



SAN Climate Module

Criteria for Mitigation and Adaptation to Climate Change

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Sustainable Agriculture Network (SAN):

Conservación y Desarrollo, Ecuador · Fundación Interamericana de Investigación Tropical, Guatemala ·
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Pronatura Sur, Mexico · Rainforest Alliance · SalvaNatura, El Salvador

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Sustainable Agriculture Network Secretariat
P.O. Box 11029
1000 San José
Costa Rica

Please send your comments or suggestions concerning this Sustainable Agriculture Network Standards & Policy document to:

standards@sanstandards.org

Or via regular mail to:

Sustainable Agriculture Network Secretariat
P.O. Box 11029
1000 San José
Costa Rica

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Introduction

The Sustainable Agriculture Network and Rainforest Alliance

The Sustainable Agriculture Network (SAN) is a coalition of independent non-profit conservation organizations that promote the social and environmental sustainability of agricultural activities by developing standards. Standard and policy development and review is coordinated by the SAN secretariat based in San José, Costa Rica. Certification Bodies certify farms or group administrators that comply with SAN's standards and policies. Certified farms or group administrators can apply for use of the *Rainforest Alliance Certified*TM trademark for products grown on certified farms.

Since 1992, more than 700 certificates for more than 130,000 farms - including small family farms of cooperatives, as well as plantations - in 29 countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, India, Indonesia, Jamaica, Kenya, Malawi, Mexico, Nicaragua, Panama, Papua New Guinea, Peru, Philippines, Sri Lanka, Tanzania, United States, Vietnam and Zambia) have met the *Sustainable Agriculture Standard* on more than 700,000 ha for 30 crops: açaí palm, allspice and pepper, apple, avocado, banana, blueberry, cherry, chestnut, citrus, cocoa, coffee, cupuacu, flowers, foliage, grapes, heart palm, jocote, kiwi, leek, macadamia, mango, mangosteen, pear, pineapple, plum, radicchio, sugarcane, sweet onion, tea and tomato.

The SAN representatives are: Conservación y Desarrollo (C&D), Ecuador; Fundación Interamericana de Investigación Tropical (FIIT), Guatemala; Fundación Natura, Colombia; ICADE, Honduras; IMAFLORA, Brazil; Nature Conservation Foundation, India; Pronatura Chiapas, Mexico; SalvaNatura, El Salvador; and, Rainforest Alliance.

The Sustainable Agriculture Network's Mission

The Sustainable Agriculture Network (SAN) promotes efficient agriculture, biodiversity conservation and sustainable community development by creating social and environmental standards. The SAN fosters best management practices across agricultural value chains by encouraging farmers to comply with SAN standards and by motivating traders and consumers to support sustainability.

The SAN pursues its mission by:

- Integrating sustainable production of crops and livestock into local and regional strategies that favor biodiversity conservation and safeguard social and environmental well-being.
- Raising awareness among farmers, traders, consumers and business leaders about the interdependencies of healthy ecosystems, sustainable agriculture and social responsibility.
- Impressing upon business leaders and consumers the importance of choosing products grown on environmentally sustainable and socially responsible farms.
- Stimulating dialog among environmental, social and economic groups, North and South, about the benefits of sustainable agriculture.

Prologue to the Climate Module

The implementation of the *Sustainable Agriculture Standard* has generated positive environmental and social impacts and more rewarding, stable markets for producers. *Rainforest Alliance Certified™* farms – those which meet the criteria of the *Sustainable Agriculture Standard* – are taking actions that mitigate their impact on climate change. The *Sustainable Agriculture Standard* already incorporates practices that reduce greenhouse gas (GHG) emissions, promote carbon stocks on farms and help farmers increase their resilience in the face of climate change. The conservation of natural ecosystems prevents the conversion of land to uses with lower carbon stock. The restoration of natural ecosystems and reforestation of marginal farm areas also increases carbon stocks on farms and by not allowing the cutting of natural forest or burning of land, emissions of associated greenhouse gases are avoided. Additionally, allowing only the extraction of timber, plants and non-timber forest products that conform to a sustainable management plan will minimize the loss of carbon stocks that result from over-extraction and wasteful techniques.

Certified farms also implement activities to promote long-term improvement of the soils that support agricultural production. These activities include increasing ground cover to prevent soil erosion, which allows for and maintains carbon storage in the soil. Tree planting is also promoted, since trees hold soil moisture and make farms more resilient to erratic rainfall and other effects brought about by a changing climate. Additionally, the standard requires careful application of fertilizers and giving priority to organic fertilizer generated on the farm, thus minimizing greenhouse gas emissions and carbon based emissions associated with their use, production and transportation. Certified farms reduce the amount of waste they produce and thereby not only decrease GHG emissions directly, but also indirectly by saving energy and materials from non-renewable sources used to produce the discarded items.

However, SAN's Sustainable Agriculture Standard is not explicit about what practices, measures, actions, and reporting are needed for a farmer to demonstrate verifiable climate friendliness. While there are so many climate mitigation practices already defined in this standard, for farmers to make a credible, defensible statement that is explicit about climate actions, there needs to be clearly defined criteria, consistently applied, and verified.

The *SAN Climate Module* continues on this path of promoting sustainable agricultural production through a specific voluntary set of climate change adaptation and mitigation criteria which supplement the existing *Sustainable Agriculture Standard*. The climate-friendly criteria reinforce existing certification criteria and provide additional value. Those farmers that achieve compliance with the module will be able to assess the risks posed by climate change to their farms and communities; analyze their practices to quantify and reduce the GHG emissions generated by growing, harvesting and processing activities; and increase the levels of carbon stored on their farms through the restoration of degraded lands, reforestation and improved soil conservation while also be able to better adapt to altered growing seasons and other conditions.

Background

With support from Efico (www.efico.com) – a green coffee and cocoa trading company, the Efico Foundation (www.eficofoundation.org), and its partners: ANACAFE (Asociación Nacional del Café; www.anacafe.org) and Universidad del Valle in Guatemala, the Rainforest Alliance, the Fundación Interamericana de Investigación Tropical (FIIT), and other members of the Sustainable Agriculture Network have identified best management practices that farmers can employ to reduce their own climate impacts and adapt to the challenges created or exacerbated by climate change. Using selected farms in Guatemala as a laboratory, the coalition implemented a project to measure carbon storage on typical farms, test assumptions regarding practices in the existing standard that reduce or offset greenhouse gas emissions and develop credible climate criteria that could be verified as part of routine farm auditing procedures.

Financial support was received by Rockefeller Foundation to expand this work on coffee and cocoa farms in Ghana, Indonesia, Tanzania, Kenya and Brazil. The ZZurich Foundation and Caribou Coffee supported related activities in Central America (Costa Rica and El Salvador) and close collaboration with the Sangana Public–Private Partnership (partners: GTZ, Sangana Commodities Ltd., 4C Association, World Bank and Tchibo GmbH) generated additional inputs in developing the module.

From July 2010 to October 2010 a public consultation process was conducted according to the *ISEAL Alliance Code of Good Practice for Setting Social and Environmental Standards* (<http://www.isealalliance.org/>). The public consultation comprised one 100-day round of on-line consultation, local workshops and trial audits.

More than 160 organizations from 41 countries (Belgium, Bolivia, Botswana, Brazil, Cambodia, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Ethiopia, Germany, Ghana, Guatemala, Honduras, India, Indonesia, Italy, Kenya, Malaysia, Mexico, Netherlands, New Zealand, Nicaragua, Nigeria, Panama, Paraguay, Peru, Philippines, Portugal, Spain, Sri Lanka, Sweden, Switzerland, United Kingdom, United States, Uruguay and Venezuela) posted a total of 810 comments. The majority of the participating stakeholders came from the environmental interest group (82%), followed by economic (9%) and social (9%) sectors. A distinct categorization showed the following participation statistics: NGOs (45%), academic & research (24%), industry and commerce (11%), producers (7%), government (3%) and others (10%).

Local consultation workshops were held in seven countries: Brazil, Costa Rica, El Salvador, Ghana, Guatemala, Indonesia and Kenya with the participation of 172 stakeholders including producers and their organizations, representatives from universities and government agencies, as well as NGOs. 217 comments were received during these workshops. 15 field tests were conducted in cocoa, coffee and tea farms in Brazil, Costa Rica, El Salvador, Ghana, Guatemala, Indonesia, Kenya and Tanzania.

SAN's International Standards Committee of 12 international independent expert advisers met in November 2010 to write the final draft of this module and approved the current version on December 2010.

Vision of the Climate Module

The aim of the *SAN Climate Module* is to raise awareness about climate change and foster best management practices that can help farmers and communities to better adapt to the challenges of a changing climate and work towards a commitment across the supply chain to mitigating and adapting to its effects.

Climate-friendly farmers implement policies, procedures and best management practices to reduce greenhouse gas emissions from farming and manufacturing operations. Certified farms that want to become more efficient through reducing emissions, increasing their carbon stocks through tree planting and other strategies and that also want to prevent deforestation and destruction of agro-ecosystems can work to achieve verification to the *SAN Climate Module*.

The *SAN Climate Module* is an add-on for voluntary verification within the existing Sustainable Agriculture Network certification system. It is not intended to be a carbon foot printing or Life Cycle Analysis methodology, nor a 'carbon neutral' module or label, and does not attempt to generate carbon offsets.

The *SAN Climate Module* encourages:

- Increased awareness and preparation on the part of farmers to adapt and deal with climate change impacts at the landscape level;
- Implementation of programs and procedures for adaptation to and mitigation of climate change;
- Reductions in the main contributing sources of GHG emissions and monitoring of changes over time;
- Analysis of actions to address climate change risks and improve farm resiliency;
- Regeneration of native vegetation on sites that are degraded or vulnerable to extreme weather events;
- Enhancements to the community climate change adaptive capacity via work with local institutions and associations;
- Improvements in farmers technical knowledge and social networks for confronting climate change impacts;
- Maintenance or increases in soil carbon stocks;
- Efficient use of nitrogen fertilizers;
- Preferential treatment for wastewater treatment options that minimize methane emissions;
- Management of agricultural residues and their use in generating energy or other inputs

In addition to making farmers allies in the fight against climate change and helping farmers prepare for global warming impacts, implementation of the *SAN Climate Module* will necessitate the involvement of businesses and consumers in promoting markets for crops from

farms that meet the criteria. Potential additional benefits to farmers of implementing activities in order to meet the *SAN Climate Module* include the following:

- Increased awareness regarding the impacts of climate change on the agricultural sector, including effects on yields and income, thus improving the farm's resilience to a changing climate;
- Improved livelihoods and foster alliances across the supply chain through access to climate-responsible markets, businesses and consumers;
- Demonstration of preparedness to engage in payment for ecosystem services and/or restoration programs; and,
- Basis for partnerships with public and private initiatives oriented towards reducing GHG emissions on farms.

Structure

The *SAN Climate Module* consists of 15 voluntary criteria that a climate-friendly farm must meet additionally if the farm chooses to become *SAN Climate Module* verified. The *SAN Climate Module* does not contain critical criteria. The following table shows how the additional *SAN Climate Module* criteria relate with the principles and criteria of the *Sustainable Agriculture Standard*:

Criteria in the <i>Sustainable Agriculture Standard</i>	Criteria in the <i>SAN Climate Module</i>
Principle 1: Social and Environmental Management System	
1.1	1.12
1.11	1.13
1.2	1.15
1.9	1.16
1.8	1.17
Principle 2: Ecosystem Conservation	
2.1	2.10
Principle 4: Water Conservation	
4.4	4.10
Principle 6: Occupational Health and Safety	
6.18, 6.20	6.21
Principle 8: Integrated Crop Management	
8.2; 9.2	8.10
Principle 9: Soil Management and Conservation	
9.1, 9.3, 9.4	9.6

Scope

The *SAN Climate Module* can be implemented by *Rainforest Alliance Certified™* farms or groups that cultivate crops mentioned in the List of Authorized Crops for *Rainforest Alliance Certified™* Certification included in SAN's Farm Certification Policy, or cattle farms certified under the *Standards for Sustainable Cattle Production Systems*.

Scoring System

Compliance with the *SAN Climate Module* will be verified separately from compliance with the *Sustainable Agriculture Standard*, but can be combined in the certification audit process. However, verification to the *Climate Module* (or failure to achieve such verification) has no effect on a farm or group administrator's existing certification to the *Sustainable Agriculture Standard*.

In order to become verified against the *SAN Climate Module*, the farms must be inspected against the *SAN Climate Module* and must meet the following requirements:

- a. **Certified by an accredited certification body under the scope of *Sustainable Agriculture Standard* and, if applicable, with the *SAN Standard for Sustainable Cattle Production Systems* or *SAN Standard for Group Certification*;**
- b. **Comply with a minimum score of 80% compliance with all the applicable 15 *SAN Climate Module* criteria.**
- c. **Not complying with any or some of the elements defined by a climate module criterion, will result in the assignment of non-conformity. There are two categories of non-conformities: 1) Major Non-Conformity, and 2) minor non-conformity. The level of compliance for these categories is as follows:**
 1. **Major Non-Conformity (MNC): indicates compliance with less than 50% of a criterion's element - equaling 0 points.**
 2. **minor non-conformity (mnc): indicates compliance with equal or more than 50% of a criterion's elements, but less than 100% - equaling 0.5 points.**

Terms and Definitions

- **Adaptation:** The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploit beneficial opportunities (*Source: United Nations Framework Convention on Climate Change, UNFCCC*).
- **Adapted species:** species that are suitable to or consistent with a particular situation or use, for example: species that are well adapted to tropical climates.
- **Adaptive capacity:** The capacity of a system to adapt if the environment where the system exists is changing. The farm will need to have adaptive capacity in order to respond to climate variability (Millennium Ecosystem Assessment, 2005).
- **Aerobic treatment system:** The treatment of sewage, spills, or waste, with oxygen dependent microorganisms that break down (biodegrade) the polluting substance into harmless compounds over time.
- **Agricultural residues:** Agricultural waste which will be treated and/or disposed with other solid waste. For example, manure, dead bodies of live stock, plastics and mulch (*Source: Intergovernmental Panel on Climate Change, IPCC*).
- **Biomass:** Organic material both aboveground and belowground, and both living and dead, e.g., trees, crops, grasses, tree litter, roots, etc. (*Source: IPCC*). Renewable organic materials, such as wood, agricultural crops or wastes, and municipal wastes, especially when used as a source of fuel or energy.
- **Carbon sequestration:** The process of removing carbon from the atmosphere and storing it in solid form. In plants this is achieved through photosynthesis which uses sunlight to turn atmospheric carbon dioxide to biomass.

- **Carbon stock:** The carbon stock in any one place is the sum of the carbon stored in its biomass.
- **Climate change adaptation:** Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects.
- **Climate change mitigation:** Actions taken to reduce or help stabilize the concentration of greenhouse gases in the atmosphere. This can involve reducing emissions from sources, or by increasing sinks.
- **Climate change:** A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (*Source: IPCC*).
- **Climate friendly farming:** Farming practices with beneficial impacts for the climate, demonstrated by farmers who are reducing emissions, enhancing carbon stocks on their farms, and improving the resilience of agro-ecosystems to adapt to a changing climate, and thus sustain their own livelihoods.
- **Climate friendly practices:** Management practices that mitigate climate change by reducing GHG emissions or increasing carbon stocks coupled with practices that enable operations to adapt to a changing climate.
- **Climate risk:** A risk resulting from climate change and affecting natural and human systems and regions.
- **Climate vulnerability:** The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change; including climate variability.
- **Climate:** The average course or condition of the weather. More rigorously, it can be defined as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind (*Source: IPCC*).
- **Direct GHG emissions:** Greenhouse gas emissions from sources that are owned or controlled by the reporting entity (*Source: GHGprotocol.org*).
- **Extreme weather events:** Severe heat waves, heavy rains, hails storms, hurricanes. These have severe impacts such as: landslides, wild fires, floods, pest and diseases outbreaks.
- **Fossil fuels:** Fuels formed in the ground over millions of years from the remains of dead plants and animals, for example, oil, coal and natural gas.
- **Greenhouse gases (GHG):** Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth surface, the atmosphere and clouds. This property causes the greenhouse effect. Carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the Earth's atmosphere. There are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine and bromine containing substances. GHG are measured in metric tons of carbon dioxide-equivalent (CO₂e) (*Source: (ISO 14064-3:2006)*).
- **Greenhouse gas emissions:** Total mass of a GHG released to the atmosphere over a specified period of time (*Source: ISO 14064-2:2006*).

- **Indirect GHG emissions:** Emissions that are a consequence of the operations, but occur from sources owned or controlled by another entity, e.g., as a consequence of the import of electricity and feed imported for livestock.
- **Land degradation:** Is a human induced or natural process which negatively affects the land to function effectively within an ecosystem, by accepting, storing and recycling water, energy, and nutrients (*Source: United States Department of Agriculture*).
- **Land use change:** A change in the use or management of land by humans, which may lead to a change in land cover. Land cover and land-use change may have an impact on the albedo, evapotranspiration, sources, and sinks of greenhouse gases, or other properties of the climate system, and may thus have an impact on climate, locally or globally (*Source: IPCC*).
- **Mitigation:** In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other sinks to remove greater amounts of carbon dioxide from the atmosphere (*Source: UNFCCC*).
- **Organic fertilizer:** A fertilizer that is derived from animal or vegetable matter.
- **Organic residue:** Any waste matter that has come from a once-living organism; is capable of decay, or the product of decay; or is composed of organic compounds, for example manure.
- **Nitrogen fertilization:** Enhancement of plant growth through the deposition of nitrogen compounds. This typically refers to fertilization from anthropogenic sources of nitrogen such as, man-made fertilizers - chemical and organic (*Source: IPCC*).
- **Reduced tillage:** A practice of minimizing soil disturbance and allowing crop residue or stubble to remain on the ground instead of being thrown away or incorporated into the soil. Reduced tillage practices may progress from reducing the number of tillage passes to stopping tillage completely (zero tillage). Also known as conservation tillage.
- **Renewable energy:** Energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat, which are renewable (naturally replenished). The most widely used renewable source is hydroelectric power; other renewable sources are biomass energy, solar energy, tidal energy, wave energy, and wind energy.
- **Resilience:** The amount of change a system can undergo without changing state (*Source: IPCC*).
- **Risk assessment:** The determination of quantitative or qualitative value of risk related to a situation and a recognized threat (also called hazard).
- **Service provider:** An entity that provides services or goods to other entities.
- **Sink:** Any process, activity or mechanism which removes a GHG, an aerosol or a precursor of a greenhouse gas from the atmosphere. Forests and other vegetation are considered sinks because they remove carbon dioxide through photosynthesis.
- **Stakeholders:** A person, group or organization that has direct or indirect interest in an organization because it can affect or be affected by the organization's actions, objectives and policies (*Source: ISO 14064-2:2006*).
- **Tree inventory:** A documented record of tree species names, size, DBH (diameter at breast height) and tree height of those trees within the farm boundaries. Characteristics of

the site should also be listed such as soil type and condition, root space, slope, effective soil depth and degree of conservation and vulnerability to extreme weather events.

- **Vulnerability:** the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (*Source: United Nations Framework Convention on Climate Change*).
- **Woody Biomass:** Trees, shrubs, bushes, or products derived from woody plants, which are plants that use wood as its structural tissue (*Source: Agriculture and Natural Resources, University of California*).

Sources

Content for this document has been consulted from the following sources

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- Intergovernmental Panel on Climate Change (IPCC). <http://www.ipcc.ch>
- International Organization for Standardization Organization <http://www.iso.org>.
- PAS 2050. Assessing the life cycle greenhouse gas emissions of goods and services. <http://www.bsigroup.com>.
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1. SOCIAL AND ENVIRONMENTAL MANAGEMENT SYSTEM

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms have a social and environmental management system for the implementation of the best management practices indicated in the *Sustainable Agriculture Standard*, including a personnel training program and evaluation of service providers. A farm's commitment to climate change adaptation and mitigation is represented in a set of policies and procedures managed by the farm's management or group administrator under the same system. The climate change-related policies and procedures foster implementation of best management practices for reducing GHG emissions from production and processing practices and managing carbon storage in soil and farm biomass. The management system on a climate-friendly farm should also have a program focused on identification of climate risks, implementing strategies to adapt to climate change and raising awareness about climate change.

- 1.12 The farm's social and environmental management system must assess climate risks and vulnerabilities and include plans to adapt to and mitigate climate change.**
- 1.13 The farm must annually record data about its main GHG emissions sources related to, at minimum, nitrogen fertilizer input, pesticide input, fossil fuel use for machinery, methane generated in waste and wastewater treatment and animal husbandry.**
- 1.14 The farm must obtain available information on climate variability and its predicted impacts and adapt farm practices considering that information.**
- 1.15 The farm must map its land use and keep records of land use changes.**
- 1.16 The farm's climate change adaptation and mitigation practices must be included in its training and education programs.**
- 1.17 The farm must, to the extent possible, choose service providers that incorporate climate-friendly practices in their operations.**

2. ECOSYSTEM CONSERVATION

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms protect natural ecosystems and work to protect plants and animals that depend upon the farm environment for habitat and refuge. Climate-friendly farms make efforts to maintain and enhance ecosystem conservation in the face of climate change by enhancing their carbon sequestration capacity, reducing the vulnerability of the agro-ecosystem to changing climatic conditions and improving its resilience to extreme weather events.

- 2.10 The farm must reduce vulnerability, prevent land degradation or enhance ecological functions by planting native or adapted species or promoting natural regeneration.**

- 2.11 The farm must maintain or increase its carbon stocks by planting or conserving trees or other woody biomass. The farm must conduct tree inventories every five years.**

4. WATER CONSERVATION

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms implement activities to conserve water, avoid surface water contamination caused by chemical or sediment run-off and make efforts to reduce energy use in pumping and distribution. Any irrigation must incorporate best known practices for using water efficiently in the region. Climate-friendly farms conduct activities to conserve and minimize the use of water in post-harvest processing, therefore reducing the quantity of residual water that needs treatment and minimizing methane emissions from wastewaters. Climate-friendly farms identify adaptive measures for increasing water efficiency and adapting to water scarcity when affected by climate change impacts, including extreme weather events.

- 4.10 The farm must analyze and implement wastewater treatment options that reduce methane emissions from wastewater treatment and recover the generated methane, to the extent possible.**
- 4.11 The farm must adapt to water scarcity by practices such as harvesting and storing rainwater and selecting drought tolerant crop varieties.**

6. OCCUPATIONAL HEALTH AND SAFETY

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms identify potential emergencies and are prepared to efficiently respond and minimize their possible impacts on workers and the environment. Climate-friendly farms are prepared with plans and measures to respond to potential climate change risks, including extreme weather events (heat waves, heavy rains, prolonged droughts) and associated impacts (fires, landslides, floods or other events or incidents that can be reasonably anticipated).

- 6.21 The farm must implement an emergency preparedness and response plan for extreme weather events to prevent damage to people, animals and property.**

7. COMMUNITY RELATIONS

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms maintain good relationships with neighboring communities and periodically consult with local stakeholders about changes on farms that could have potential impacts on the social and environmental well-being of surrounding communities. Climate-friendly farms work with local institutions and associations to enhance the community's climate change adaptive capacity.

- 7.7 The farm must initiate or actively participate in community's climate change adaptation and mitigation efforts, including identification of relevant resources.**

8. INTEGRATED CROP MANAGEMENT

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms work towards the reduction of chemical products use through integrated crop management. Climate-friendly farmers are aware that nitrogen-based fertilizers can release nitrous oxide (N₂O) and this can be a significant GHG emitted on-farm. Climate-friendly farmers use fertilizers efficiently, since GHG emissions released during application depend on the type and formulas of agrochemicals used and the timing and quantity of fertilizer application.

8.10 The farm must reduce nitrous oxide emissions through the efficient use of nitrogen fertilizers to minimize the loss to air and water.

9. SOIL MANAGEMENT AND CONSERVATION

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms implement practices to maintain healthy and productive soils and carry out activities to prevent erosion and loss of nutrients. Soils are large carbon stocks and have the potential to sequester GHG when managed well or to release GHG when mismanaged. Climate-friendly farms implement practices that amend soil with crop residues or manures, increase the build-up of biomass and soil carbon, and minimize the disturbance of soil under tillage. Improving soil fertility, structure, and water holding capacity increases crop productivity and reduces vulnerability to climate change impacts.

9.6 The farm must maintain or increase its soil carbon stocks by implementing management practices, such as crop residue recycling, permanent cover crops reducing tillage, and optimizing the soil's water retention and infiltration.

10. INTEGRATED WASTE MANAGEMENT

Summary of the SAN Climate Criteria (non-binding for verification purposes): Certified farms have programs for managing all wastes, leading to a direct decrease in GHG emissions. Integrated waste management also reduces GHG emissions indirectly by saving energy and materials from non-renewable sources used to produce the discarded items. Waste - in particular methane gas released from the anaerobic decay of the organic matter - is a major contributor of GHG emissions. Climate-friendly farms use waste treatment procedures that minimize GHG emissions and make efforts to manage agricultural biomass residues to generate energy or other inputs.

10.7 The farm must implement organic residue management practices that reduce GHG emissions, such as production of organic fertilizer or biomass energy generation.