Conservation and management of natural resources

C. Conservation and management of natural resources

Natural resources, especially water and soil, are essential for the function and structure of agricultural production systems and for the overall social and environmental sustainability.

Agriculture accounts for roughly 70% of total freshwater withdrawals globally. Most of this freshwater is used by agriculture operations in Least Developed Countries (FAO, 2011). Farming also contributes to water pollution from nutrient and pesticide run-off and soil erosion. Without improved efficiency measures, agricultural water consumption is expected to rise by about 20% globally by 2050 (WWAP, 2012). With increased pressure from urbanization and industrialization, agriculture will face more competition for scarce water resources. Additionally, climate change is already affecting water supply and agriculture through changes in the seasonal timing of rainfall and snowpack melt, as well as with higher occurrence and severity of droughts, floods, and fires.

As the supply of healthy and productive land decreases and the population grows, competition is also intensifying for land and soil resources. One-third of the planet's land is severely degraded and fertile soil is being lost at the rate of 24 billion tons a year because of bad farming practices, such as heavy tilling, multiple sequential harvests, and abundant use of agrochemicals (UNCCD, 2017).

An increase of agricultural productivity and agricultural goods nutrition quality can help push progress towards future food security and the general wellbeing of producers and rural communities globally but given the limited natural resource base on which agriculture and livestock depend, sustainable development will ultimately depend on the responsible management of the planet's natural resources.

SAN's approach to a sustainable use of natural resources proposes a series of good practices to help reduce agriculture's pressure on natural resources and build more efficient and resilient production systems, which includes:

- encouraging the protection and restoration of water sources, and promote water use optimization;
- supporting the implementation of systems for wastewater treatment before reuse or disposal;
- fostering soil conservation and improved carbon stocks; and
- promoting waste reduction, recycling, and responsible disposal.

C.1. Sustainability goal: Soil restoration and management

Outcomes	ID	Performance Indicators /Best practices
Agricultural practices do not degrade the soil and enhance its condition.	C101	Operations only grow crops and graze livestock where soils are proven to be suitable for that crop, and in rotations or with intercrops when feasible.
	C102	Operations identify and map the soil types present within the farm, and the areas that are affected by or susceptible to erosion.
	C103	Operations minimize the risk of contamination or depletion of soils within their scope and related to their activities, including the management of soil exhaustion risks.
	C104	Operations implement practices to minimize soil erosion, including: - ground covers; - mulches; - re-vegetation of steep areas; - terracing, contour farming; - strip-cropping; - sediment control basins; - filter strips; and/or - minimization of herbicide use.
	C105	Operations design and install drainage systems to divert water away from vulnerable areas and drains to run across slopes.
	C106	Operations intercept and retain sediments from drainage systems and return them back to the field.
	C107	Operations implement practices to reduce soil compaction. All sites with evidence of soil compaction are subject to control measures.
	C108	Operations implement practices to maintain or enhance soil condition, including: - crop rotation; - planting of nitrogen-fixing ground covers or cover crops; - application of compost or mulch; - application of green manures; and - minimized tillage.
	C109	Operations increase and manage soil carbon (organic matter) by using organic fertilizers and amendments, and low toxicity substances.

Outcomes	ID	Performance Indicators /Best practices
Agricultural practices conserve the soil and enhance its condition.	C110	Operations use fire for virus control purposes only as a last resort measure. If fire is used for virus control: – it is prescribed by a competent professional and included as part of the IPM Plan; – it is applied only by trained workers that are provided with fire suppression tools and PPE[4]; – it is applied only when wind speed and direction create minimal risk of uncontrolled burning; – fire use areas and history are indicated on updated farm maps; and – additional soil and biodiversity restoration measures are implemented.
	C111	Sugar cane operations do not practice pre-harvest field burning. Feasible alternatives are green-harvesting and mechanized harvesting.
	C112	Operations do not dump solid or hazardous waste streams (according to Annexes I and II of the 1992 Basel Convention) on soils.
	C113	Operations implement practices to increase and maintain soil biodiversity, such as: establishing buffer strips, small fields, and contour strip cropping; regular crop rotation; varying of tillage practices; and increasing plant diversity.
	C114	Operations annually monitor their soil conditions to determine changes in structure, nutrient content, organic matter content and erosion evidence.
Agricultural practices optimize the nutrient balance in the soils.	C115	Operations implement nutrition management practices based on the assessment of crop and pasture needs, soil fertility and environmental conditions.
	C116	Operations use fertilizer application mechanisms that maximize nutrient availability to crops and pastures and minimize lixiviation and soil fixation losses.
	C117	Operations calibrate equipment for mixing and applying fertilizers: - as specified in the equipment and products' application manual; - whenever there are changes of physical state of the product (i.e., liquid, solid and/or emulsion); and - after maintenance activities.
	C118	If cover crops are planted, operations select the species, location, and seasonality of these plantings to minimize crop/pasture competition for water or nutrients and prioritize the use of native species.

[4] *See the definition of Personal Protective Equipment on Section IV: SAN Technical Concepts*

C.2. Sustainability goal: Water conservation

Outcomes	ID	Performance Indicators /Best practices
All water sources are protected.	C201	Operations identify and map all surface and ground water sources within their scope .
	C202	Operations implement actions to conserve and protect water sources from sedimentation, soil erosion and contamination.
	C203	Operations ensure that productive activities do not contaminate, degrade, or destroy water sources.
	C204	Operations demonstrate that water withdrawal complies with applicable legislation.
Water consumption is efficient.	C205	Operations implement a water conservation program[5] that includes: – water availability data (sources and volume); – current consumption records (volume and uses); – future water needs estimations (volume and uses); and – targets and actions for improving efficiency (including savings).
	C206	Operations diversify their water sources, including mechanisms for rainwater harvesting and storing.
	C207	Operations implement practices to conserve and retain soil moisture, such as: - establishment of ground covers; - application of organic mulches; and - crop and pasture grazing rotations.
	C208	Operations design and implement efficient irrigation systems, to optimize productivity, reduce water waste and avoid soil erosion and salinization.
	C209	Operations ensure that irrigation water is free of hazardous substances that can pose risk to soils, crops, human and environmental health.
	C210	Operations implement maintenance activities for all irrigation and water distribution systems (including irrigation by gravity channels), minimizing water losses due to leaks, broken pipes, valves that do not close properly and all other evidence of inefficient performance.
	C211	Operations implement actions to reduce tail water/runoff and store it.
	C212	Operations implement measures and procedures to optimize the use of water in processing plants, buildings, housing, agrochemical storage, and other infrastructure facilities, including the cleaning of equipment, machinery, and vehicles.

[5] A program is considered as a set of related measures or activities with a long-term aim

C.3. Sustainability goal: Responsible wastewater management

Outcomes	ID	Performance Indicators /Best practices
Wastewaters are managed to avoid environmental, human, or animal health risks.	C301	Operations ensure that all wastewater from processing operations, greywater, and sewage is treated to avoid negative effects to environmental and human health.
	C302	Operations demonstrate that wastewater discharges do not alter, destroy, or contaminate water sources, natural ecosystems, soil, crops, and vegetative covers; and are compliant with applicable legislation.
	C303	Operations do not use untreated sewage in production and/or processing activities.
	C304	Operations may use treated sewage for production activities of non-fresh consumption goods only if operations adapt or conduct a risk analysis for environmental and human health risks and implement the respective risk mitigation measures.
	C305	Operations design, site and manage wastewater treatment systems to minimize contamination and health risks, and in compliance with applicable legislation and health regulations.
	C306	Operations map all pit latrines, sewage drainages and wastewater disposal sites.
	C307	Operations use wastewater from processing operations and greywaters in irrigation or apply it to soil only if treated, and after demonstrating that it is chemical and biological characteristics do not pose a risk to environmental and human health.
	C308	Operations do not intentionally mix wastewaters with clean water for the purpose of diluting it before its discharge.
	C309	Operations safely store or reuse in production plots wastewater with agrochemical residues.
Wastewaters are managed to minimize environmental, human, or animal health risks.	C310	Operations do not discharge untreated wastewater with agrochemical residues to natural ecosystems.
	C311	Operations test wastewater with agrochemical residues prior to discharging it to ensure compliance with the parameters specified by applicable legislation.
	C312	Operations monitor service providers that are handling operations' wastewater to ensure their compliance with applicable legislation for safe wastewater treatment or disposal.

C.4. Sustainability goal: Responsible waste management

Outcomes	ID	Performance Indicators /Best practices
Waste is managed to minimize environmental, human, or animal health risks.	C401	Operations identify the type and amount of different waste streams produced within their activities' scope.
	C402	Operations implement a monitor mechanism for all waste management activities.
	C403	Operations minimize the purchase or use of inputs that generate waste.
	C404	Operations compost organic waste or use any other method to reintegrate it into their productive systems.
	C405	Operations utilize burning of waste as a treatment measure only if there are incinerators technically designed for the specific waste type and in compliance with applicable legislation.
	C406	Operations store, treat and dispose waste in a way that does not pose risks to environmental and human health.
	C407	Operations keep infrastructure clean and free of waste accumulations that can attract disease vectors and other pests.
	C408	Operations reduce the volume of hazardous waste streams (according to Annexes I and II of the 1992 Basel Convention)[6].
	C409	Operations comply with applicable legislation about handling and final disposal of hazardous waste streams.
	C410	Operations store prohibited, obsolete and expired hazardous substances (including agrochemicals) until safely returned to the supplier. If suppliers do not receive such substances back, operations label the containers, and store them separately in dedicated safe areas or sealed pits for their disposal.
Service providers are monitored for correct waste management.	C411	Operations evaluate if service providers minimize waste generation and receive back the used packaging and empty containers of hazardous substances.
	C412	Operations implement mechanisms to monitor service providers and ensure that they comply with the applicable legislation and other requirements to safely dispose the waste handled over from operations.

[6] *See the definition of Hazardous substance in Section IV: SAN Technical Concepts*