

Food and Agriculture Organization of the United Nations (FAO)

Submission on indicators of adaptation and resilience at the national and/or local level or for specific sectors¹

We thank you in advance for filling out this template with concise, evidence-based information and for referencing all relevant sources. As you will see on the last page of the document, more detailed information on case studies, tools/methods and other knowledge resources for dissemination through the [Adaptation Knowledge Portal](#) is welcome, but optional.

Name of the organization or entity:

Food and Agriculture Organization of the United Nations (FAO)

Type of organization/entity:

Please choose as appropriate:

- | | |
|--|---|
| <input type="checkbox"/> Local government/ municipal authority | <input type="checkbox"/> Regional center/network/initiative |
| <input type="checkbox"/> Intergovernmental organization (IGO) | <input type="checkbox"/> Research institution |
| <input type="checkbox"/> National/public entity | <input checked="" type="checkbox"/> UN and affiliated organization |
| <input type="checkbox"/> Non-governmental organization (NGO) | <input type="checkbox"/> University/education/training organization |
| <input type="checkbox"/> Private sector | |

Scale of operation:

- | | |
|--------------------------------|--|
| <input type="checkbox"/> Local | <input checked="" type="checkbox"/> National |
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Specific sectors addressed:

- | | |
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| <input checked="" type="checkbox"/> Adaptation finance | <input type="checkbox"/> Gender |
| <input checked="" type="checkbox"/> Agriculture | <input type="checkbox"/> Health |
| <input checked="" type="checkbox"/> Biodiversity | <input type="checkbox"/> Heavy industry |
| <input checked="" type="checkbox"/> Community-based adaptation | <input type="checkbox"/> Human settlements |
| <input checked="" type="checkbox"/> Disaster risk reduction | <input type="checkbox"/> Indigenous and traditional knowledge |
| <input checked="" type="checkbox"/> Ecosystem-based adaptation | <input type="checkbox"/> Infrastructure |
| <input checked="" type="checkbox"/> Ecosystems | <input type="checkbox"/> Services |
| <input type="checkbox"/> Energy | <input type="checkbox"/> Tourism |
| <input checked="" type="checkbox"/> Food security | <input type="checkbox"/> Urban resilience |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Other (Please specify below) |

City(ies)/Country(ies)/Region(s) of operation (if appropriate):

The FAO has 194 Member Nations and it is currently present through its Representations in 144 countries. FAO Regional Offices cover Africa; Asia and the Pacific; Europe and Central Asia; Latin America and the Caribbean; Near East and North Africa.

¹ FCCC/SBSTA/2016/2, paragraph 18.

Description of relevant activities/processes or research:

Please describe the activities/processes that your entity has implemented in relation to indicators of adaptation and resilience. In case your organization carried out research, please describe it.

FAO has a longstanding experience in the development, measurement and monitoring of indicators related to agricultural development, natural resources management, disaster risk reduction, resilience, food security and nutrition, among others. FAO's global role in developing harmonized methods and providing technical assistance to countries for monitoring development indicators was reaffirmed in the framework of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDG), where FAO is proposed 'custodian' UN agency for 21 SDG indicators, and a contributing agency for six more indicators.

In July 2017, FAO's governing bodies have endorsed the FAO Strategy on Climate Change, which will guide FAO's activities on climate action. The Strategy focuses on three main outcomes: (1) Enhanced capacities of Member Nations on climate change through FAO leadership as a provider of technical knowledge and expertise; (2) Improved integration of food security, agriculture, forestry and fisheries within the international agenda on climate change through reinforced FAO engagement; (3) Strengthened coordination and delivery of FAO work on climate change. Progress towards the main outcomes will be monitored through relevant output indicators, including indicators that are specific to climate change adaptation.

As part of its strategic programme on resilience, FAO provides trainings to governments and other relevant stakeholders on measuring indicators of disaster impacts on agriculture sectors, as well as indicators of added benefits, avoided losses and co-benefits deriving from the implementation of farm level DRR and CCA good practices. FAO provides technical assistance to countries for harmonized collection of data and information on adaptation and resilience, and the use of key indicators for evidence-based planning and decision-making in Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA).

FAO assists countries and communities on vulnerability and risk assessment in agriculture, providing technical support for the development, measurement and use of standardized indicators of vulnerability and adaptive capacity. Based on the results of the assessments, FAO supports the identification of short-term disaster risk reduction measures and longer-term adaptation priorities for national and local sectoral planning.

FAO conducts integrated assessments of agrometeorological, socioeconomic and environmental indicators to support countries with regular information and early warning against potential, known and emerging threats. FAO works with countries to improve the quantity and quality of climate information and to encourage the wide use of climate information and early warning systems at all levels.

Description of relevant tools/methods:

Please describe the tools and/or methods that have been developed and/or used.

Tracking Adaptation in Agriculture Sectors: FAO is currently developing a flexible and consistent indicator framework for tracking adaptation in agricultural sectors (crops, livestock, forestry, fisheries and aquaculture) at national level. The adaptation tracking framework largely builds on existing sustainable development, climate change adaptation and disaster risk reduction indicators, which are analysed in combination for comprehensive assessment of progress towards adaptation.

The indicator based methodology consist of four major categories of indicators are recognized, reflecting both the local and national context: (1) natural resources; (2) agricultural production systems; (3) socio-economics; and (4) institutions and policy. These categories cut across all the major entry points for adaptation – vulnerability reduction, enhancing adaptive capacity and mainstreaming climate change concerns into policies, programmes and plans. Four sub-categories of indicators are proposed in each of the four main categories described above, making the total sub-categories of indicators to sixteen. A suit of process and outcome-based indicators relevant to agriculture sectors are suggested to be selected for context specific tracking of adaptation. Selection of indicators for tacking is flexible and driven by user’s needs, relevance, data availability, and other criteria.

The indicative list of indicators is carefully selected considering on-going country level efforts towards reporting to major international mechanisms – sustainable development goals (SDGs) and Sendai Framework for Disaster Risk Reduction (SFDRR), and data availability from various existing sources to avoid unnecessary burden on data collection and reporting by the countries. The tracking methodology is meant to be applied at the national level, but flexible enough to be adopted in context specific situations at the local level based on data availability. The methodology includes a scoring procedure - the scores ranges from 0 to 10 scaled down from raw quantitative and qualitative data of the selected indicators, and matches with the six levels of adaptation progress - very low adaptation, low adaptation, moderate adaptation, high adaptation, and very high adaptation.

The framework is based on the recognition that adaptation should be tracked by analyzing a number of different indicators across agricultural sub-sectors, and creating a thorough understanding of the relationship between climatic, environmental, socioeconomic and institutional and policy systems. FAO’s adaptation indicators framework aims to support country compliance with Articles 7 and 13 of the Paris Agreement, and help monitor progress of adaptation activities at national level and report and share the information widely.

Agricultural damage and losses caused by natural disasters: FAO has developed a harmonized methodology on measuring agricultural damage and losses caused by disasters. The methodology aims to measure monetary damage to agricultural assets and infrastructure, as well as the value of production losses attributed to disasters in the crops, livestock, fisheries, aquaculture and forestry sectors. The computation methods allow to measure the direct effects of a wide range of disaster types, including sudden and slow onset weather and climate-related events. Furthermore, the methodology can be applied to disasters of small, medium and large-scale. Such harmonized methodology is at the disposal of countries as a means to address the information and knowledge gap on disaster impact on agriculture, and it represents a valuable analytical tool to assess indicators of disaster impacts at all levels, and to support the design of evidence-based resilience and adaptation policies and actions.

The methodology for the quantitative analysis of production losses and changes in economic flows after disasters included selection of natural hazards, assessment of agriculture production losses after natural hazards, assessment of changes in trade flows after natural hazards and assessment of changes in agriculture value-added growth after natural hazards. The detailed methodology for damage and loss assessment in agricultural sectors can be found in the document on Impacts of disasters on agriculture and food security (<http://www.fao.org/3/a-i5128e.pdf>.) **Anne 2-5.**

Resilience Index Measurement and Analysis (RIMA): At the household level, FAO has pioneered the development and the use of Resilience Index Measurement and Analysis (RIMA). RIMA is an innovative quantitative approach that allows explaining why and how some households cope with shocks and stressors better than others do. It facilitates comparisons between different types of households in a given country or area, and supports decision makers and other stakeholders to better understand the dynamics of positive trends in resilience. Central to this work are efforts to build national and regional

capacities for resilience analysis. Through regional and country offices, FAO works closely with regional bodies such as the Intergovernmental Authority on Development and the Permanent Interstate Committee for Drought Control in the Sahel, international organizations (including the United Nations Children’s Fund, the United Nations Development Programme, the World Food Programme and the World Bank), academia and other institutional partners on data collection and analysis and impact evaluations on resilience to inform related policy.

A detailed methodology for RIMA can be found in the publication on analysing resilience for better targeting and action - Resilience index measurement and analysis (<http://www.fao.org/3/a-i5665e.pdf>). In summary, the early empirical applications of FAO RIMA adopted two-stage Factor Analysis (FA) with Bartlett’s prediction technique. In the first step resilience pillars were estimated through FA of observable variables and RCI was then estimated through FA of the pillars. The last generation of RIMA applications employed factor analysis at the first stage and then estimated Resilience Capacity Index (RCI) by adopting a Structural Equation Model (SEM) at the second stage. Root Mean Square Error of Approximation (RMSEA), Chi-squared tests, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) and Standardized Root Mean Square Residual (SRMR) were estimated to evaluate goodness-of-fit and, ultimately, correlation between residual errors. A modified RIMA-I approach was recently employed as a predictor of well-being variation over time to estimate rural household resilience in Nicaragua and the capacity of an RCI to predict future food consumption.

Index for Risk Management (INFORM): FAO contributes as external partner to the Index for Risk Management – INFORM, a composite indicator that identifies countries at risk of humanitarian crisis and disaster that would overwhelm national response capacity. INFORM is a joint effort of UN agencies, donors, NGOs and research institutions to establish a common evidence-base for global humanitarian risk analysis.

INFORM is a composite indicator that identifies countries at risk of humanitarian crisis and disaster that would overwhelm national response capacity. The INFORM index supports a proactive crisis and disaster management framework. The INFORM initiative began in 2012 as a convergence of interests of UN agencies, donors, NGOs and research institutions to establish a common evidence base for global humanitarian risk analysis. The INFORM model is based on risk concepts published in scientific literature and envisages three dimensions of risk: Hazards & exposure, Vulnerability, and Lack of coping capacity. The INFORM model is split into different levels to provide a quick overview of the underlying factors leading to humanitarian risk and builds up the picture of risk by 54 core indicators. Any changes in the INFORM methodology are always applied to at least the five previous years of data to preserve the consistency of the trend analysis. Detailed methodology can be found from the following link: <http://www.inform-index.org/Portals/0/InfoRM/2017/INFORM%20Concept%20and%20Methodology%20Version%202017%20Pdf%20FINAL.pdf?ver=2017-07-11-104935-783>

Self-Evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP): FAO has developed a participatory tool for Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP) as an instrument to assess the climate resilience of smallholder farmers and pastoralists through a set of qualitative indicators, and to provide key data to help scientists and policy-makers in their efforts to reduce the risks associated with climate change. The SHARP tool is implemented in three phases: (1) A participatory self-assessment survey of smallholder farmers and pastoralists regarding their climate resilience; (2) A double gap analysis and assessment of the responses both at local level with the farmers and pastoralists in a rapid assessment and through a cross-sectional review of multiple assessments; (3) The use of all data collected, in conjunction with

climate and scientific data, to inform and guide farmers' practices, curricula, and local and national policies.

The methodology of SHAP includes a self-assessment consists of interviewees to consider their environmental, social, economic, governance and agricultural practices so as to obtain a holistic understanding of their climate resilience. The farmers and pastoralists answer questions that are tailored to their specific context; rank the adequacy of the component (e.g. access to markets or water quality) and then indicate the importance of that component for their livelihood. SHARP goes beyond traditional extractive surveys by providing immediate offline results and encourages communities to learn from each other and plan activities for improvement.

SHARP was developed to be applied in the context Farmer Field School programmes, before or during activities, but has since been used in other contexts. All questions in the survey were screened to be gender-sensitive. Questions of access to resources were also included, which are especially important for female respondents. A few questions were integrated that specifically tackled the gender aspect of resilience and potential intra-household disparities, including questions on household decision-making, diet patterns within the household and education levels of different members. Results are gender-disaggregated. The guidelines for SHARP implementation underscore the importance of including women in SHARP assessments and highlight facilitation processes for gender-sensitive questions. Detailed methodology and tools are available from the link: <http://www.fao.org/in-action/sharp/en/>

FAO as custodian UN Agency for SDG indicators: FAO is custodian UN agency for 21 SDG indicators, across SDGs 2, 5, 6, 14 and 15, and a contributing agency for six more – a significant increase on the four indicators the organization was responsible for in the MDGs. While developing indicators that can be disaggregated, adopted universally, and reported regularly and cost-effectively, FAO is at the forefront of innovations to collect and capture information, striking new partnerships and investing in novel equipment, from earth observation satellites to mobile devices to aerial drones.

As custodian agency, FAO can support governments to set national priorities and targets; foster strong and coherent institutional and policy environments; engage all actors concerned in national policy processes and dialogues, contribute to innovative partnerships; support national statistical institutions to produce global and national indicators; support governments to report on challenges and results; contribute to mobilizing resources in support to national efforts; contribute to the global follow-up and review of SDGs.

Details of all indicators and FAO's role is available in the document on FAO and the SDGs: Indicators – measuring up to the 2030 Agenda for sustainable development from the link: <http://www.fao.org/3/a-i6919e.pdf>.

Key outcomes of the activities/processes undertaken:

Please provide information regarding the outcomes of the activities/processes described above, and do not hesitate to add qualitative assessment and/or quantitative data to substantiate the information.

FAO applies RIMA in more than ten countries in the Near East and sub-Saharan Africa, including Burkina Faso, Mali, Niger, Senegal, Somalia, South Sudan and the Sudan. Several Resilience Analysis Reports have been published over the last years to support the establishment of baseline values for impact evaluation, and to carry out resilience profiling.

The Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP) tool has been piloted or tested in 10 countries across sub-Saharan Africa, and integrated in several

projects funded by the Global Environment Facility (GEF). For instance, SHARP is being used in West and Central Africa in the context of better understanding the needs and resilience levels of farmers. This information will form the basis of subsequent reference guides on climate proofing of small scale irrigation schemes developed as part of an IFAD project

In 2016, the Open-Ended Intergovernmental Expert Working Group on indicators and terminology relating to disaster risk reduction (OIEWG) endorsed the FAO methodology on measuring damage and losses caused by disasters in agriculture, which will be used to monitor agriculture-related indicators under the Sendai Framework for Disaster Risk Reduction (SFDRR), and particularly *Indicator C-2: Direct Agricultural Loss Attributed to Disasters*. This indicator is part of a compound indicator that measures progress towards reducing direct disaster economic loss in relation to global gross domestic product by 2030 (Global Target C of the SFDRR). The same compound indicator will be used – together with other indicators – to monitor achievement of the Sustainable Development Goal’s target to build the resilience of the poor and those in vulnerable situations by 2030, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters (SDG Target 1.5).

FAO is conducting trainings to strengthen capacities of national focal points to apply the above methodologies, with the aim of harmonizing and supporting national and regional institutional setups for monitoring adaptation and resilience.

Description of lessons learned and good practices identified:

Please consider the following points when describing lessons learned and good practices: (a) effectiveness/impacts of the activities/processes (including measurability of the impacts), (b) efficiency in the use of resources, (c) replicability (e.g. in different locations, at different scales), (d) sustainability (i.e. meeting the current economic, social and environmental needs without compromising the ability to address future needs).

Based on current and past experience in supporting the development and monitoring of adaptation and resilience indicators in agriculture, FAO has derived a number of lessons learned and identified several good practices including, among others:

- **Use of both outcome and process indicators:** a successful framework for tracking progress towards adaptation should include both process and outcome-based indicators. Indeed, indicators should help understanding how policy design and implementation processes translate into observed, measurable outcomes that lead to better adapted agricultural systems. Indicators should measure both the quantity and quality of the results achieved, as well as the effectiveness of the steps taken to create the enabling environment for the achievement of such results.
- **Gender sensitivity:** the risks associated with climate change may have a proportionately stronger impact on rural women, given their limited access to resources in many countries. Adaptation indicators should be gender disaggregated and capture gender perspectives in order to allow monitoring the impact of adaptation policies and actions on gender, and ensure that gender mainstreaming and gender equality are adequately addressed in the pathway towards adaptation in agriculture.
- **Moving baselines and targets:** The continuously evolving climate change scenarios and related impacts require that adaptation indicator baselines and targets be regularly updated. This may be particularly challenging, especially since data on past effects of climate change is not

available, and future climate impacts on agriculture are projected with a significant degree of uncertainty.

- **Use of existing data:** Countries are requested to measure several indicators to report on their progress towards a number of international agreements and instruments, including the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction, among others. Therefore, an indicator framework for tracking adaptation should build on existing data and information that is being collected by countries as part of their international commitments. The goal is to avoid further increasing the burden of data collection, and to ensure alignment with existing tracking and monitoring frameworks.
- **Traditional knowledge:** There is growing recognition that traditional knowledge provides an important contribution to observations of climate change and the identification of adaptation priorities and actions at local level. Adaptation indicators should combine and link traditional and scientific knowledge to measure progress towards adaptation in a comprehensive manner.
- **Bottom-up and top-down actions:** A comprehensive framework of adaptation indicators should allow monitoring adaptation progress at the national, sub-national and local levels. In particular, the indicators should help analyse bottom-up adaptation progress by capturing information from formal and informal local adaptation initiatives, as well as top-down adaptation processes.
- **Multi-stakeholder and iterative process:** The development, measurement and reporting on adaptation indicators should follow a multi-stakeholder approach, whereby all relevant actors are engaged in the definition of priorities, baselines and targets. In the case of agriculture, for instance, all relevant Ministries should be involved together with Disaster Management Authorities, National Statistical Offices, research institutes, NGOs, farmers associations, and relevant private actors. Furthermore, tracking adaptation should be an iterative process. The results of the assessment should guide the decision-making process and inform the setting of priorities, baselines and targets for the next round of measurement.

Description of key challenges identified:

Please describe the key challenges associated with those activities/processes or the use of those tools/methods, that policy-makers, practitioners and other relevant stakeholders should know about.

The development of indicator frameworks to track progress towards adaptation and resilience in agriculture is a complex process due to a number of challenges including, among others:

- **Multiple actions:** A broad range of policies, actions, projects, programmes can contribute to adaptation, although they might have different goals. It is therefore challenging to keep track of all these simultaneous activities, and to develop an indicator framework that allow users to identify synergies and potential unintended consequences across past, ongoing and planned actions. Another important challenge is the difficulty of attributing outcomes to a given adaptation intervention; this in turn may undermine the learning process inherent to monitoring and evaluation.
- **Flexibility of measurement vs cross-country comparability:** Priorities, targets and measurement frameworks to track progress towards adaptation should be adapted to national and local climatic, economic, environmental and social contexts. National adaptation strategies should be devised based on existing and expected climate drivers and risks, which

may differ significantly across countries and areas. Therefore, an effective framework for tracking adaptation should provide a high degree of flexibility in the choice and prioritization of process and outcome indicators. On the other hand, a certain level of coherence across national tracking frameworks should be also ensured in order to allow cross-country comparability and ease the exchange of information and good practices.

- **Limited data quality and quantity.** Several countries have limited capacity to gather data and information relevant to adaptation in agriculture. The development of such capacities should be prioritized in order to support the establishment of comprehensive tracking systems. Furthermore, capacity should be strengthened for data analysis and adequate use of adaptation indicators in the decision-making process.
- **Timescales of climate impacts.** Climate change impacts affect agricultural systems in the short, medium and longer-term. Tracking progress towards adaptation to climate impacts in agriculture should take into account these different time scales, and support the setting of priorities at all levels.

Planned next steps (as appropriate):

Based on this experience or research, have next steps been planned to address/study some of the identified challenges, scale up or scale out such activities/processes?

FAO is in the process of finalizing a framework of indicators that can be used at national level to track progress of adaptation in the agriculture sectors. The framework seeks to address the challenges identified above, and to reflect the adaptation priorities indicated by countries in their Nationally Determined Contributions (NDC). The structure of the framework builds on the lessons learned and good practices listed previously. The next steps for this work will involve capacity development, further pilot testing and customization of the framework to country needs, in support of the implementation process of the Paris Agreement and other relevant initiatives, programmes and plans related to adaptation in agriculture.

FAO's continues to refine its work on resilience measurement and analysis based on experiences in applying RIMA, with the following main objectives:

- effectively contribute to resilience programming in priority regions and selected countries through country-led resilience analysis and identification of policy issues;
- develop capacity within countries and regional institutions, international organizations and partner organizations in order to conduct resilience analysis at scale, including mapping and assessing the quality of existing country-level datasets and developing specific learning packages, guidelines and tools to offer on-the-job training to government and partner staff; and
- consolidate RIMA as a key corporate tool for resilience programming, integrated with other FAO indicators on resilience to climate change, poverty, nutrition and crises.

Concerning damage and loss, FAO aims to build a global information system on damage and losses caused by disasters (including climate-related disasters) on agricultural sectors, and provide support to countries for the data collection process that will start next year for monitoring SFDRR indicator C-2 and SDG Target 1.5. Next steps will include further trainings on methods and tools for damage and loss assessment and reporting, and the use of resilience indicators for disaster risk reduction planning in agricultural sectors.

FAO, as custodian Agency of 21 SDG indicators, will aim to work on the following activities:

- supporting governments to set national priorities and targets,
- fostering strong and coherent institutional and policy environments, engaging all actors concerned and dialogues,
- contributing to innovative partnerships,
- supporting national statistical institutions to produce global and national indicators,
- supporting governments to report on challenges and results,
- contributing to mobilizing resources in support to national efforts, and
- contributing to the global follow up and review of SDGs

Relevant hyperlinks:

Please provide hyperlinks to sources of information.

Further information:

- FAO (2017). Food and Agriculture – Driving action across the 2030 Agenda for Sustainable Development, FAO, Rome (<http://www.fao.org/3/a-i7454e.pdf>)
- FAO (2017). FAO and the SDGs. Indicator – Measuring up to the 2030 Agenda for sustainable development. <http://www.fao.org/3/a-i6919e.pdf>
- FAO (2015). The Impact of Disasters on Agriculture and Food Security: <http://www.fao.org/3/a-i5128e.pdf>
- FAO (2016). Resilience Index Measurement and Analysis (RIMA): <http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/416587/>
- FAO (2016). The agricultural sectors in nationally determined contributions (NDCs). Priority areas for international support: <http://www.fao.org/3/a-i6400e.pdf>
- FAO (2017). FAO Strategy on Climate Change: <http://www.fao.org/3/a-i7175e.pdf>
- FAO (2017). The Impact of Disasters on Agriculture: <http://www.fao.org/3/a-i7279e.pdf>
- FAO. Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP): <http://www.fao.org/in-action/sharp/en/>
- Index for Risk Management – INFORM: <http://www.inform-index.org/>
- UNISDR (2017). Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction. Collection of Technical Notes on Data and Methodology: https://www.unisdr.org/files/globalplatform/entry_bg_paper~collectionoftechnicalnotesonindicat.pdf