Values, and require yes or no responses. Where the answer to a question is no, this indicates no further action is required and the next question can be addressed. Where the answer is yes, there are additional statements that are ticked when applicable that:

- assess the **condition** of biodiversity feature from ‘good’ to ‘bad’ using a simple ticking system of biodiversity indicators, where left-hand ticks indicate where there are opportunities for improvement,
- identify indicators of **High Conservation Values**.

Q1 Are there rivers, streams, canals, lakes, or ponds on, or near the farm? Yes: ↓
No: → Q2

Good quality water is necessary to sustain aquatic insects, amphibians, fish, birds and mammals. It is also vital to meet human requirements for consumption, cooking and personal hygiene. Water quality may be compromised by leakage of pesticides or fertilisers used on nearby fields, by runoff soil particles from fields and fallows, by poor pesticide disposal near the water body, or free roaming animal such as cows or goats accessing open water bodies and carrying water- borne diseases or increasing erosion of river margins.

1.1 Condition of (main) watercourse / waterbody:

Signs of water pollution (e.g. algae blooms, murky colour², smell, dense aquatic vegetation):

Much/always Considerable/often Some/occasionally No

Proportion of riverbanks / shores bordered by (at least 10 m) of permanent vegetation:

No Some Most All

Presence of native birds / mammals:

Seldom Occasionally Often Always

Provider of fish suitable for human consumption:

No/poor Decent Good Excellent

Presence of invasive aquatic plants / animals:

Common Considerable Some No

Ticks towards the left for each condition indicate opportunities to improve

1.2 High Conservation Value indicators:

- There are fields, housing or infrastructure closer than 50 m to a river, stream, lake, pond or well used as a main source of drinking or household water by people on, or off the farm;
- The watercourse / waterbody connects to a nearby (<5 km) priority conservation area;
- The waterbody may be important for one or more Focal Species;
- Other people have customary or legal rights to use water on the farm.

Any ‘yes’ tick above: → The watercourse / waterbody is of potential High Conservation Value. Growers must take measures as necessary to avoid, or effectively mitigate, any negative impacts.

² Other than the naturally brownish colour of water from peat areas.

1.3 Examples of strategies and activities:

- Maintain, or re-establish buffer strips of permanent vegetation (native plants, agroforestry or perennial crops), 10 m wide or more (refer also to relevant legislation on riparian areas), between fields and water bodies - the steeper the bank, the wider the distance. Where riparian vegetation has been lost in the past, emphasis should be made on the restoration of riparian vegetation, ideally as coordinated efforts by other growers in the supply area;
- Minimise disturbance of strip vegetation cover and bare ground to patches necessary for establishing and renewing individual specimens of trees, bushes and other perennial plants; keep farm animals out of these vegetation strips and buffer zones;
- Add a further 20 m 'no spray' buffer zone where no pesticides or fertilisers are applied to the to the minimum 10 m vegetation buffer zone;
- Store pesticides or hazardous waste safely and away from waterbodies to prevent leaching;
- Make sure there is no leakage from human faeces, and localise pens so as to minimise pollution from animal dung;
- Take specific measures to support Focal Species as recommended in the focal species field guides;
- Take specific measures to maintain the quality of key aquatic habitats as recommended in the key habitat materials;
- Respect others' customary and legal rights and make sure these are not affected or diminished without prior consent from the rights-holders.

Q2 Are there wetlands on or near the farm? Yes: ↓
No: → Q3

Wetlands are characterised by seasonal inundation or permanent high water tables. Many wetlands and wetland mosaic landscapes have extremely rich flora and fauna. However, wetlands are also important for people and their livestock, and many areas have been moulded by grazing, harvesting of reeds and grasses, and other uses for centuries. Peat wetlands form where dead wood and plant material accumulates faster than it decomposes. This happens in flat tropical regions with ample rainfall where high, stagnant ground water tables effectively block air oxygen from entering the soil. Peatlands provide several services: they slow down water movement and so mitigate floods, maintain base flow in rivers, trap sediments and prevent intrusion of salt water in flat coastal areas. However, arguably the main conservation value of peatlands is the enormous amount of carbon stored in thick peat domes with high water tables. Threats to wetlands include that traditional practices are abandoned in favour of new (often more intensive and less diverse) land use. Other threats are channelling and irrigation that reduce the amount of inflow, and drainage that lower the water table – particularly in peat areas where decomposition picks up speed, releasing vast amounts of carbon dioxide into the atmosphere. Wetland ecosystems may also be negatively affected by leakage and runoff of fertilisers and pesticides from adjacent farmland, and by invasive species. Wetland species richness, and balances between species, may also be threatened through over-exploitation of fish, fowl or other resources

Signs of water pollution (e.g. algae blooms, murky colour³, smell, dense aquatic vegetation):
Much/always Considerable/often Some/occasionally No

Effects of draining / ditches (lowering of water table, soil decomposition):
Strong Considerable Some No

Presence of native birds / mammals:
Seldom Occasionally Often Always

Provision of natural resources for livelihoods:
No/poor Decent Good Excellent

Presence of invasive aquatic plants / animals:
Common Considerable Some No

Ticks towards the left for each condition indicate opportunities to improve

³ Other than the naturally brownish colour of water from peat areas.

2.2 High Conservation Value indicators:

- On-farm wetland connects to a nearby (<5 km) priority conservation area;
- The wetland may be important for one or more Focal Species;
- Other people have customary or legal rights to use wetlands on the farm.

Any 'yes' tick above: → The wetland is of potential High Conservation Value. Growers must take measures as necessary to avoid, or effectively mitigate, any negative impacts.

2.3 Examples of strategies and activities:

- Maintain, or re-establish buffer zones of permanent vegetation (native plants, agroforestry or perennial crops), 10 m wide or more, between fields and wetland areas to reduce pollution and run-off from fields
- Minimise disturbance of buffer vegetation cover and bare ground to patches necessary for establishing and renewing individual specimens of trees, bushes and other perennial plants; keep farm animals out of buffer zones;
- Add a further 20 m 'no spray' buffer zone where no pesticides or fertilisers are applied to the to the minimum 10 m vegetation buffer zone;
- Store pesticides or hazardous waste safely and away from wetlands to prevent leaching;
- Localise pens away from wetlands so as to minimise pollution from animal dung;
- Take specific measures to support wetland Focal Species as recommended in the focal species field guides;
- Take specific measures to maintain the quality of key wetland habitats as recommended in the key habitat materials.
- Respect others' customary and legal rights and make sure these are not affected or diminished without prior consent from the rights-holders.

Q3 Are there forests or woodlands on or near the farm? Yes:
↓ No: → Q4

Forests host more animal and plant species than any other terrestrial ecosystem. Forests also capture and store vast amounts of carbon in the trees and in the ground, and so help to reduce climate change caused by carbon dioxide emissions from burning of coal and oil. Large forest areas even play a part in regulating weather systems and precipitation patterns at a global scale. In many areas, farmers and communities also depend on functions and resources from nearby forests for their livelihoods.

However, wherever humans have settled and the climatic conditions permit, people have cleared forests to cultivate crops, and today more than half of the original global forest area now turned into farmland - much of it quite recently. Forests and other natural ecosystems may also be degraded or under threat due to excessive extraction of wood for construction and fuel, charcoaling, collection of non-timber forest products or livestock grazing.

3.1 Condition of (main) forest area:

Numbers of different tree species

One (plantation) Few Considerable Many

Canopy closure

Single trees Open forest Semi-closed Closed

Amount of trees larger than 30 cm diameter (breast height):

None Some Considerable Many

Amount of understorey / smaller trees:

None Some Considerable Many

Amount of tree seedlings / saplings:

No Some Considerable Many

Ticks towards the left for each condition indicate opportunities to improve

3.2 High Conservation Value indicators:

- On-farm forest / woodland connects to a nearby (<5 km) priority conservation area;
- The forest / woodland may be important for one or more Focal Species;
- Other people have customary or legal rights to use forests or woodlands on the farm

Any 'yes' tick above: → The forest / woodlands is of potential High Conservation Value. Growers must take measures as necessary to avoid, or effectively mitigate, any negative impacts.

3.3 Examples of strategies and activities:

- Reduce grazing pressure to allow bare ground to recover vegetation
- Fence or herd goats and other livestock away from part of the forest to allow regeneration of trees
- Retain a proportion of larger trees when extracting timber or fuelwood
- Take specific measures to maintain the quality of forest and woodland habitats as recommended in the key habitat materials
- Respect others' customary and legal rights and make sure these are not affected or diminished without prior consent from the rights-holders.

1.3 Examples of strategies and activities:

Q4 Are there grasslands or savannas on or near the farm? Yes: ↓
 No: → Q5

Grasslands are ecosystems where establishment and growth of trees is counteracted by shallow soils, permanent or seasonal droughts, seasonal inundation, grazing and browsing herbivores, or, at high altitudes, short and cold growing seasons. Productive and easy to convert to agriculture, most historic grasslands on deep and fertile soils have been transformed into fields or pastures – so much that rich grasslands in good conditions have become rare and endangered.

Open grasslands often blend seamlessly into savanna ecosystems that incorporate and combine elements from forests and grasslands. A common denominator is a certain amount of bushes and trees, from small, often scattered, 4-5 meters high trees in drier, less fertile areas, to higher, closed-canopy gallery forests along rivers where water availability is greater and less seasonal. Savannas are often highly dynamic, and the composition and density of trees and bushes may vary over time with climate, grazing pressure and other factors.

Frequent fires, induced by humans or ignited by lightning, are key dynamical factors in most grassland ecosystems. Almost all grasslands and savannas have also been moulded by seasonal grazing, often interacting with fire to promote vegetation variation and mosaics. Historically, nomadic pastoralism with livestock have come to blend with, and later overtake, the role of wild herbivores in many regions - often with surprisingly little negative impacts on biodiversity. However, as nomadic practices give way to sedentism, stationary herds may cause over-grazing and leave little room for the vegetation to recover. Intensive grazing also reduces litter production and fire loads, and so contributes to lower fire frequencies.

4.1 Condition of (main) grassland / savanna area:

Numbers of different grasses and grass-like species

Few Several Considerable Many

Numbers of different herb and flower species (in season):

Few Several Considerable Many

Amount of trampled, bare ground without vegetation cover:

Much Considerable Some No

Fire frequency / intervals:

More seldom 5-10 years 2-4 years Annually

Amount of bushes / small trees – recent trends:

Massive increase Moderate increase Constant Fewer

Ticks towards the left for each condition indicate opportunities to improve

4.2 High Conservation Value indicators:

- On farm grassland / savanna connects to a nearby (<5 km) priority conservation area;
- The grassland / savanna may be important for one or more Focal Species;
- Other people have customary or legal rights to use grassland / savanna on the farm.

Any 'yes' tick above: → The grassland / savanna is of potential High Conservation Value. Growers must take measures as necessary to avoid, or effectively mitigate, negative impacts.

Q5 Is any farmland located near, or inside a priority conservation area? Yes: ↓
No: → Q6

As agriculture and animal husbandry expand, remaining natural areas become ever more important as habitat for animals and plants. Some such areas are (more or less efficiently) protected in natural reserves and national parks, designated and recognised based on conventions and treaties, or identified as of particular natural value by international Non-Governmental Organisations. Bonsucro collectively refers to these as 'priority conservation areas'. The biodiversity and natural ecosystem mapping under 4.1.1 will have compiled information on the relevant priority conservation areas (HCV proxy areas), with maps showing if and which production lands are in or near any of these.

5.1 High Conservation Value indicator:

Part of the farm is located less than 2 km from a priority conservation area;

If the answer is 'yes' growers must identify (through information provided by the mill) the main values of the area whether species or natural ecosystems, and take additional measures as necessary to avoid, or effectively mitigate, potential negative impacts on these values.

Impacts may be direct or indirect, and measures to mitigate them depend on the character of the conservation value e.g. habitat or resource requirements of particular species, as well as the extent to which growers' practices on and off the farm may affect them.

Indirect impacts tend to affect the habitat quality of the nearby area, e.g. practices that cause soil erosion and siltation of nearby priority aquatic ecosystems, irrigation that alters hydrological dynamics and lower water tables, or fencing that restricts the mobility of wildlife. Main direct impacts are related to hunting and collecting of sensitive species, as well as persecution due to conflicts between wildlife and people or livestock.

As a minimum, growers must:

- respect the borders and integrity of the area;
- comply with all applicable, national legislation and site-specific legal regulations related to the priority conservation area;
- avoid activities that threaten species or other conservation values for which the area has been protected or designated a priority conservation area;
- inform workers on the farm about what measures they are expected to take.

Q6 Are growers or the farm workers engaged in hunting, collecting of wild animals or plants, or experiencing conflicts with wildlife? Yes: ↓ No: →
Q7

Hunting can provide protein for rural farming communities. However unregulated hunting may also lead to major loss of wildlife, particularly of medium and larger mammals and reptiles that are often favored. Bushmeat may also spread infectious diseases like Hanta or Ebola. Species sensitive to overhunting include apes and other primates, medium sized antelopes, wild pigs and pythons. As a result, these species are often, but not always, nationally protected.

Another major cause of biodiversity loss is the organized international trade of animal or plant parts. Driven by high demand and extreme prices in 'consumer' countries, populations of targeted species can be devastated very rapidly. Coveted alive animals include carnivores like bears and big cats which are kept in private zoos. Sought-after animal and plant products include elephant ivory and materials used in traditional medicine such as rhinoceros' horns, pangolin scales and the root of the Iboga psycho-active plant.

Animals can also be damaging or dangerous, such as elephants or primates that devastate people's crops, or wild cats that prey on livestock or even kill people. As a result, these animals may be persecuted, even though they are of particular conservation concern and often nationally protected.

6.1 High Conservation Value indicator:

O Growers or farm workers hunt, collect or experience conflicts with Focal Species

If the answer is 'yes' growers must abandon or adapt their practices as necessary to avoid negative impacts on Focal species.

6.2 Examples of strategies and activities:

- Identify animal species that may be hunted (on and off the farm);
- Inform about, and respect relevant wildlife and hunting regulations, e.g. seasons, species, off take quotas etc;
- Use signage of no-hunting areas, and introduce sanctions when hunting rules are not respected;
- Avoid buying meat from protected species on offer at the roadside or in the local market;
- Do not engage in capture or killing of animals for international trade;
- Explore substitutes for animal parts used in traditional ceremonies, e.g synthetic skins/feathers;
- Explore strategies to minimize human-wildlife conflicts, e.g. combating poaching in reserves (which depletes the natural prey base and force predators to look for food in surrounding areas), fencing, night-corralling and training people in conflict-avoiding behaviour;
- Seek help from relevant experts/authorities to identify immediate and longer-term measures to reduce conflicts adapted to the available resources

Q7 Do growers use communal or public lands for e.g. cattle grazing, timber collection, or hunting? Yes: ↓
No: → End of questionnaire

Communally used and managed lands may provide the wider community with a range of resources and ecosystem services. They are also often important for biodiversity. Such areas serve the collective interests of both farming and non-farming families.

However, farming-related activities can degrade communal lands if not well managed or controlled. Excessive cattle grazing can compact the soil and prevent natural regeneration, and bushmeat hunting by farmers or hired labour may deplete protein sources for the local communities. Uses of communal areas vary a lot, and their values as common resources are easily underestimated. If lands are degraded, or their resources diminished, they may lose value both for the farmer and the wider community. As an example, if communal patches of woodland used by villagers for gathering firewood are over-exploited, people may have to spend more time, travel further or become dependent on more expensive sources of energy.

7.1 High Conservation Value indicator:

Growers use communal lands and/or resources that are scarce and/or in demand by other community members

If the answer is 'yes', growers must adapt as necessary to avoid reducing the availability of resources for other legitimate users.

7.2 Examples of strategies and activities:

- Identify and describe all current or planned activities related to farming practices that may affect communal lands or resources, including crop cultivation, animal husbandry, hunting, collection of fuelwood, extraction of wood for fences and buildings etc.;
- Consider if farming-associated activities are likely to affect the vegetation structure or impact the provision of common resources;
- Seek ways to reduce negative impacts and avoid relying on the resources of communal lands when expanding or diversifying farming activities;
- Engage in, or initiate, community initiatives to collectively agree on rules for managing and maintaining common lands and resources;
- Explore if community-based natural resource management initiatives and restoration projects may be supported by authorities and/or through collaboration with local academic institutions or non-governments organisations.

3. DEVELOPING THE MANAGEMENT PLAN

Once the questionnaire is completed, YES answers indicate where growers should consider appropriate management practices in the planning step.

3.1 PRIORITISE ACTIONS

The growers will need to prioritise where to first focus their management activities. This should be done in the following order of priority:

- implementing precautionary practices where there are indicators of High Conservation Values,
- improving the condition of natural habitats or features, prioritising lower condition scores which indicates an opportunity to improve the condition.

In some cases, maintaining HCVs requires improving the condition of natural habitats, and therefore these represent one action rather than being exclusive.

While growers take individual actions, achieving some biodiversity goals may require cooperation with neighbours in the landscape, whether other growers or other land users and managers. The biodiversity and natural ecosystems mapping conducted under 4.1.1 may indicate where coordinated actions by Bonsucro growers and other stakeholders will best contribute to achieving some of the biodiversity goals. This may also influence the priorities at the farm level.

The table below outlines a template for developing the BMP (see separate BMP template to be completed by the grower), starting with the highest priorities at the top of the table, and providing some example content.

Question to act upon & Objective	Proposed Activity or Management Practice	Goal related to priority or Management Practice	Proposed monitoring	
			What	When
<p>Q1 Stream running through farmlands; HCV indicator, and opportunity to improve condition.</p> <p>Objective: improve the quality and quantity of water resources for needs of other people and for biodiversity</p>	Actively promote establishment of native flora (grasses, shrubs or trees) to enhance riparian vegetation along stream	Permanent cover of native vegetation with range of grasses and shrub species on both banks of the stream	New growth of plants. Increase in plant species and aquatic wildlife	Annual
	Manage timing and intensity of livestock grazing in riparian areas on and off farm to allow native vegetation to establish and reducing trampling			
	No chemical spray and/or storage zones in the riparian vegetation adding an additional buffer of 20m	The quality of water downstream of farm used by local community for domestic purposes shows measurable signs of improvement	Indicators of water quality (direct or indirect) improve over time	Annual

3.2 SELECT MANAGEMENT PRACTICES

Growers should select activities to reduce risks and improve conditions for biodiversity based on the outcomes of the questionnaire, while using their own knowledge and field guides provided by the mill. Some management practices may address several issues identified in the questionnaire. As an example, maintaining and restoring permanent vegetation along water bodies reduces soil erosion and run-off from fields, helps to improve water quality and quantity for nearby settlements, provides habitat and refuge for a range of species, and creates wildlife corridors. Such synergies may be identified and taken advantage of by aligning the BMP with the Soil Management Plan and the Water Stewardship Plan.

In addition, there are several general farming practices that improve the overall biodiversity condition of production lands. These are relevant to all growing contexts but will be particularly valuable on farms with few or no areas of natural ecosystems. Beneficial farming practices include:

- **Crop rotation and/or intercropping.** The main biodiversity benefit of all crop variation is to increase the structural micro-complexity of vegetation, as different crop species have different heights, kinds of leaves, branching patterns, flowers etc – all factors that contribute to make the farm hospitable to a wider range of insects (most of which are harmless, helpful pollinators or pest predators!), birds and small mammals.
- **Fallow periods.** Fallows help the soil to ‘rest’ and recover nutrients, processes that may be supported by planting cover crops of the pea family which capture air nitrogen, prevent erosion and keep weeds in check. In rain-fed farming, fallows may also serve to store limited amounts of seasonal rainfall in the ground for later use. Spontaneous vegetation (often annual plants) maintained on such fallows increase the complexity and diversity of on-farm vegetation, supports populations of native pest predators, and generate seeds as food for insects and birds (including household chickens!).
- **Mulching crop residues.** The organic component of soils derives from dead plants that have become incorporated in the soil profile through the activities of earthworms and other soil fauna, ploughing etc. Organic materials are crucial to the capacity of the soil to absorb and store water and nutrients, and so key to healthy, productive soils and good harvests. The organic content of soils can be increased by leaving crop residues on site (without burning!), so called mulching. This practice has several additional benefits: dead plant materials that cover the topsoil increase water retention, reduce water loss through evaporation, help protect against wind and water erosion and reduce germination of weeds. The mulch layer is also habitat to a wide variety of insects, spiders, millipedes and other ground fauna, many of which prey on pests, or become food for small mammals, birds and lizards.
- **Spray-free margins.** Use of pesticides comes with costs – literally and figuratively. Fortunately, use of persistent toxic substances that accumulate in food chains, harming birds of prey and other top predators, is no longer allowed. Unfortunately, most pesticides are still quite indiscriminate, killing a wide range of species (most of which are harmless or beneficial) along with the relatively few that may be serious problems for the grower. Use and application of pesticides in line with good Integrated Pest Management practices help to reduce such unintended side effects. Growers can also help mitigating negative impacts by avoiding spraying in field margins, creating strips where sensitive species and pest predators may survive.
- **Creating strips of natural vegetation along fields, roads and tracks.** Such habitats are linear by nature, and the total area relatively small. However, in intensively cultivated landscapes, edges may well be the only significant habitats with largely native vegetation, and so be much more important for on-farm biodiversity than suggested by their limited size. Strip vegetation along fields, roads, tracks and pens serve numerous functions – sheltering spiders, dragonflies, praying mantises and other natural enemies of pest species, providing habitat for ground-nesting bees (many of which are important pollinators of herbs, trees, crops and garden plants), and providing food and shelter for a variety of birds and small mammals. Edges with bushes and/or trees may be useful as sources of fuelwood, browse or forage for livestock, as windbreaks and shelterbelts that reduce erosion of topsoil and loss of soil moisture. They may also serve as living fences to demarcate borders and keep in (or out) livestock, and as sources of medicinal plants. By protecting edge vegetation from over-grazing, taking care of self-seeded/sprouting saplings, and/or planting native fruit- or other useful trees, growers may benefit both themselves and a wide range of native plants and animals.

3.3 SET GOALS

Once management practices and activities have been identified, set specific goals for what these are expected to achieve on or off the farm. This will allow you to assess to what extent your management has been successful, and if any practices need to be adapted or changed. Goals therefore need to be specific and measurable.

Goals and activities may intersect, and prior to completing the BMP table, growers may consider how practices overlap to achieve the same goal, and also how some practices contribute to achieving several goals, and coordinate or prioritise the practices accordingly. For instance, controlling livestock grazing in riparian areas can allow riparian vegetation to naturally restore, as well as reduce pollution of water bodies that a local community depends upon for domestic purposes.

Growers also need to consider what resources are necessary to implement the management practices. Some measures require investment, longer time-scales and/ or coordination with other actors. As the BMP is developed and implemented through a prioritisation process, highest priorities are addressed first. As an example, implementing 'easy-to-implement management practices' that do not address HCV indicators, should not come at the expense of implementing more resource-heavy activities that do address HCVs.

3.4 MONITOR

The action plan table will include the metric(s) to monitor the goal and when this should occur, to assess if the goal is being achieved or not. As much as possible, monitoring should be simple enough for growers to make their own observations and adapt their management practices accordingly.

Where there are coordinated actions by growers, monitoring can also be shared between growers (e.g. a network of water table measures), or even centralised at the mill level (e.g. remote sensing of vegetation cover along water bodies). Monitoring can also be participatory with the public, e.g. through local citizen science programs, regular bird watching events, camera trapping in wildlife corridors etc.

Adaptive management

As the BMP is implemented, the monitoring will inform the grower if the practices that are being implemented are achieving the goals that have been set. Where goals have been achieved, the grower can progress to implementing other activities (while retaining their current activities!). Goals that are not being achieved, suggest that the activities and strategies need to be adjusted or adapted. For instance, there may be other external factors or impacts that had not originally been accounted for, or outreach and coordination with stakeholders may be a pre-requisite for actions by individual grower actions to have an impact.

The biodiversity questionnaire and BMP should be updated periodically and at least every three years as measures are implemented and goals achieved, allowing the grower to identify outstanding gaps and the next measures. This allows the grower to continuously improve biodiversity condition on and off their farmlands.

BIODIVERSITY QUESTIONNAIRE FIELD FORM

Q1 Are there rivers, streams, canals, lakes, or ponds on, or near the farm? Yes: ↓
No: → Q2

Opportunities to improve condition: Yes No
HCV indicator : Yes No

1.1 Condition of (main) watercourse / waterbody:

Signs of water pollution (e.g. algae blooms, murky colour⁵, smell, dense aquatic vegetation):
Much/always Considerable/often Some/occasionally No

Proportion of riverbanks / shores bordered by (at least 10 m) of permanent vegetation:
No Some Most All

Presence of native birds / mammals:
Seldom Occasionally Often Always

Provider of fish suitable for human consumption:
No/poor Decent Good Excellent

Presence of invasive aquatic plants / animals:
Common Considerable Some No

1.2 High Conservation Value indicators:

- There are fields, housing or infrastructure closer than 50 m to a river, stream, lake, pond or well used as a main source of drinking or household water by people on, or off the farm;
- The watercourse / waterbody connects to a nearby (<5 km) priority conservation area; The waterbody may be important for one or more Focal Species;
- Other people have customary or legal rights to use water on the farm.

Any 'yes' tick above: → The watercourse / waterbody is of potential High Conservation Value. Growers must take measures as necessary to avoid, or effectively mitigate, any negative impacts.

⁵ Other than the naturally brownish colour of water from peat areas.

Q2 Are there wetlands on or near the farm? Yes:
 ↓ No: → Q3

Opportunities to improve condition: Yes No
 HCV indicator : Yes No

2.1 Condition of (main) wetland area:

Signs of water pollution (e.g. algae blooms, murky colour⁶, smell, dense aquatic vegetation):
 Much/always Considerable/often Some/occasionally No

Effects of draining / ditches (lowering of water table, soil decomposition):
 Strong Considerable Some No

Presence of native birds / mammals:
 Seldom Occasionally Often Always

Provision of natural resources for livelihoods:
 No/poor Decent Good Excellent

Presence of invasive aquatic plants / animals:
 Common Considerable Some No

2.2 High Conservation Value indicators:

- On farm wetland connects to a nearby (<5 km) priority conservation area;
- The wetland may be important for one or more Focal Species;
- Other people have customary or legal rights to use wetlands on the farm.

⁶ Other than the naturally brownish colour of water from peat areas.

Q3 Are there forests or woodlands on or near the farm? Yes:
↓ No: → Q4

Opportunities to improve condition: Yes No
HCV indicator : Yes No

3.1 Condition of (main) forest or woodland area:

Number of different tree species:

one (plantation) Few Considerable Many

Canopy closure:

Single trees Open canopy Semi-closed canopy Closed

Amount of trees larger than 30 cm diameter (at breast height):

None Some Considerable Many

Amount of understorey / smaller trees:

None Some Considerable Many

Amount of tree seedlings / saplings:

No Some Considerable Many

3.2 High Conservation Value indicators:

- On-farm forest / woodland connects to a nearby (<5 km) priority conservation area;
- The forest / woodland may be important for one or more Focal Species.
- Other people have customary or legal rights to use forests or woodlands on the farm

Q4 Are there grasslands or savannas on or near the farm? Yes: ↓
No: → Q5

Opportunities to improve condition: Yes No
HCV indicator : Yes No

4.1 Condition of (main) grassland / savanna area:

Numbers of different grasses and grass-like species:
Few Several Considerable Many

Numbers of different herb and flower species (in season):
Few Several Considerable Many

Amount of trampled, bare ground without vegetation cover:
Much Considerable Some None

Fire frequency / intervals:
More seldom 5-10 years 2-4 years Annually

Amount of bushes / small trees – recent trends:
Massive increase Moderate increase Constant Fewer

4.2 High Conservation Value indicators:

- On farm grassland / savanna connects to a nearby (<5 km) priority conservation area; The grassland / savanna may be important for one or more Focal Species;
- Other people have customary or legal rights to use grassland / savanna on the farm.

Q5 Is any farmland located near, or inside a priority conservation area? Yes: ↓
No: → Q5

Opportunities to improve condition: Yes No
HCV indicator : Yes No

5.1 High Conservation Value indicator:

- Part of the farm is located less than 5 km from a priority conservation area

Q6 Are growers or the farm workers engaged in hunting, collecting of wild animals or plants, or experiencing conflicts with wildlife? Yes: ↓ No: →
Q7

Opportunities to improve condition: Yes No
HCV indicator : Yes No

6.1 High Conservation Value indicator:

Growers or farm workers hunt, collect or experience conflicts with Focal Species

Q7 Do growers use communal or public lands for e.g. cattle grazing, timber collection, or hunting? Yes: ↓
No: → Q8

Opportunities to improve condition: Yes No
HCV indicator : Yes No

7.1 High Conservation Value indicator:

Growers use communal lands and/or resources that are scarce and/or in demand by other community members

BIODIVERSITY MANAGEMENT PLAN TEMPLATE

Name of Property and property manager			Date Assessment completed and BMP developed		
Question to act upon & Objective	Proposed Activity or Management Practice	Goal related to priority or Management Practice	Proposed monitoring		Period for Implementation; resources; other notes
			What	When	

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