Biodiversity conservation and management

B. Biodiversity conservation and management

Biodiversity plays an important role in the provision of goods and services to people all around the world and is critical for economic development and poverty alleviation (Millennium Ecosystem Assessment, 2005). More than three billion people depend on coastal and marine biodiversity and 1.6 billion more depend on wood and non-timber forest products. Around 70% of the global poor live in rural areas, where as much as 50% to 90% of livelihoods are sourced from non-marketed goods and ecosystem services (CBD, 2017).

The agriculture sector is highly dependent on the services generated by natural ecosystems. These provide the sector with a wide range of services that include pollination, pest control, genetic diversity for future agricultural and livestock use, soil retention and structure, and the regulation of soil fertility, nutrient cycling, and water supply (Power, 2010).

Yet biodiversity and ecosystem services supporting agriculture and people's livelihoods continue to be at risk of loss and degradation. Analysis of the major primary sector activities indicate that drivers linked to agriculture production account for up to 70% of the projected loss of terrestrial biodiversity (CBD, 2014). This poses a great challenge to the natural environment because it depends on the same resources as agricultural production, and because certain widespread agricultural practices have a negative impact on the environment (Tillman, Balzer, Hill & Befort, 2011; Tanentzap, Lamb, Walker & Farmer, 2015).

The use of land resources for agriculture prioritizes crop and livestock production over the many benefits that natural ecosystems provide (Tanentzap et al, 2015). Although there is an increased adoption of good agricultural practices (CBD, 2014), unsustainable practices in agriculture are abundant and cause substantial environmental degradation and biodiversity loss, while also reducing agricultural productivity in the longer term.

SAN's approach focuses on the five principal causes of pressure on biodiversity:

- climate change,
- deforestation, habitat loss and degradation,
- excessive nutrient loading and other forms of pollution,
- overexploitation and unsustainable use, and
- invasive alien species.

The Sustainable Agriculture Framework has refined its "natural ecosystem" -concept to better support the design, development and implementation of ecosystem conservation and restoration initiatives in agricultural landscapes worldwide (SAN, 2017 and 2018).

Based on this Framework, SAN proposes the design of biodiversity management programs within agricultural and livestock operations that:

- promote environmental and social impact assessments (ESIA) prior to land use conversion or expansion of the operations activities;
- identify all nearby natural ecosystems and protected areas to implement better conservation practices;
- avoid the degradation and destruction of natural ecosystems;
- establish buffer zones to prevent any alteration in the balance of natural ecosystems;
- maintain, restore, and increase the non-crop canopy covers and protect large native trees;
- identify protected and endangered species that have their habitat within or near the operations;
- avoid the introduction and spread of invasive alien species;
- stop all hunting activities; and the killing and collection of protected or endangered species;
- avoid the use of explosives or toxic substances as a method for wildlife pest's control;
- prevent captivity of wildlife; and
- promote training programs to prevent and correctly respond to wildlife attacks in farms.

B.1. Sustainability Goal: Protection of natural environment

Outcomes	ID	Performance Indicators /Best practices
Natural ecosystems and protected areas are conserved.	B101	Operations identify all natural-ecosystems (according to the SAN Natural Ecosystems definition) and protected areas (as designated by local authorities) on or adjacent to the operation.
	B102	Operations do not destroy any natural ecosystems as of the initial engagement date with SAN programs, and onwards. Previous no-destruction periods can be defined for each operation based on risk conditions and available monitoring mechanisms.
	B103	Operations establish protection zones around all natural-ecosystems and protected areas, to prevent negative effects of the operation´s activities. Protection zones include buffer, riparian, or non-intervention areas.

Outcomes	ID	Performance Indicators /Best practices
Natural ecosystems and protected areas are conserved.	B104	Operations avoid the following activities with direct negative effects over natural ecosystems and nearby protected areas: – mining or soil removal; – deforestation and elimination of natural and native vegetation; – dumping solid waste or untreated wastewater over soils and water bodies, including water for washing agricultural facilities and stables; – dumping of hazardous waste (according to Annexes I and II of the 1992 Basel Convention) in soils and water bodies; – cattle grazing; – construction of impoundments; stream channelization; adding fill; extraction of aggregates for construction industry; or in any other way changing the depth or flow direction of a water body; – draining or drying of aquatic ecosystems through filling, excessive water withdrawal or other means; – pollution of aquatic ecosystems that significantly alters their natural chemistry or species composition; and – application of agrochemicals or fire, except for the control of invasive plant species or restoration purposes, and only if allowed by applicable legislation and the competent authorities..
Operations maintain and restore non-crop vegetation within their scope.	B105	Operations maintain existing non-crop canopy cover and vegetation cover in non-productive areas.
	B106	Operations restore degraded or contaminated natural ecosystems towards their original natural state.
	B107	Operations incorporate non-crop native vegetation around housing and infrastructure, and along protection zones, natural ecosystems, and protected areas, such as border plantings and barriers, live fences, shade trees, and permanent agroforestry systems.
	B108	Operations maintain and protect large non-crop trees, unless such trees pose a direct threat to people's and infrastructure's safety.
	B109	Operations maintain or increase the number of native shade tree species compatible with their productive systems and geographic region.

B.2. Sustainability goal: Protection of biodiversity

Outcomes	ID	Performance Indicators /Best practices
Wildlife (native plants and animals) is conserved.	B201	Operations implement routine monitoring protocols to follow up on wildlife status and the way it is affected by the operations' activities.
	B202	Operations prevent the collection of protected or endangered species (as defined by IUCN and applicable legislation) within their limits and their surroundings, except in the following scenarios and if compliant with applicable legislation: - plants used for non-commercial traditional medicinal use, when extraction does not affect the long-term viability of their populations; or - plants and wildlife collected for conservation efforts and scientific research.
	B203	Operations do not intentionally introduce or release alien invasive plants or animals (as defined by IUCN or applicable legislation) within the farm and its proximities; and take measures to contain and reduce invasive plants and wildlife already present within their limits.
	B204	Operations do not permit hunting and intentional killing of wildlife within their properties' limits and install signals, fences and/or surveillance systems to prevent these actions in their scope.
	B205	Operations inform and sensitize workers and local communities about biodiversity conservation and protection efforts and their importance.
	B206	Operations do not kill nor remove native vertebrates, unless: - they are considered as pest species and control measures are included as part of their IPM as a last resource; or - used for subsistence fishing activities.
	B207	Operations do not use explosives nor toxic substances for fishing or wildlife pest control, except for cases of rodent control.
	B208	Operations do not keep wildlife in captivity. If operations already have captive animals: - animals can be kept if: a) operations are granted a permission from competent authorities, b) animals are not held for commercial purposes, and c) animals are not mistreated; and - animals are not released or removed without supervision and permission from competent authorities.
	B209	Operations train workers in emergency response protocols for addressing wildlife attacks to people or crop/production damage.

B.3. Pollinator "friendly" agriculture

Pollinators –a wide variety of insects, birds, and mammals– are key elements for the conservation of natural ecosystems and the stability and enhancement of agricultural production. They have a fundamental role in the preservation of the relationships between the plants and animals that maintain basic ecosystem services and establish biological structures resilient to the effects of climate change.

Around 90% of flowering plants depend, directly or indirectly, on animal pollination to guarantee their reproduction. Wild pollinators ensure the optimum functioning and improvement of the ecosystem services offered by plant communities, such as the provision of food and shelter, the release of oxygen and carbon capture, and various functions in the water, carbon, and nitrogen cycles.

Pollination-dependent crops contribute to 35% of the global crop production volume, and more than three-quarters of the leading types of global food crops rely to some extent on animal pollinators to guarantee good yields and product quality. Because of the varying degrees in of pollination dependency, around 5% to 8% of crop production can be directly attributed to animal pollinators, with an annual market value ranging from US$235 billion to US$577 billion (IPBES, 2016).

Protecting native pollinator populations is not only economically important, but also contributes to food safety, better livelihoods, environmental conservation, and sustainable use of biological diversity (CBD, 2016). Among pollinator-dependent crops are numerous plants that are part of a healthy and nutritive diet (fruits, vegetables, cereals, seeds, nuts, and oilseeds).

SAN approach is based on offering solutions for production systems that reduce the pressure of agriculture and livestock on the natural populations of pollinator insects, birds, and mammals, while favoring their recovery, by proposing the implementation of best practices specifically addressed at protecting native pollinator populations and enhancing ecosystem services; and that are complemented by a series of other best practices for soils, water, ecosystem, and pest control management.

With the support both from local SAN technical specialists and the Oregon Integrated Plant Protection Center, SAN establishes the scientific foundations for each intervention and designs specific intervention strategies based on a participatory approach to determine the best practices for the conservation and restoration of pollinator populations.

B.3.1. Sustainability goal: Protection of pollinator biodiversity

Outcomes	ID	Performance Indicators /Best practices
Wild pollinator habitats are protected.	B301	Operations identify the different pollinator species (insects, birds and/or mammals) present on their farms and surrounding areas, specifying those species that are important for their crops and pasture/forage pollination.
	B302	Operations avoid contamination or reduction of habitats, food sources and water provision of pollinators during their different development stages.
	B303	Operations learn about the life cycle of the main pollinator species that have their habitat in or near the farm, or that are important for their production activities, to avoid agricultural practices that can negatively affect pollinator populations.
	B304	Operations control invasive alien species (plants or animals) that can negatively affect natural pollinators' populations due to competition for resources, toxicity, or predatory relationships.
	B305	Operations protect local pollinator populations through: - keeping non-crop areas within the farm landscape, such as flower strips, grasslands, buffer strips, native hedgerows, or fallow lands; - providing shelter, breeding, and nesting places or resources (natural o artificial materials); - implementing bare ground and low till practices for soil nesters; - planting of mass-flowering crops and blooming management (so flowers are available during long periods year-round); - planting of host plants for the immature stages of the pollinator species; and - diversifying productive systems to enhance diversity (number of kinds) and abundance (size of populations) of pollinators.
Introduced pollination services are responsibly managed.	B306	Operations implement cultural practices to prevent health, nutrition, and stress problems to introduced pollinators, and prevent the spread of pests.
	B307	Operations implement cultural practices to prevent pest propagations from introduced pollinators into natural pollinator populations, including the spread of virus, bacteria, fungi, protozoa, insects, parasitic mites, and predators.
	B308	Operations demonstrate that the number of introduced pollinators per area does not affect the provision of food, water, or shelter to the native pollinators' population.
	B309	Operations ensure that selection and management practices for introduced pollinators prevent their hybridization with wild pollinator populations