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# Using metrics to assess progress towards the Paris Agreement's Global Goal on Adaptation

TRANSPARENCY IN ADAPTATION  
IN THE AGRICULTURE SECTORS



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# **Using metrics to assess progress towards the Paris Agreement's Global Goal on Adaptation**

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# Foreword

The Global Goal on Adaptation (GGA), established under the 2015 Paris Agreement, urges the international community to ensure adequate adaptation measures are in line with keeping average global warming below 1.5 °C. The GGA is closely linked to this temperature goal, as variations in climate scenarios can lead to varying levels of climate risk and disaster, which has implications for the levels of adaptation effort and responses needed to strengthen agrifood systems. Countries are encouraged to implement the GGA and report on their progress in enhancing adaptive capacity and resilience while reducing vulnerability. However, they face the complex task of meaningfully measuring adaptation outcomes across diverse contexts.



At the 26th United Nations Framework Convention on Climate Change (UNFCCC) conference of parties (COP26) in 2021, the Glasgow-Sharm el-Sheikh work programme on the Global Goal on Adaptation (GlaSS) marked a significant milestone in translating the GGA into concrete actions. The GlaSS defines global adaptation targets, metrics and indicators that countries can use or adapt to assess progress toward the GGA. This paper was developed to respond to the global momentum to take urgent action on assessing adaptation progress in the agriculture sectors. At COP27, held in Egypt in 2022, the importance of adaptation in agriculture was further emphasized with the adoption of the new decision on the Sharm el-Sheikh joint work on implementing climate action on agriculture and food security. Likewise, the UNFCCC conference elevated the status of loss and damage, resulting in a breakthrough agreement on the Loss and Damage Fund for vulnerable countries. FAO is currently working closely with countries and the UNFCCC Secretariat to advocate for better integration of agriculture and food security in the international agenda, shaping the adaptation and disaster risk reduction response.

This publication aims to provide guidance to countries, development actors and UNFCCC bodies in utilizing robust and context-specific metrics derived from the Sustainable Development Goals and Sendai Framework for Disaster Risk Reduction (SFDRR) that are meaningful and relevant to national and local adaptation, can be aggregated and can serve as proxies to capture the diversity and multidimensional aspects of adaptation in the agriculture sectors. It also aims to reduce the burden of reporting under various frameworks.

By supporting adaptation reporting under the Enhanced Transparency Framework of the Paris Agreement, this paper will aid member countries in implementing FAO's recently adopted Strategy on Climate Change (2022-2031), which guides countries in fulfilling their climate





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commitments and reporting to UNFCCC, including through country support for monitoring and evaluation.

As we strive to build resilient agrifood systems and a sustainable world to address the climate crisis, FAO is engaged in developing and providing countries with the latest knowledge, scientific evidence and most efficient tools to take concrete actions towards the sustainable transformation and adaptation of agrifood systems, ensuring no one is left behind.



Zitouni Ould-Dada

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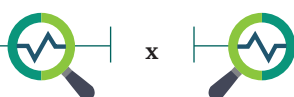
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# Abbreviations and acronyms

<b>A-BTR</b>	adaptation section of the biennial transparency reports
<b>BTR</b>	biennial transparency reports
<b>CCA</b>	climate change adaptation
<b>COP</b>	Conference of the Parties
<b>DRR</b>	disaster risk reduction
<b>ETF</b>	Enhanced Transparency Framework
<b>GDP</b>	gross domestic product
<b>GGA</b>	Global Goal on Adaptation
<b>GHG</b>	greenhouse gas
<b>GlaSS</b>	Glasgow-Sharm el-Sheikh work program on the Global Goal on Adaptation
<b>GST</b>	Global Stocktake
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>KJWA</b>	Koronovia Joint Work on Agriculture
<b>M&amp;E</b>	monitoring and evaluation
<b>MPGs</b>	modalities, procedures and guidelines
<b>NAP</b>	National Adaptation Plan
<b>NDC</b>	nationally determined contribution
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>SDG</b>	Sustainable Development Goal
<b>SFDRR</b>	Sendai Framework for Disaster Risk Reduction
<b>SFM</b>	Sendai Framework Monitor
<b>UNDRR</b>	United Nations office for Disaster Risk Reduction
<b>UNEP-WCMC</b>	United Nations Environment Programme - World Conservation Monitoring Centre
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change









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# Summary

This document seeks to contribute to the international commitment to better understand, assess, conceptualize and achieve the Global Goal on Adaptation (GGA). The Paris Agreement stresses the need to monitor and draw lessons from adaptation and establishes a periodic Global Stocktake of progress in adaptation outcomes. With assessing adaptation progress at country level increasingly recognized as an important element of climate planning, countries are tracking adaptation through national, sectoral and subnational climate and development monitoring and evaluation (M&E) systems. This paper aims to demonstrate the pertinence of using a selection of metrics when reporting on adaptation in the agriculture sectors under the Paris Agreement and the benefits of aligning reporting efforts under complementary international agreements such as the United Nations Framework Convention on Climate Change (UNFCCC), the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction (SFDRR).

The paper's scope is to effectively guide ongoing local and national efforts to identify both what to track - by providing conceptual clarity of the three elements of the GGA - and how to track it, by outlining appropriate methodologies and metrics that they can use, such as agriculture-specific Sustainable Development Goal (SDG) and SFDRR indicators. This work builds on the advantage that FAO is the designated custodian agency for 21 SDG indicators (under SDG 2, 5, 6, 12, 14 and 15) and acts as a contributing agency for five more.<sup>1</sup> As custodian agency, FAO has developed methodologies and data for 18 of these indicators and ensures that national data are comparable and aggregated at different levels.

Several countries have already taken steps towards this approach by exploring the linkages between adaptation priorities - under their nationally determined contributions (NDC) or National Adaptation Plans (NAPs) - and their contribution to the SDG achievements, for more aligned and effective policies. Likewise, the design of their national adaptation M&E systems would benefit from stronger synergies and complementarities with existing national reporting systems under other international agreements.

At the same time, under the Paris Agreement, there are ongoing negotiations around defining a collective and univocal concept of vulnerability, adaptive capacity and resilience, and how to adequately measure and assess adaptation progress in a way that captures the ample variety of context- and location-specific adaptation efforts across the globe. This paper aims to contribute to the international discourse on the methodologies and conceptual framework for operationalizing the GGA, while guiding countries on using metrics that are flexible, comparable and capture the multidimensional aspects of adaptation in the agriculture sectors, to create the basis for aggregated and collective reporting under the GGA.

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<sup>1</sup> SDGs 1.4.2, 1.5.2, 15.3.1, 15.6.1, 14.c.1.

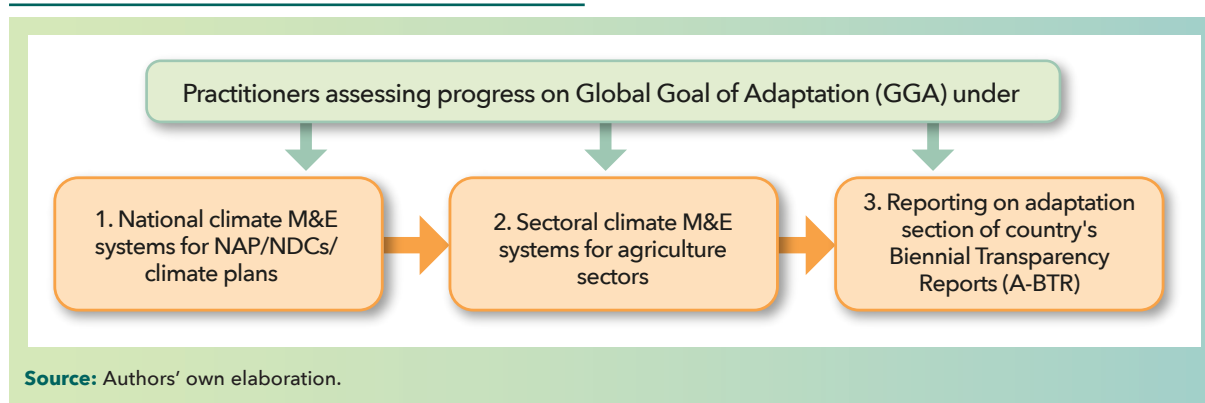


The paper starts by discussing and reflecting on the overlap in reporting under the Paris Agreement, the 2030 Agenda and the SFDRR, unpacking the key domains of the GGA. It then illustrates how countries can assess its three elements: vulnerability, resilience and adaptive capacity. It continues with an insight of how the data collected for the SDG and SFDRR indicators under FAO custodianship can inform the compilation of information to assess progress under the three elements of the GGA, and helps countries explore the practical implications of doing this when compiling information for adaptation reporting under the Paris Agreement and its Enhanced Transparency Framework (ETF). The paper concludes by demonstrating that being aware of the linkages between adaptation reporting and the potential use of selected SDG and SFDRR indicators can help reduce the burden of adaptation reporting.

## Who can use this document?

This document is targeted towards national decision-makers and planners, adaptation practitioners, officials from ministries of agriculture and environment – and their statistics departments – who are responsible for monitoring, evaluating and reporting on adaptation outcomes under a wide range of national and international mechanisms.

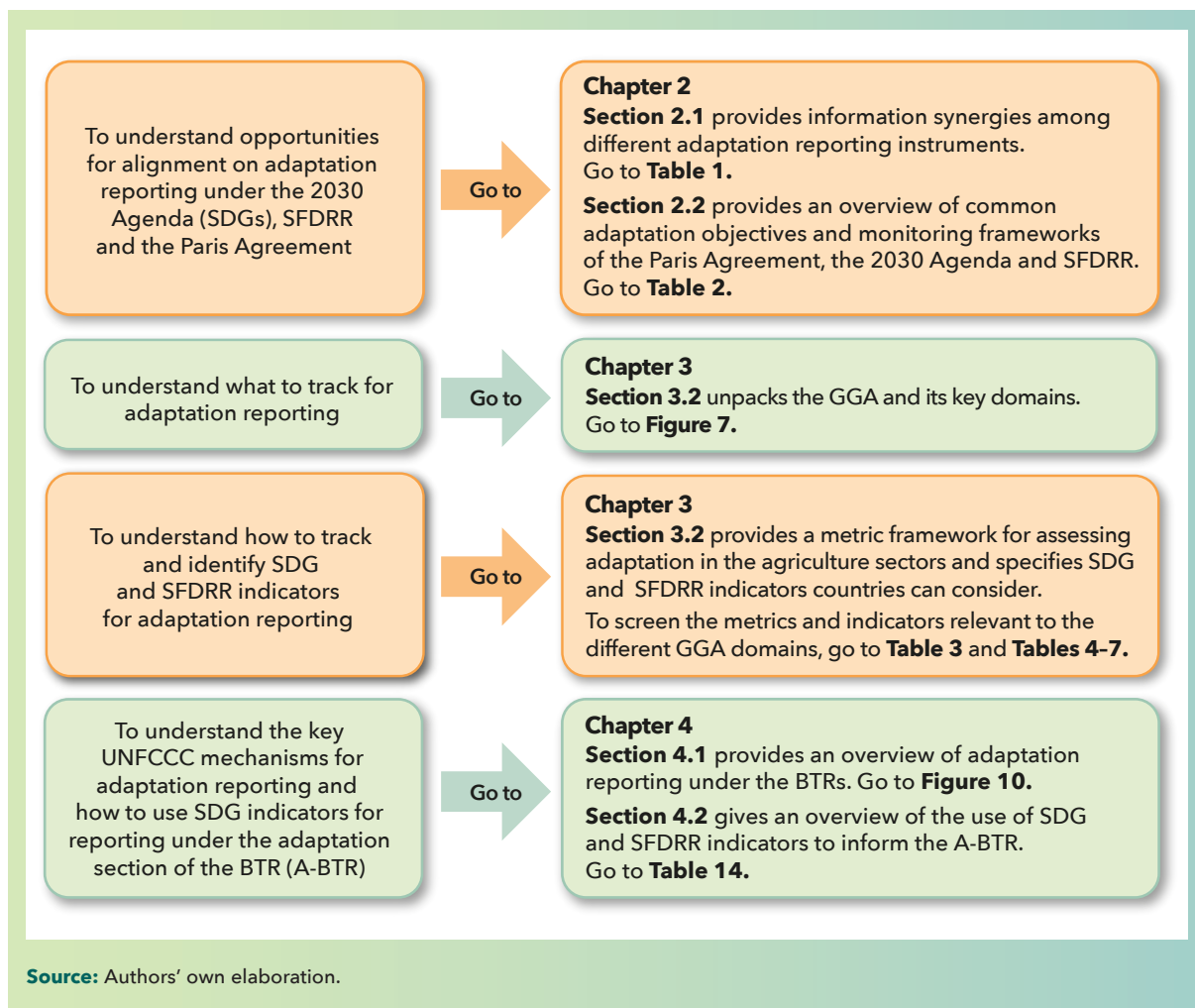
**FIGURE 1.** Who can use this document?



## How to use this document

The approach provided in this paper aims to facilitate national reporting on GGA outcomes, focusing on adaptation progress in the agriculture sectors. It effectively guides ongoing national efforts to identify what to track and how to track adaptation progress through the biennial transparency report (BTR) mechanism and/or adaptation reporting from national and sectoral M&E systems. Figure 2 provides an overview of the chapters of this paper that decision-makers can use to measure and report on agriculture-specific adaptation outcomes.

**FIGURE 2.** How to use this document







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# 1. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement set a Global Goal on Adaptation (GGA) under Article 7.1 for “enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response to climate change impacts” (UNFCCC 2016). Parties agreed the GGA to drive and enhance global adaptation ambition-setting and action to give an equal weight to the long-term goal of limiting global warming to 1.5 °C temperature, as referred to in Article 2. The Paris Agreement calls countries to assess and report their progress and needs for adaptation, the adequacy of their efforts and the support they need (UNFCCC, 2016). Under Article 13, it sets out the Enhanced Transparency Framework (ETF) with rules and procedures for monitoring and reporting climate action. The United Nations General Assembly also adopted two other international agreements – the 2030 Agenda for Sustainable Development and the SFDRR (2015–2030) – in 2015, to shape the global response to climate change, sustainable development and disaster risk reduction (DRR). Together with the Paris Agreement, they reinforce the global momentum to assess the performance of adaptation actions and provide a foundation for designing monitoring and evaluation (M&E) systems to monitor and report on climate and development outcomes. The three frameworks have parallel time horizons.

Assessing adaptation is imperative, but parties have yet to agree on how to define and measure the GGA. This is due to: intrinsic challenges and methodological difficulties in quantifying adaptation; a lack of universal metric to capture adaptation across different contexts; a lack of agreement on definitions of adaptation; insufficient resources and capacity for assessing adaptation progress; and challenges in aggregating and establishing ways to measure the goal collectively (see Box 1). This triggered the creation of the two-year Glasgow-Sharm el-Sheikh work programme on the GGA (GlaSS) at the 26th UNFCCC climate change conference (COP26) in 2021. The GlaSS aims to enhance understanding of the GGA and the methodologies, indicators, data, metrics, needs and support required for assessing progress towards it (UNFCCC, 2021c). Country submissions under the GlaSS noted overlaps between the three global agendas’ reporting requirements, reiterating the importance of learning from the reporting systems established under the 2030 Agenda and SFDRR and finding synergies with them to reduce the reporting burden.

Adaptation actions in the agriculture sectors<sup>2</sup> are key to achieving the GGA. Increasing climate variability and extremes, linked to climate change, negatively affect all dimensions

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<sup>2</sup> In this paper, ‘agriculture sectors’ refers to crop-based farming and livestock systems, including rangelands and pasturelands, forestry, and fisheries. The latter includes capture fisheries (fish caught from wild stocks in marine, coastal, offshore and freshwater ecosystems) and aquaculture (breeding, rearing and harvesting plants and animals in all types of aquatic environments). Forests are land spanning more than 0.5 hectares with trees higher than 5 metres and more than 10 percent canopy cover, or trees able to reach these thresholds in situ (FAO, 2017b).



of agriculture, food security and nutrition (FAO, 2021a). Human-induced warming has slowed the growth of agriculture productivity over the last 20–50 years, compromised crop yields, increased tree mortality, decreased sustainable yields of fisheries and negatively affected crop and harvest quality (IPCC, 2022). As such, climate change adaptation (CCA) in the agriculture sectors is a key objective for meeting the GGA. The Intergovernmental Panel on Climate Change (IPCC) indicates that a wide range of adaptation options can be effective for reducing climate impacts in different socioeconomic and geographical contexts, including cultivar improvements, community-based adaptation, agricultural diversification, climate services and adaptive ecomanagement in fisheries and aquaculture (IPCC, 2022). The agriculture and land use sectors are also crucial for meeting adaptation and mitigation targets set out in nationally determined contributions (NDCs), which are foundational vehicles for implementing the Paris Agreement. In 2021, updated NDCs showed an increase in ambition in the agriculture and land use sectors for both adaptation and mitigation, with 95 percent of NDCs referring to adaptation in agriculture sectors, compared to 92 percent in 2016 (FAO, 2021a). National Adaptation Plans (NAPs), established under the UNFCCC Cancun Adaptation Framework in 2010, seek to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience, and facilitate the coherent integration of CCA into new and existing policies, programmes and activities, particularly development planning processes and strategies, within all relevant sectors and at different levels, as appropriate (UNFCCC, 2012). As a result, national adaptation planning is evolving at country level, with a wider focus on the medium to long term and an emphasis on specific sectors. And because production in the agriculture sectors involves the careful management of natural resources and ecosystems – including land, water, biodiversity and genetic resources – adaptation activities and interventions to improve crop and livestock production, forestry, fisheries and aquaculture (FAO, 2017b) can make a significant contribution to the GGA at a national level. These actions, formulated in NDCs and sectoral NAPs, indicate that agriculture is a top priority for countries to meet their adaptation objectives. As such, it should be possible to assess the GGA by monitoring and evaluating adaptation performance of key climate-sensitive sectors such as agriculture.

Adaptation actions in the agriculture sectors are also uniquely placed to deliver on sustainable development and DRR goals. CCA is central to achieving sustainable economic, social and environmental development, particularly in the agriculture and land use sectors, where climate change can strongly affect decades of development efforts. The IPCC Special Report on Climate Change and Land highlights that under all greenhouse gas (GHG) emission scenarios, impacts on land, ecosystems, biodiversity and developmental well-being will have cascading effects across systems (IPCC, 2019a), while the UNFCCC joint work on implementation of climate action on agriculture and food security (decision -/CP.27) highlights that many approaches with high potential for adaptation and adaptation co-benefits related to land and food systems have significant positive direct and indirect links with biodiversity and ecosystem services, food security and the Sustainable Development Goals (SDGs). Adaptation and DRR both aim to reduce the adverse impacts of climatic



hazards by addressing drivers of vulnerability and exposure. They are integrated in the SDGs, which refer to building climate resilience, addressing climate hazards, ecosystem-based adaptation, access to water resources, conservation and biodiversity as foundations for achieving adaptation and sustainable development. Given their interconnectedness, the three agendas and their corresponding agreements represent an opportunity to simultaneously invest in rolling actions, harnessing the linkages and identifying SDG and SFDRR indicators under FAO custodianship<sup>3</sup> to assess adaptation outcomes, leveraging the mutual benefits of development and climate action.

When designing national adaptation M&E systems, governments should consider integrating adaptation reporting with measurable global SDG and SFDRR targets. Countries are advancing on the design of national and local M&E systems, but progress remains limited. According to the Adaptation Gap Report, of 196 countries, only 26 per cent have M&E systems in place and 36 per cent are developing a system; this limits the assessment of the effectiveness and adequacy of adaptation interventions (UNEP, 2021). Countries face unprecedented resource and capacity challenges when developing M&E systems. To ensure resource efficiencies and avoid both duplicating efforts and double-counting when reporting outcomes for development and adaptation, the three international agendas provide the foundation to align global reporting with national climate or development M&E systems that are both country-led and country-owned. Identifying adaptation metrics through the SDG and SFDRR indicators that are relevant to their own vulnerability, adaptive capacity and resilience profile can help countries overcome some of the challenges associated with assessing progress on adaptation action. The context-specificity of adaptation actions means that countries cannot monitor adaptation solely through the selection of global SDG and SFDRR indicators presented in this paper; rather, these provide a basis for starting to use the statistical data they have already collected through internationally established quantitative methodologies and standards to assess the status of SDG achievements and against the SFDRR framework (see Annex 4).

With this paper, FAO confirms its commitment to contribute to the global discussion on a suitable metrics and approaches for reviewing and aggregating progress towards the GGA, and to provide country guidance for reporting on adaptation in the agriculture and land use sectors under the adaptation section of the biennial transparency reports (A-BTR) of the ETF. This is in line with the FAO Strategy on Climate Change (2022-2031) and its aim to support the implementation of the Paris Agreement, including by supporting countries to set baselines and monitor and report on progress in their climate commitments (FAO, 2022).

This publication has been developed drawing on FAO's engagement in the international discourse on the GGA and the communication of adaptation information under the Paris Agreement. Key events that informed this work include the African Group of Experts Support

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<sup>3</sup> FAO is the designated custodian agency for 21 SDG indicators; this paper presents 25 indicators including 19 under FAO custodianship, 2 for which it is a contributing agency, and the 4 the most relevant under SDG 13 Climate Action.

Dialogue, the Partnership on Transparency in the Paris Agreement regional workshops, the UNFCCC Capacity Building Hub Transparency events, and the Glasgow-Sharm el-Sheikh work programme on the GGA. The paper builds on an extensive literature review and FAO's methodologies and publications, such as "Tracking adaptation in agriculture sectors, climate change adaptation indicators" (FAO, 2017a), "Guidance note: strengthening M&E for adaptation planning in the agriculture sectors" (2019), "Linking NDCs and the SDGs through agriculture: a methodological framework" (FAO, 2019a), and FAO's custodianship of the 21 SDG indicators (FAO, 2020).

The paper also builds on FAO's support to ministries in designing national adaptation M&E systems for their agriculture sectors in over ten countries. While progress is being made in identifying metrics and M&E systems for reporting on adaptation, challenges remain due to technical, financial, human resources, and data requirements. Trade-offs exist between aggregability and sensitivity to the national context, as well as between country-driven metrics and international monitoring frameworks. Technical assistance from FAO-UNDP initiatives like "Integrating Agriculture in National Adaptation Plans (NAP-Ag)" and "Scaling up Climate Ambition on Land Use and Agriculture through NDCs and NAPs (SCALA)", as well as the FAO-Global Environment Facility (GEF) Global Capacity-Building Towards Enhanced Transparency in the agriculture, forestry, and other land use (AFOLU) sector, has contributed to a better understanding of national and subnational adaptation priorities. These efforts have also highlighted the relationship between existing M&E systems, adaptation indicators for agriculture sectors, and the SDG indicators under FAO's custodianship.





**BOX 1.** Six challenges to address while performing adaptation M&E

- 1. Uncertainty in the main drivers of climate change vulnerability and resilience:** The uncertain and dynamic nature of the main drivers that influence climate change vulnerability and resilience make identifying adaptation targets and corresponding indicators complex. As a result, adaptation targets and indicators may not look different from development targets and indicators.
- 2. Long timeframes that stretch far beyond common programme cycles:** Climate change is an ongoing, long-term process that will unfold over many years, with significant time lags between interventions and measurable impacts. As such, practitioners tend to use metrics that quantify short-term outcomes.
- 3. Baseline changes over time:** In a more straightforward development context, baseline data gathered before project implementation would provide the starting point or benchmark against which to monitor the effectiveness of an intervention and measure achievements. But when it comes to climate change, natural and socioecological systems undergo continuous change over time, so the baseline data may not always be a sound point of reference. This is called the “shifting baseline” problem.
- 4. Global climate change and local adaptation:** Efforts to build resilience by promoting adaptation to the effects of climate change will vary radically between locations. Because the diverse range of adaptation contexts makes it difficult to effectively compare or aggregate results, there is no universal set of indicators or M&E approach.
- 5. Combining data and information from different sources:** To collect data for adaptation tracking, it may be necessary to combine data gathered for other purposes - for example, extracting information on sustainable development and natural resource management from national statistical surveys, reporting systems and datasets on relevant international frameworks. This may result in a mismatch of data types according to methodology, format, spatial or temporal scale, or granularity. In some cases, there is a risk of data overload, so monitoring processes should be kept simple. In others, countries may struggle to collect specific accurate, qualitative and quantitative data to allow proper quantification of adaptation. This is particularly so in the agriculture sectors, considering the complexity of production systems
- 6. High costs of data collection:** There are often limited available resources for collecting and analysing data and information on adaptation, leading to compromises on what can and should be monitored. At local level, data collection is difficult and costly, particularly for agricultural support services and local institutions. It is therefore advisable for countries to build tracking efforts on existing mechanisms and processes.

**Sources:** FAO. 2019. *FAO and the SDG Indicators: Measuring up to the 2030 Agenda for Sustainable Development*. [www.fao.org/3/a-i6919e.pdf](http://www.fao.org/3/a-i6919e.pdf); FAO. 2017. *Tracking adaptation in agriculture sectors- climate change adaptation indicators*. [www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1193260/](http://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1193260/); Bours, D., McGinn, C. & Pringle, P. 2014. *Twelve reasons why climate change adaptation M&E is challenging*. SEA Change CoP, Phnom Penh and UKCIP, Oxford. [www.ukcip.org.uk/wp-content/PDFs/MandE-Guidance-Note1.pdf](http://www.ukcip.org.uk/wp-content/PDFs/MandE-Guidance-Note1.pdf).





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## 2. Background, rationale and concepts

This chapter provides an overview of the UNFCCC policy context for communicating and reporting on adaptation, and the rationale for using SDG and SFDRR metrics for adaptation reporting in the agriculture and land use sectors, unpacking the interlinkages between adaptation, SDG and DRR agendas.

### 2.1 The Global Goal on Adaptation and the international policy context for adaptation transparency reporting

Assessing adaptation progress is an instrumental milestone under the provisions of the Paris Agreement. Article 7.1 establishes the GGA and Article 7.9 recognizes the importance of assessing adaptation progress towards achieving the key dimensions of the GGA.

To assess national and global progress on mitigation and adaptation commitments and collective progress under the Paris Agreement, Article 14 established the Global Stocktake (GST). With regard to adaptation, it aims to: recognize adaptation efforts of developing country; enhance the implementation of adaptation action, taking into account the adaptation communication; review the adequacy and effectiveness of adaptation and support provided for adaptation; and review overall progress towards achieving the GGA on a five-yearly basis, starting in 2023.

National adaptation reporting under the ETF will inform the GST, with the dual mandate of reviewing overall progress towards the GGA and recognizing national- and local-level enhanced adaptation actions. Figure 3 illustrates the main provisions of the Paris Agreement and the interlinkages between them, highlighting how national adaptation planning and communication will feed into the global assessment and reporting. Countries can voluntarily submit information on adaptation progress through the BTR under Article 13, starting in 2024. The BTR is designed as an important vehicle for adaptation reporting, alongside national and adaptation communications.<sup>4</sup>

Countries can report success in adaptation actions in the agriculture sectors if they can assess progress under the following key domains of the GGA:

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<sup>4</sup> The adaptation communication was established in Article 7 and subsequent Conference of the Parties serving as the meeting of the Parties to the Paris Agreement decisions, to: enhance the visibility and profile of adaptation, and balance with mitigation; provide input to the GST; strengthen adaptation action and support for developing countries; and enhance learning and understanding of adaptation needs and actions. Countries can submit and update them as a component of – or in conjunction with – other communications, including NAPs, NDCs, national communications and/or BTRs, or as a standalone document. They should submit them in time to inform each GST (UNFCCC, 2021a).

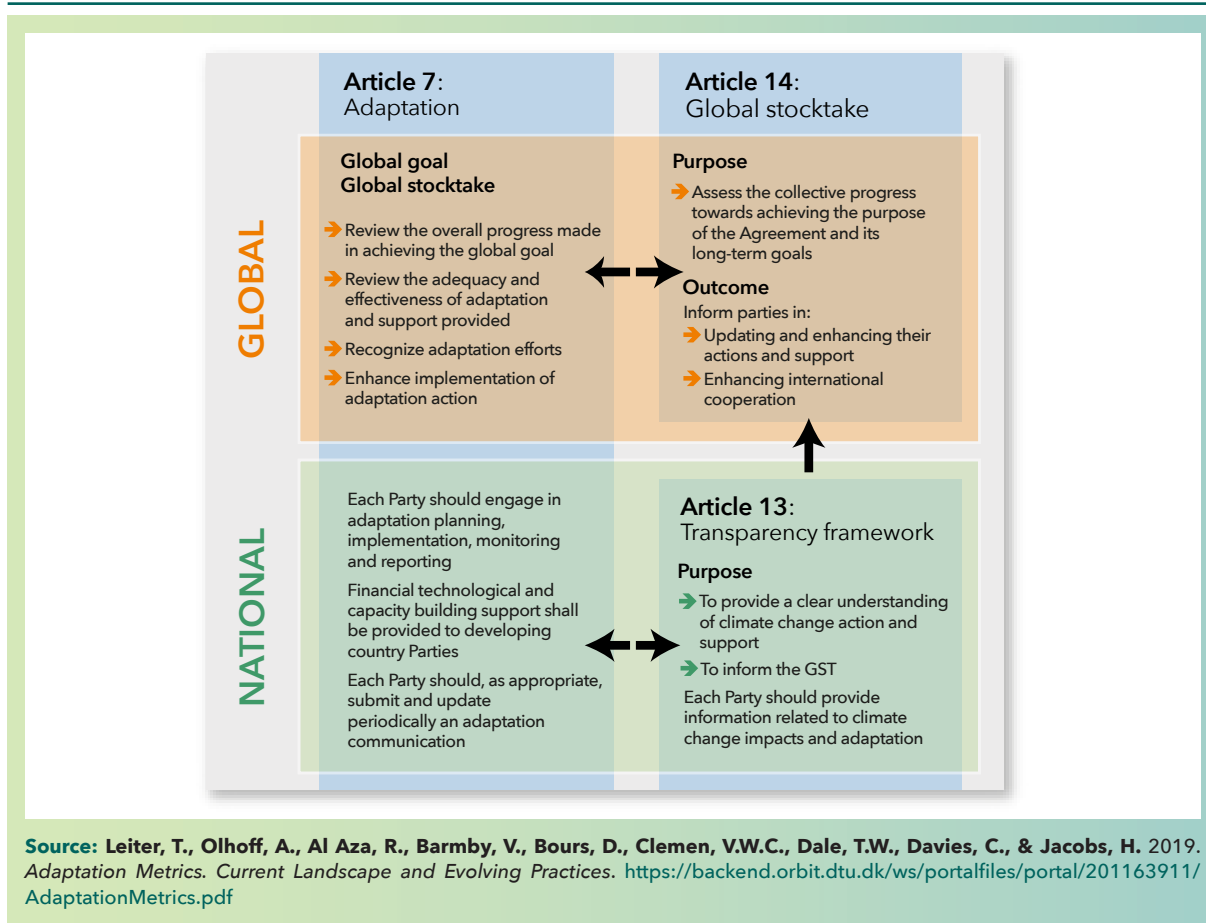




- Reducing vulnerability to climate change or the underlying factors that determine farmers’ and communities’ susceptibility to climate risks and hazards.
- Strengthening climate resilience and adaptive capacity, or improving a system’s ability to respond, recover and address the adaptation deficit.
- Enhancing sustainable development impacts, by ensuring adaptation is delivering development benefits in the context of climate hazards and variability.

Establishing the GGA has already provided significant visibility to the adaptation agenda by bringing it on a par with mitigation. These domains are the cornerstones for developing country-specific adaptation priorities and targets, against which they can assess adaptation performance. Agriculture-specific metrics for assessing GGA achievements could therefore integrate and capture how well short- medium - and long-term adaptation efforts help improve resilience and reduce vulnerability to climate risks and keep agriculture development on track in the face of climate risks and hazards.

**FIGURE 3.** Key adaptation provisions under the Paris Agreement and linkages between them



Adaptation reporting under the ETF, GGA, NAPs, NDCs and the GST provides an opportunity to establish and advance M&E systems and methods for assessing adaptation. Article 13 of the Paris Agreement contains additional provisions on adaptation reporting under the ETF and its modalities, procedures and guidelines (MPGs FCCC/PA/CMA/2018/3/Add.2). Adopted at COP24, the MPGs provide more robust, clear and effective principles to collect, manage and share relevant and high-quality data to inform and advance climate action. Under the ETF, countries will submit a BTR, with the scope of including voluntary adaptation information on nine areas (see chapter 4 of the MPGs for the ETF for action and support for the transparency framework for action and support referred to in Article 13 of the Paris Agreement). This includes planning-oriented information for an overview of national adaptation priorities, strategies, policies, plans, goals and actions, and reporting-oriented information for an overview of progress and results achieved against adaptation goals and strategies (Dale, Christiansen and Neufeldt, 2020). The GGA also includes national planning instruments, such as national development plans, NDCs and NAPs, in which countries set out their strategic priorities, planned actions and adaptation goals for addressing climate risks, and communicate with the UNFCCC. The Paris Agreement identifies all these instruments as vehicles for adaptation reporting; and the UNFCCC's Adaptation Committee further outlines linkages and potential information synergies between these vehicles (see Table 1), urging the need for a collective arrangement for adaptation M&E.

Assessing adaptation under the GGA, GST, NDCs, NAPs and BTRs provides a unique opportunity to create an evidence-based, collective M&E system on adaptation. This is a chance for countries to agree on how to: assess national and global progress in implementing adaptation actions; recognize developing countries' adaptation efforts; review the adequacy and effectiveness of the current level of adaptation and support; gather lessons learned and good practices to enhance adaptation actions; share challenges and barriers to adaptation to identify capacity-building and technology needs; and review overall progress towards achieving the GGA (UNFCCC, 2022).



**TABLE 1**

Information synergies between different adaptation reporting instruments

Type of information	Adaptation reporting instruments				
	Planning-oriented instruments		Reporting-oriented instruments		
	NAPs	NDCs	National communications (non-Annex 1 countries)	BTRs (MPGs)	Adaptation communications
<b>Background</b>					
Adaptation-related national circumstances, development priorities, institutions, governance, laws, policies	x	x	x	x	x
Observed and expected impacts, risks, trends and hazards	x	x		x	x
Vulnerability to adverse effects/vulnerability assessments	x	x	x	x	x
<b>Ex-ante (forward-looking information)</b>					
Contribution of adaptation to other international frameworks	x				x
Adaptation policies, plans, goals, objectives, priorities	x	x	x	x	
Implementation of adaptation actions and plans			x	x	x
Integrating climate change into development efforts and other policies	x	x	x		
Gender-responsiveness and integration of science, traditional, Indigenous and local knowledge	x			x	x
Barriers, challenges and gaps related to implementation	x		x	x	x
<b>Ex-post (backward-looking information)</b>					
M&E/adaptation-related systems and indicators	x	x	x	x	x
Implementation support needed or received					x
Cooperation, good practices, experiences and lessons learned				x	x
Information on loss and damage		x		x	

**Sources:** Adapted from **UNFCCC**. 2018. *Further guidance in relation to the adaptation communication, including, inter alia, as a component of nationally determined contributions, referred to in Article 7, paragraphs 10 and 11, of the Paris Agreement*. FCCC/PA/CMA/2018/3/Add.1. [https://unfccc.int/sites/default/files/resource/9-CMA.1\\_English.pdf](https://unfccc.int/sites/default/files/resource/9-CMA.1_English.pdf); **UNFCCC**. 2021. *Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication*. <https://unfccc.int/documents/279284>.

**Note:** Under the Paris Agreement, there are no guidelines on NDC compilation, but the FAO's global overview of the NDCs indicates that NDC adaptation components generally contain many of the information areas that are relevant to the ETF transparency requirements (FAO, 2020. Crumpler, K. & Meybeck, A. *Adaptation in the agriculture sectors: leveraging co-benefits for mitigation and sustainable development*. Rome, FAO.).



## 2.2 Adaptation within the Sustainable Development Goals and disaster risk reduction objectives

Climate adaptation efforts are closely interlinked with sustainable development and DRR objectives. This section outlines how the three international agreements adopted in 2015 – the Paris Agreement, 2030 Agenda and SFDRR – jointly reinforce the global momentum to assess how well adaptation actions are performing.

### 2.2.1 Climate change adaptation and the Sustainable Development Goals

Climate change is undermining sustainable development progress. This is particularly evident in the agriculture and land use sectors, where climate change is projected to have longstanding negative impacts. The IPCC Special Report on Climate Change and Land highlights that under all GHG emissions scenarios, impacts on land, ecosystems, biodiversity and developmental well-being will have cascading effects across systems (IPCC, 2019a).

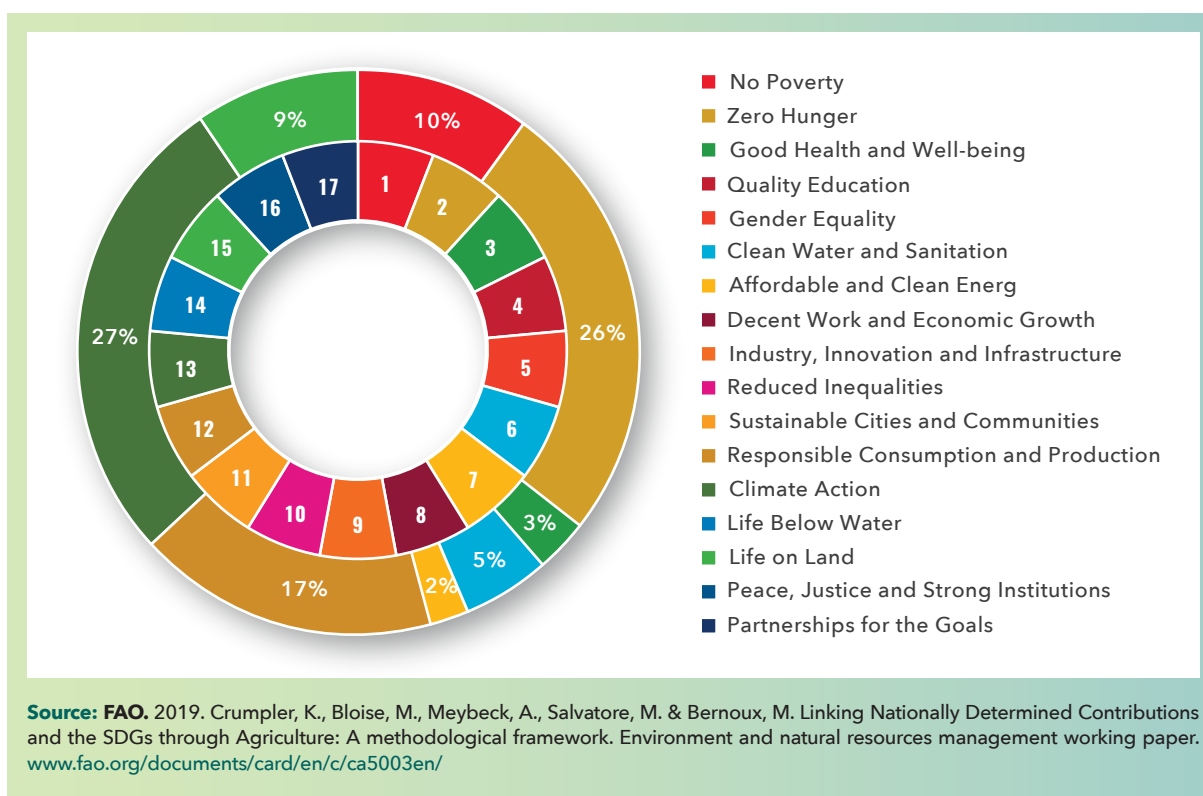
Sustainable land management practices will reduce land- and food-related vulnerabilities and ensure positive economic returns, so CCA is central to achieving sustainable economic, social and environmental development, particularly in the agriculture and land use sectors. The 2030 Agenda commits the international community to end poverty and hunger and achieve sustainable development in all three dimensions – social, economic and environmental – encompassing the 17 SDGs, 169 targets and 232 indicators. But multiple climate change threats are undermining progress towards these goals. A framework for adaptation to advance and safeguard the SDGs (Fuldauer *et al.*, 2022) shows that nearly all the 169 SDG targets are at threat from near-term climate change.

A recent analysis by the United Nations office for Disaster Risk Reduction (UNDRR) that uses a mapping tool to assess the implications of seven climate indicators on the SDGs shows that rising carbon emissions and connected temperature change will put the achievement of various goals at risk. For example, higher carbon dioxide concentrations threaten food security, particularly SDG 2.1.2 (percentage of severe food insecurity). As carbon dioxide increases, the increase in photosynthesis speeds up agricultural yields over a short period, reducing grain protein concentration and nutrient content, impacting food security (UNDRR, 2022).

Marine and biodiversity loss are also directly connected to temperature increase and extreme events, compromising ocean conservation and sustainable use (SDG 14) and the management of forests, land degradation and biodiversity loss (SDG 15). Changes in species composition due to temperature change could lead to the loss of entire ecosystems. And when combined with water scarcity and extreme events, biodiversity loss poses risks to agriculture and fishing and the communities that depend on them (SDG 1), compromising food security (SDG 2).

Adaptation and climate-resilient food systems are central to achieving the SDGs. Adaptation actions in the agriculture sectors and ecosystems can help achieve targets for 13 of the 17 SDGs.

**FIGURE 4.** Degree of convergence between climate actions in the agriculture sectors and SDGs in Central Asia



At sector level, ecosystem adaptation alone - in grasslands, forests, cropland, wetlands and so on - can help safeguard more than 60 percent of all SDG targets. SDG 13 aims to urgently address climate change, and adaptation is integrated across a wide range of SDGs. This is demonstrated by an FAO analysis, which shows the degree of alignment between NDC climate actions and SDG targets by screening the climate actions in all NDCs and linking them to one or more of the SDG targets (FAO, 2019a). Overall, it finds the greatest areas of convergence between the NDCs in the agriculture sectors and SDG 13 (Climate Action), SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), SDG 1 (No Poverty), SDG 15 (Life on Land) and SDG 6 (Clean Water and Sanitation). The most potential for aligning the three agendas is in climate actions that target biodiversity and ecosystems, followed by water resources, land resources, forestry and land use, socioeconomics and well-being (FAO, 2019a; see Figure 4).

Two SDGs refer to climate resilience and adaptation:

- SDG 1 (end poverty in all its forms everywhere) which aims to build the resilience of the poor and vulnerable and reduce their exposure and vulnerability to climate-related extreme events.



- SDG 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) which aims to ensure sustainable food production systems and implement resilient agricultural practices that strengthen capacity to adapt to climate change.

Two SDGs explicitly indicate the importance of addressing climate-related hazards and disasters:

- SDG 15 (managing forests, land degradation and biodiversity loss) which aims to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.
- SDG 14 (conserve and sustainably use the oceans) which aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development and address the impacts of ocean acidification.

The following SDGs have a strong focus on ecological resilience and protection and restoration of ecosystems and their services, a vital response in adaptation:

- SDG 6 (ensure availability and sustainable management of water and sanitation for all) which aims to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes – for example, building water-related infrastructure and/or promoting desalinization increase drought preparedness and adaptive capacity for water management in response to reduced levels of precipitation (FAO, 2020).
- SDG 14 (conserve and sustainably use the oceans) which aims to sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and to act for their restoration to achieve healthy and productive oceans – for example, mangrove and salt marsh restoration acts as a buffer against damage to coastal communities and provides biodiversity co-benefits by supporting fish nurseries (FAO, 2020).
- SDG 15 (managing forests, land degradation and biodiversity loss) which aims to ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, particularly forests, wetlands, mountains and drylands, in line with obligations under international agreements – for example, protecting forest areas also protects ecosystem services, such as flood management (FAO, 2020).

Many SDGs underscore conservation and sustainable biodiversity and genetic resource use as a building block for ensuring adaptability and resilience in the face of climate change, including:

- SDG 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) which aims to maintain the genetic diversity of seeds, cultivated



plants, and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at national, regional and international levels.

- SDG 14 (conserve and sustainably use the oceans) which aims to increase scientific knowledge, develop research capacity and transfer marine technology to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing states (SIDS) and least developed countries (LDCs).
- SDG 15 (managing forests, land degradation and biodiversity loss) which aims to take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and protect and prevent the extinction of threatened species - for example, protecting critical habitats for vulnerable species and preserving natural corridors to enable species migration helps maintain ecosystem, species and genetic diversity (FAO, 2020).

The SDGs also highlight the importance of ensuring availability of water and productive land - a fundamental condition for adaptation - particularly:

- SDG 1 (end poverty in all its forms everywhere) which aims to ensure that all men and women, particularly the poor and the vulnerable, have equal access to basic services, ownership and control over land.
- SDG 2, (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) which aims to double the agricultural productivity and incomes and access to land for small-scale food producers, particularly women, Indigenous Peoples, family farmers, pastoralists and fishers.
- SDG 5 (achieve gender equality and empower all women and girls) which aims to undertake reforms to give women equal rights to economic resources, and access to ownership and control over land.
- SDG 6 (ensure availability and sustainable management of water and sanitation for all) which aims to substantially increase water use efficiency across all sectors, ensure sustainable withdrawals and freshwater supply to address water scarcity, and implement integrated water resources management.

### ***2.2.2 Climate change adaptation and disaster risk reduction***

CCA and DRR are similarly interconnected. While their broad objectives are similar, their differences and linkages are not straightforward. Both seek to protect social and environmental systems from climate-related risks, reduce underlying vulnerabilities and build resilience to immediate and long-term climate risks. Originating from societies' historical need to prepare and respond to threats, and reduce the possibility of hazards transforming into disasters, DRR encompasses a variety of risks, from earthquakes to tsunamis, volcano eruptions and those related to climate. DRR deals with high uncertainty of risk occurrence,





but with predictions and forecasts largely based on historical data – that is, the regularity of occurrence of similar events in the past – risk management under CCA, with its focus on new future risks, can support more robust disaster risk management practices.

CCA is about building the capacity of people, societies and ecosystems to adapt to changing climate conditions, including extreme events and slow-onset environmental change. Despite their differences, CCA and DRR are complementary, as they share an understanding of the concepts of risks and resilience, and foresee similar actions for reducing vulnerability, strengthening adaptive capacity and reducing direct exposure through long-term, self-sustaining, community- or ecosystem-based measures, as well as measures to help communities adapt to, protect against and prepare for risks and hazards (FAO, 2019b).

In the agrifood sectors, where climate-related risks are most prevalent, DRR and CCA planning and actions can incrementally support and reinforce each other. So, it is important to consider and realize both types of strategy to address short- and long-term challenges, from supporting ecosystems and ecosystem services to address environmental change, to providing humanitarian support in case of disaster, and developing – and increasing – the climate resilience of underlying socioeconomic systems.

They also share common reporting frameworks. SFDRR monitoring is through voluntary self-assessment on the Sendai Framework Monitor (SFM).<sup>5</sup> Countries can use this online platform to report on progress against the 7 global targets and 38 indicators, and there are options to customize national indicators to measure domestic progress against their own SFDRR priorities. The Organisation for Economic Cooperation and Development (OECD) underscores that the SFM focuses on promoting a coherent approach to adaptation, DRR and sustainable development, with Target E calling for an increase in countries with national and local DRR strategies. An important element in monitoring progress towards this target is that countries promote policy coherence that is relevant to DRR, climate change, sustainable development and poverty eradication – and therefore aligns with both the Paris Agreement and SDGs (OECD, 2020, United Nations Climate Change Secretariat, 2017).

Using SFDRR indicators to assess adaptation outcomes can unpack success by measuring the extent to which actions protect social and environmental systems from climate-related risks, reduce underlying vulnerabilities and build climate resilience to immediate and long-term climate risks.

In summary, as emphasized by the UNFCCC (2018), the Paris Agreement, SDG and SFDRR “collectively paved the way for [...] mainstreaming of climate change adaptation into both development and disaster risk reduction activities”. This is also reflected in their provisions for reporting, as illustrated in Table 2.

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<sup>5</sup> <https://sendaimonitor.undrr.org>





**TABLE 2**

Comparing the Paris Agreement, 2030 Agenda and SFDRR: common objectives related to adaptation, sustainable development and DRR

	Paris Agreement	2030 Agenda (SDGs)	SFDRR
<b>Objectives</b>	Hold the increase in global average temperature to well below 2 °C and pursue efforts to limit it to 1.5 °C (mitigation) Increase the ability to adapt to the adverse impacts of climate change (adaptation) Make finance flows consistent with a pathway towards low GHG emissions and climate-resilient development (Article 2)	Contribute to achieving sustainable development Serve as a driver for implementation and mainstreaming	Substantially reduce disaster risk and losses in lives, livelihoods, health, and in economic, physical, social, cultural and environmental assets
<b>Quantitative goals and targets</b>	Mitigation quantitative target (well below 2 °C and pursuing efforts to 1.5 °C) The GGA is qualitative Countries define their own targets (NDCs)	17 global goals with several targets each Countries may define additional national targets	7 global targets Countries may define additional national targets
<b>Purpose of monitoring</b>	GST: Assess collective progress towards achieving the purpose of the Paris Agreement (Article 14) EFT: Track progress towards achieving Parties' adaptation actions (Article 13)	Measure global progress towards achievement of the SDGs and targets	Measure global progress in implementing the 7 targets
<b>Adaptation and DRR objectives mentioned</b>	Articles 7 and 8 explicitly focus on adaptation, DRR and sustainable development objectives. In particular: Article 7.1: Enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change, with a view to contributing to sustainable development Article 8.1: Avert, minimize and address loss and damage associated with the adverse effects of climate change, extreme weather events and slow-onset events	Climate action and DRR are cross-cutting issues and mentioned in: SDG 1 No Poverty SDG 2 Zero Hunger SDG 5 Gender Equality SDG 6 Clean Water and Sanitation SDG 11 Sustainable Cities and Communities SDG 13 Climate Action SDG 14 Life Below Water SDG 15 Life on Land	Paragraph 13 recognizes climate change as a driver of disaster risk and points to the opportunity to reduce disaster risk in a meaningful and coherent manner

**Sources:** Adapted from **GIZ**. 2017. *Synergies in monitoring the implementation of the Paris Agreement, the SDGs and the Sendai Framework*. Climate Change Policy Brief. [https://www.adaptationcommunity.net/wp-content/uploads/2017/11/giz2017-en-cc-policy-brief-synergies-PA\\_SDG\\_SF.pdf](https://www.adaptationcommunity.net/wp-content/uploads/2017/11/giz2017-en-cc-policy-brief-synergies-PA_SDG_SF.pdf); **OECD**. 2020. Common ground between the Paris Agreement and the Sendai Framework: climate change adaptation and disaster risk reduction. OECD Publishing, Paris. [https://www.oecd-ilibrary.org/development/climate-change-adaptation-and-disaster-risk-reduction\\_3edc8d09-en](https://www.oecd-ilibrary.org/development/climate-change-adaptation-and-disaster-risk-reduction_3edc8d09-en).

### 2.2.3 Benefits of aligning adaptation reporting efforts under the three agreements

The interconnectedness of the three agendas' objectives also indicates a strategic and pragmatic opportunity to enhance the scale and sustainability of their impact, including by capturing, reporting and updating commitments and progress towards the GGA, national targets defined NDCs and NAPs, the 17 SDGs and the 7 SFDRR global targets (GIZ, 2017). The Paris Agreement also stresses that adaptation reporting needs to avoid creating additional burden for developing countries (Article 7.10).

When designing national adaptation M&E systems, integrating adaptation reporting with SDG and SFDRR global measurable targets and corresponding indicators would allow countries to leverage existing statistical information, methodologies for data collection and reporting



systems (see Annex 4 for FAO SDG data sources). Using SDG and SFDRR indicators as proxies for adaptation metrics that are relevant to national vulnerabilities, adaptive capacities, resilience, policy goals and targets can help countries overcome methodological challenges, data constraints and resource and capacity issues related to monitoring, evaluating and reporting adaptation progress.

A first step towards aligning adaptation assessment under the three agendas is identifying metrics that countries can use to measure adaptation in the agriculture sectors within the key GGA domains, without prescribing universal indicators. As suggested by Craft and Fisher (2018), measuring adaptation through broader domains that individual countries select as relevant to their own adaptation efforts would support the dual objectives of accountability and learning from adaptation implementation. By allowing countries to bring in relevant national data from different sectors, this approach balances the context-specificity needed to capture the multisectoral aspects of adaptation in agriculture with the need to combine and aggregate information under the GST.

Both the SDGs and SFDRR have measurable global-level targets with corresponding indicators, which countries may complement with national indicators. The Paris Agreement, on the other hand, has no universally accepted global definition of how to quantify and measure adaptation progress, no clear definition of how to compare across contexts, sectors and countries, and no indication on how to establish baselines and targets. Countries identify their own, national-level adaptation targets that are relevant to the three components of the GGA and communicate these to the UNFCCC through their NDCs, NAPs and adaptation communications. Countries have also started to frame national adaptation M&E systems around an adaptation strategy or plan, such as Kenya's National Performance Benefit Measurement Framework and the Philippines' Results-Based M&E system, or around sectors, as in the case of Uganda's Performance M&E Framework for the Agriculture sectors NAP (FAO and UNDP, 2019). In these, they use a combination of quantitative and qualitative indicators that are relevant to the GGA. Many countries also explore linkages between NDC adaptation priorities and their contribution to the SDG achievements, and how to reflect these in their national M&E systems. Several are collecting and synthesizing information from a variety of sources to acquire an understanding of progress made on adaptation under the Paris Agreement (UNFCCC, 2021a).

The Adaptation Committee recognizes that the top-down assessment approaches established by the SDGs and SFDRR and the Paris Agreement's bottom-up approach could help assess collective progress towards global goals. Although full and complete harmonization between the three agendas may be neither feasible nor useful, some degree of synergy could be beneficial (UNFCCC, 2021a). The Koronovia Joint Work on Agriculture (KJWA)<sup>6</sup>

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<sup>6</sup> A landmark decision adopted in 2017 at COP23, the KJWA recognizes agriculture's unique potential in tackling climate change. As the only agenda item to focus on agriculture and food security under the UNFCCC, the Koronovia Decision addresses six interrelated topics on soils, nutrient use, water, livestock, adaptation assessment methods, and the socioeconomic and food security dimensions of climate change across the agriculture sectors.



also recognizes the benefits of an integrated framework for assessing adaptation under its Topic 2(b) - Methods and approaches for assessing adaptation, adaptation co-benefits and resilience - where countries stressed the need for a coherent framework of methods and indicators to track adaptation to reduce the reporting burden, facilitate the aggregation of data for reviewing the adequacy and effectiveness of adaptation, and support progress towards the GGA (FAO, 2019c, 2019d). Country submissions under UNFCCC decision 4/CP.23 underscored the need to develop a common approach, emphasizing differentiated smart and user-friendly indicators and metrics that multiple actors can use at different scales, considering local characteristics and conditions (UNFCCC, 2019).

**BOX 2. Benefits of using SDG and SFDRR indicators for assessing GGA progress in the agriculture sectors**

- ▶ Overcoming data constraints: baseline, basic statistical data availability.
- ▶ Facilitating comparison and aggregation at different scales.
- ▶ Reducing the reporting burden under different international obligations.
- ▶ Improving M&E capacity by tapping into existing methodologies, training resources, indicators that are already widely tested and applied, and regional and national data compiled by FAO to build institutional capacity for reporting on these indicators.



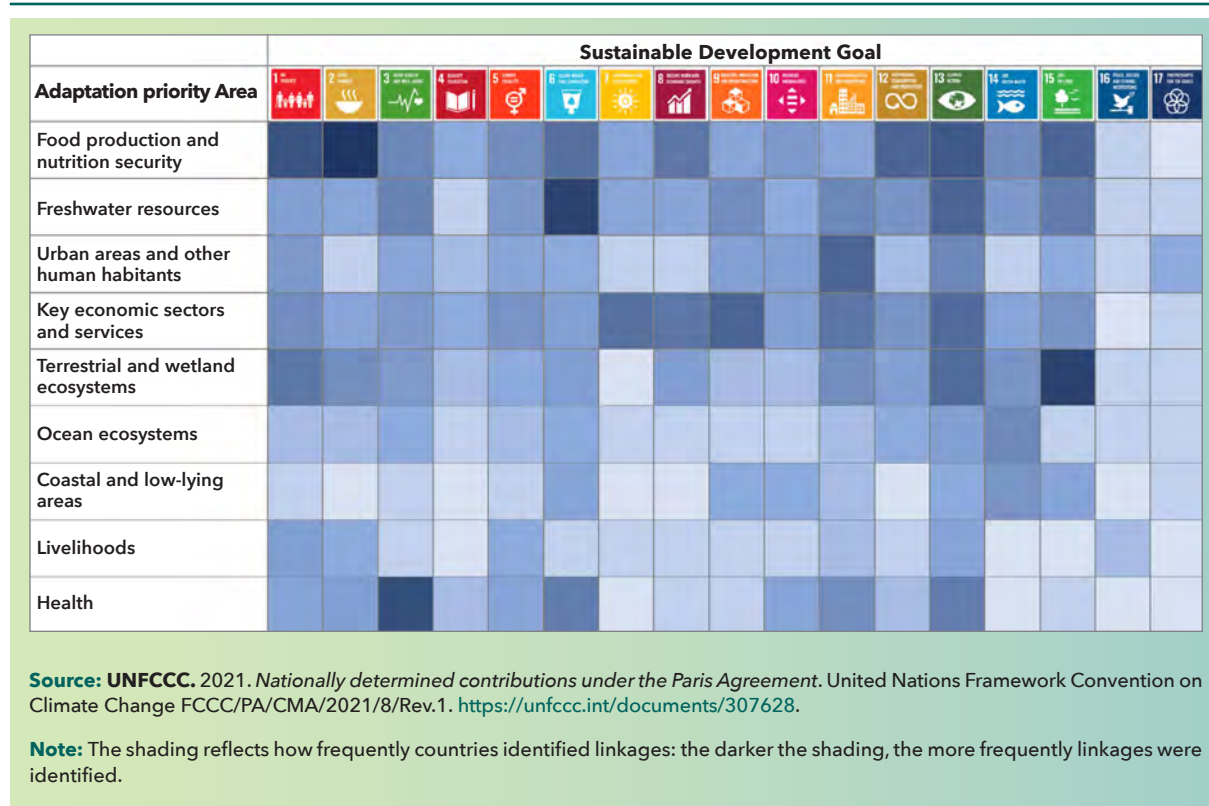
Using SDG and SFDRR indicators as proxies for assessing and appraising levels of climate risk exposure, vulnerability and adaptive capacities makes sense as these themes feature in multiple SDGs beyond SDG 13, as confirmed by FAO's (2019a) description of 1,700 potential climate action and sustainable development pathways in national agriculture sectors, extracted from NDCs and mapped across the 17 SDGs. Using SDG and SFDRR indicators under FAO custodianship can also help countries compile information under the different elements of the MPGs (see Table 14), while ensuring national data are comparable and aggregated at different levels. The key principles are to:

- Seek synergies between the three agendas to measure national progress on adaptation while being aware that selected SDG and SFDRR indicators are meaningful proxies for adaptation.
- Balance context-specificity by considering the multisectoral aspects of agriculture with the need to combine and collate information under the GST.

- Select SDG and SFDRR indicators that are relevant to the country's vulnerability, adaptive capacity and resilience profile and their policy goals and targets.
- Track selected SDG and SFDRR indicators against climate variables.

Several countries are already reporting on how adaptation actions planned under the Paris Agreement may also contribute to the objectives of related international frameworks and conventions, and tapping this momentum would be beneficial. The 2021 NDC Synthesis Report describes how NDCs reflect synergies and connections between the 2030 Agenda and SFDRR (see Figure 5), with some countries highlighting how specific adaptation actions contribute to individual SDGs and pursuing a coherent approach to monitoring adaptation progress and SDG achievements (UNFCCC, 2021b). For example, Rwanda's (2020) NDC presents a summary of prioritized sector adaptation interventions, corresponding indicators and alignment with relevant SDGs, while Cambodia's (2020), Malawi's (2021) and Namibia's (2021) NDCs all present an analysis on how their adaptation actions can impact the 2030 Agenda, screening each adaptation measure against SDG attainment.

**FIGURE 5.** Synergies between countries' efforts in NDC adaptation priority areas and towards SDGs





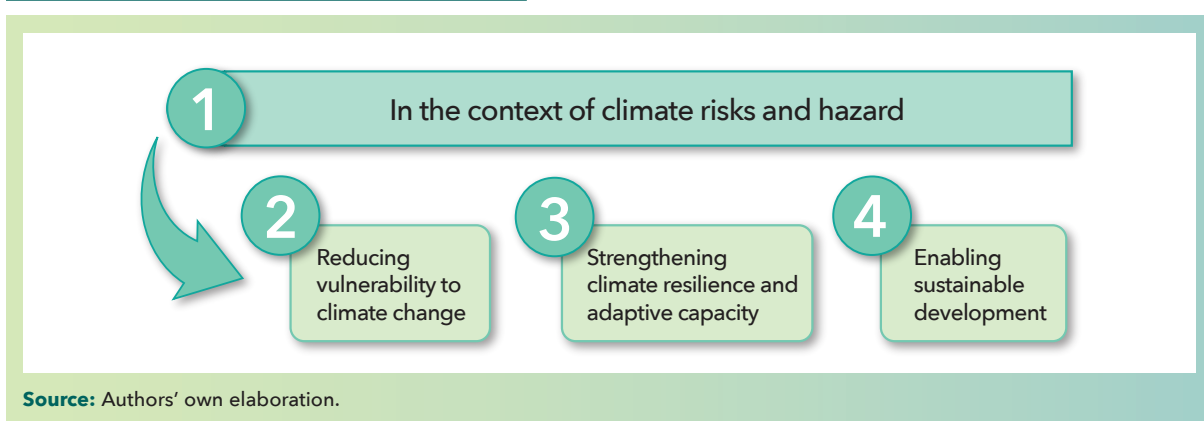


# 3. Using Sustainable Development Goal indicators to assess the Global Goal on Adaptation

## 3.1 Key Global Goal on Adaptation concepts and framework

Adaptation actions aim to address the impact of climate change by reducing vulnerability, enhancing adaptive capacity and building resilience to climate impacts. These are the main domains of the GGA and as such, countries should assess them in an interlinked manner (see Figure 6). On the one hand, the climate impacts on food systems are determined by the degree of vulnerability of the affected food systems. Likewise, a system is resilient if it can recover, cope and respond promptly in addressing climate risks. Finally, the impacts of climate change on agriculture development, well-being and socioeconomic development will be determined by degree of vulnerability, level of resilience and capacity to respond and adapt. This chapter further describes the main theoretical concepts and interlinkages underlying these key domains of the GGA and outlines a metric framework that countries can use to assess adaptation progress under the GGA.

**FIGURE 6.** Key domains of the GGA



### 3.1.1 Addressing climate risks and hazards

The IPCC defines *global climate hazards* as “the potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems



and environmental resources" (IPCC, 2018) and *climate risks* as the potential for adverse consequences for human or ecological systems, recognizing the diversity of values associated with such systems (IPCC, 2021).

Physical hazards often interact with other physical hazards - including climate-related environmental hazards, such as water scarcity resulting from rainfall deficit, or climate-related socioeconomic hazards, such as scarcity of commodities due to climatic disturbances - affecting individual and community well-being and development. As such, risks or impacts are understood to result from the interaction of hazards and the underlying vulnerability or sensitivity of exposed populations or systems:  $risk = f(hazard, vulnerability)$ .

To assess progress towards the GGA, measuring climate risks and hazards in terms of physical and non-physical impacts of climate variability can help countries understand whether adaptation is delivering development benefits in the context of climate hazards and variability.

### **3.1.2 Reducing vulnerability to climate change**

One of the main GGA domains is reducing vulnerability to climate change. The success of adaptation efforts relies on the degree of vulnerability or underlying factors that determine how susceptible farmers and communities are to climate risks and hazards. The impact of a climate shock depends not only on the intensity of, and exposure to, a shock, but also on vulnerability to the shock (FAO and OECD, 2012). Vulnerability metrics are therefore crucial for assessing adaptation success and serve as an intermediate outcome between climate actions or inputs and evaluating development impacts, such as improved agriculture yields or reduced agricultural losses (Brooks and Fisher, 2014).

But defining, measuring and assessing vulnerability is complex and should be considered across scales and dimensions (FAO and OECD, 2012). The IPCC explains vulnerability in terms of susceptibility to harm and as a function of exposure, sensitivity and adaptive capacity (IPCC, 2014). Drawing on the conceptual framings of livelihoods and poverty frameworks, vulnerability can also be defined in terms of the extent to which a system is susceptible to harm (Smit and Pilifosova, 2003). The latter definition focuses on a system's socioeconomic and ecological dimensions, to identify the inherent characteristics - such as a lack of infrastructure, resources, or adequate income - that make communities more susceptible to climate-induced harm, even when exposure is limited (Adger, 2006; IPCC, 2022).

Vulnerability can also evolve over time, particularly in the context of climate change, which can introduce new risks or change the context and ability to respond to previous risks (FAO and OECD, 2012). Adaptation efforts that reduce the impact of a shock can reduce vulnerability in the short term - for example, by sourcing feed for livestock from another area in case of floods or droughts - or in the long run, by installing climate-resilient water infrastructure or irrigation systems. The availability of resources to buy additional feed and install infrastructure to decrease susceptibility to climate impacts is a good measure of reduced vulnerability to help assess whether adaptation actions are working.



Since the severity of the impact of climate change on agriculture and food security depends on the vulnerability of the affected agrifood system (FAO, 2016a), measuring vulnerability can help assess how adaptation efforts are improving the inherent characteristics of a socioecological system, reducing sensitivity to harm and exposure to risks or changing the context and ability to respond. Measuring vulnerability can therefore cover a wide range of climate-sensitive metrics across several productive, economic and social dimensions, including health, poverty levels, nutrition, income, assets, education and infrastructure (see section 3.2).

#### ***3.1.3 Strengthening climate resilience and adaptive capacity***

The second domain for achieving the GGA is strengthening climate resilience and adaptive capacity, or a system's ability to respond, recover and address the adaptation deficit. As both can help reduce climate vulnerability and improve development impacts, they are good measures for assessing the effectiveness of climate adaptation efforts in the agriculture sectors. To a great extent, a system is resilient when it is less vulnerable to - and can recover from - shocks across time (FAO and OECD, 2012).

FAO defines climate resilience of agricultural systems, as "the ability to prevent disasters and crises as well as to anticipate, absorb, accommodate, or recover from them in a timely, efficient, and sustainable manner. This includes protecting, restoring and improving livelihoods systems in the face of threats that impact agriculture, nutrition, food security and food safety" (FAO, 2014).

It is possible to improve a system's resilience and reduce its vulnerability by decreasing exposure, reducing sensitivity and nurturing its adaptive capacity (Dalziell and McManus, 2004). Resilience is a broader state or attribute, while adaptive capacity describes the capabilities that can be harnessed to enable resilient (food) systems.

Measuring resilience to achieve the GGA therefore involves assessing how adaptation measures help improve adaptive capacities in the face of climate-related shocks and stressors, where climate resilience is a system's overarching goal to continue to function to the fullest possible extent in the face of stress. These capacities - constituting skills, capabilities and institutional attributes to respond to climate change - can be "exhibited or deployed to maintain livelihoods, food production, or food access", in the context of food and agricultural systems (Dalziell and McManus, 2004). They also include the ability to reduce a system's exposure and sensitivity to shocks, from using climate-resilient crop varieties to manage the effects of climate change, to modifying an institutional system to manage risks in the long term and having the ability to shift practices to reduce exposure to shocks. Measures to assess climate resilience and adaptive capacity include metrics that help us understand how institutions, strategies, policies and practices improve a country's or community's ability to absorb, adapt, anticipate and transform.





### **3.1.4 Enabling sustainable development impacts**

The GGA aims to contribute to sustainable development by ensuring an adequate adaptation response. Adaptation success is therefore evident if agriculture development remains on track despite climate impacts. Standard development indicators of well-being, food security, nutrition, agriculture productivity and loss and damage can help countries understand whether adaptation actions are also delivering development impacts. While vulnerability and resilience indicators predict how agricultural systems will be affected by future climate change, development impact indicators are assessed after a shock or climate stress. If interpreted over periods of evident climate variability and extreme events, development metrics can give a true picture of whether adaptation efforts are working well in the long term (Brooks and Fisher, 2014). For example, climate-related shocks and stresses can impact SDG achievements in terms of food security, nutrition, direct agriculture and economic loss. Countries that show improved food security despite climate disturbances show that adaptation efforts such as sustainable food production systems and resilient agriculture practices are working.

## **3.2 A metric framework for assessing adaptation in the agriculture sectors**

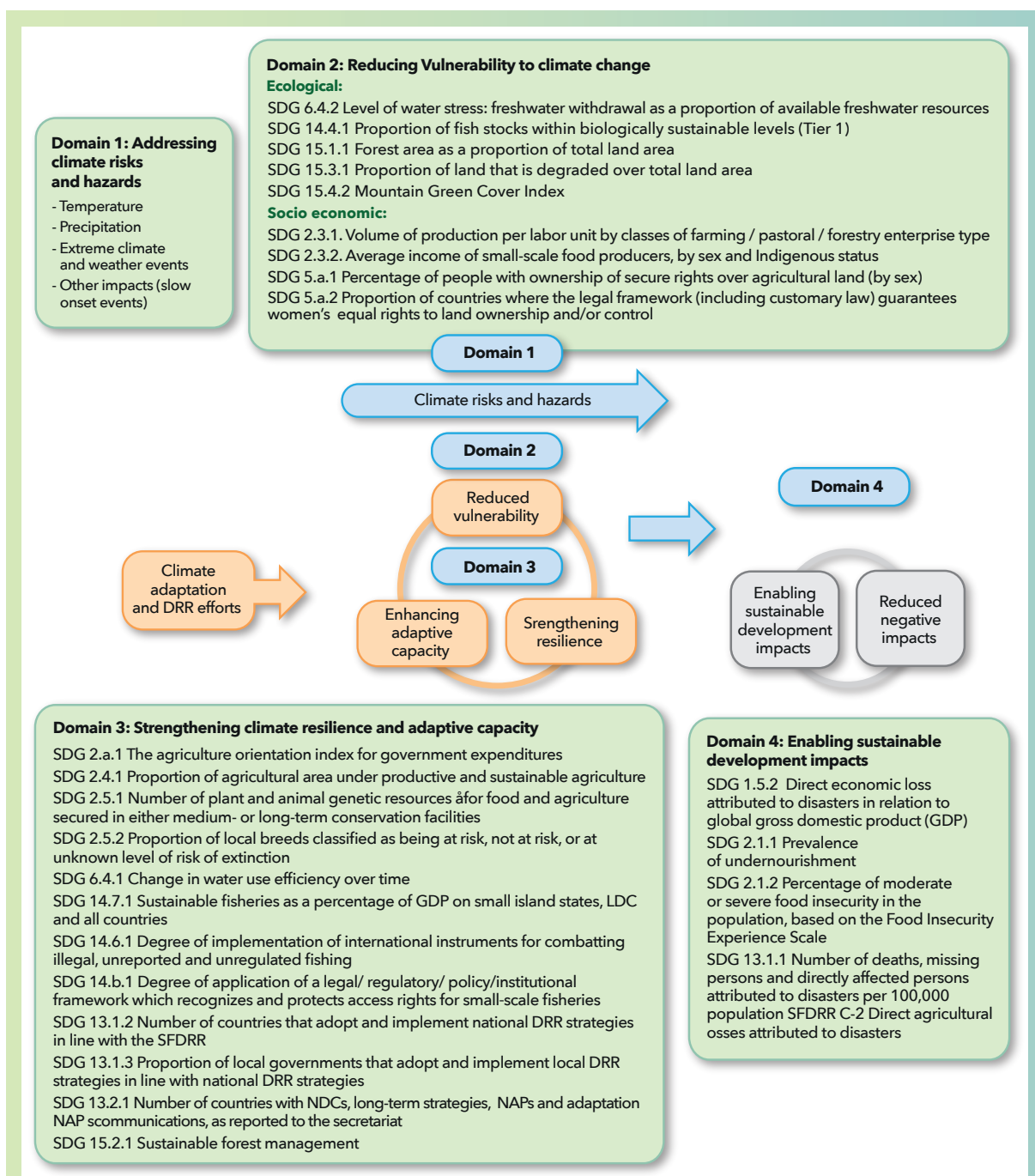
The concepts outlined in section 3.1 provide conceptual clarity on the main interlinked domains within the GGA. To assess progress under the GGA, countries will need to define metrics under these domains to assess overall adaptation performance nationally as well as globally. This section outlines a suggestive framework that countries can use to identify SDG and SFDRR indicators for assessing the extent to which adaptation, development and DRR efforts in their agriculture sectors are achieving the GGA's key objectives of reducing vulnerability, enhancing climate resilience or adaptive capacity and enabling development impacts.

Universal indicators do not always meaningfully capture enhanced adaptation across a vast range of contexts (Christiansen, Martinez and Naswa, 2018). A framework-based approach addresses these limitations by allowing countries to identify contextually relevant indicators grouped into common domains or metrics to assess collective progress (Brooks and Fisher, 2014).

Countries can use the metric framework in Figure 7 to facilitate adaptation measurement through broader domains of GGA for joint reporting on different conventions and agreements that shape the global response to sustainability. It is not an exhaustive list; countries can complement it with their own context-specific indicators.



**FIGURE 7.** Metric framework: suggested SDG and SFDRR indicators for the GGA domains



**Source:** Authors' own elaboration, adapted from **FAO**. 2017. Global Goal of Adaptation and Tracking Adaptation in the Agriculture Sectors (TAAS) framework and **Brooks, N., Aure, N., Whiteside, M.** 2014. Assessing the impact of ICF programmes on household and community resilience to climate variability and climate change and **Department for International Development (DFID)**. 2011. DFID's resilience framework. Defining Disaster Resilience: A DFID Approach Paper: London.

The set of SDG and SFDRR indicators outlined in table 3 can support a comprehensive national-level assessment of progress toward adaptation. This section unpacks the metric framework and the rationale for choice of specific SDG and SFDRR metrics corresponding to the key domains of the GGA.

**TABLE 3**

Suggested metrics and relevant SDG and SFDRR indicators

Metric	SDG/SFDRR indicator
<b>Agricultural investments</b>	2.a.1 The agriculture orientation index for government expenditures
<b>Availability and quality of productive land</b>	15.3.1 Proportion of land that is degraded over total land area
<b>Availability of water and change in water efficiency</b>	6.4.1 Change in water use efficiency over time 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
<b>Food security</b>	2.1.1 Prevalence of undernourishment 2.1.2 Percentage of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale
<b>Impact on people and society</b>	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
<b>Impacts on agricultural systems</b>	1.5.2 Direct economic losses attributed to disasters in relation to global GDP SFDRR C-2 Direct agricultural loss attributed to disasters
<b>Income and livelihoods</b>	2.3.1 Volume of production per labour unit by farming or pastoral class or forestry enterprise type 2.3.2 Average income of small-scale food
<b>Integration of climate change measures into national policies, strategies and planning</b>	13.1.2 Number of countries that adopt and implement national DRR strategies in line with SFDRR 13.1.3 Proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies 13.2.1 Number of countries with NDCs, long-term strategies, NAPs and adaptation communications, as reported to the UNFCCC secretariat
<b>Secure land tenure rights</b>	5.a.1 Percentage of people with ownership of secure rights over agricultural land (by sex) 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control
<b>Status of diversity of genetic resources</b>	2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities 2.5.2 Proportion of local breeds classified as being at risk, not at risk, or at unknown level of risk of extinction
<b>Status of ecosystems supporting agriculture production</b>	14.4.1 Proportion of fish stocks within biologically sustainable levels 15.1.1 Forest area as a proportion of total land area 15.4.2 Mountain Green Cover Index
<b>Sustainable and resilient ecosystems</b>	14.6.1 Degree of implementation of international instruments for combatting illegal, unreported and unregulated fishing 14.7.1 Sustainable fisheries as a percentage of GDP in SIDS, LDCs and all countries 14.b.1 Degree of application of a legal, regulatory, policy or institutional framework that recognizes and protects access rights for small-scale fisheries 15.2.1 Sustainable forest management
<b>Sustainable and resilient food production systems</b>	2.4.1 Proportion of agricultural area under productive and sustainable agriculture

Source: Authors' own elaboration.



## Domain 1: Climate parameters

Interpreting results in parallel to changing climate parameters can help assess the success of agriculture adaptation efforts in the context of climate change. Climate parameters enable the distinction between resilience and climate resilience, where the latter specifically refers to resilience against the effects of global warming. Measuring adaptation impacts in isolation from climate data does not reveal the true success of adaptation and resilience-building measures. In the absence of climate data, resilience indicators may simply be development indicators that do not give a true picture of success. For example, improvements in development impact or vulnerability indicators could be the result of a reduction in climate hazards during the assessment period, or due to successful adaptation interventions in a context of continuing climate variability. Without climate data that shed light on how climatic conditions evolve and what they will look like in the future, it is hard to interpret adaptation results in their true sense (Rai, Brooks and Nash, 2015).

This is why adaptation assessments should incorporate climate data comprising physical manifestations on the agriculture sectors, including:

- **Changes in variability:** Climate data that sheds light on timing, predictability, and seasonal variations of rainfall and temperature; observed trends.
- **Long-term changes:** in average temperature and rainfall; projected forecasts.
- **Climate extremes:** Changes in frequency, severity, duration, extent of meteorological drought, storms, extreme heat, cold, rainfall, wind.
- **Slow onset events:** Observed and projected sea level rise, ocean acidification; glacial retreat; salinization; others.

**TABLE 4**

Climate parameter indicators

Indicator types	Climate parameter
Temperature	Annual/seasonal/monthly temperature extremes
Precipitation	Average annual/seasonal/monthly precipitation and trends
Extreme climate and weather events	Types, frequency, and magnitude of the observed and projected extreme weather events (droughts, floods, storms, and so on)
Other impacts deriving from climate change (slow-onset events)	Observed and projected sea level rise, ocean acidification; glacial retreat; salinization; others

**Source:** Authors' own elaboration.



## Domain 2: Reducing vulnerability to climate change

FAO frames vulnerability in terms of ecological and socioeconomic conditions that make outcomes more or less likely. For example, an absence of natural resources such as water or productive land, a lack of adequate basic services or insufficient incomes can hinder individual, community and system capacities to deal with climate hazards and shocks. This framework uses FAO's definition of vulnerability to identify metrics for assessing adaptation. This framing also understands vulnerability in terms of a socioecological system's inherent characteristics rather than the qualities of a single entity exposed to specific risks (FAO and OECD, 2012).

Within this framing, there are two groups of metrics that can be used to measure vulnerability. Ecological metrics measure availability and status of natural resources and ecosystems, and socioeconomic metrics measure income, livelihoods, access to basic services and so on.

### Ecological drivers of vulnerability

Ecosystem services make human life possible by providing nutritious food and clean water, regulating disease and climate, supporting the pollination of crops and soil formation, and providing recreational, cultural and spiritual benefits. Sustainable ecosystem services reduce rural communities' vulnerabilities to climate change, so indicators that assess natural resources and ecosystems are useful for assessing and monitoring vulnerability (Cottyn, 2018; Gordon and Enfors, 2008; Goulden *et al.*, 2013). Adaptation efforts that reduce water stress, improve access to water resources or productive land, or enhance ecosystem biodiversity and sustainability of forestry and fisheries, indicate adaptation success in terms of reduction in vulnerability. Communities with access to water can deal with droughts more appropriately and ensure that development indicators such as agricultural productivity are on track despite climate disturbances. Table 5 outlines key agriculture-specific SDG indicators that countries can adapt and use to measure changes in their own vulnerability.

**TABLE 5**

Metrics to assess the ecological drivers of vulnerability

Metric	SDG indicator, custodian and tier	Rationale for choice of vulnerability indicator
Availability of water and change in water efficiency	SDG 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources FAO Tier 1	Water-stressed communities are more vulnerable and susceptible to climate change. Even seasonal water scarcity puts pressure on food production, health and environment. Crop productivity levels rely significantly on soil moisture distribution and evaporative demand, which depend on adequate rainfall levels. The availability of water resources for irrigation is another major determinant of global crop production. Agriculture is a significant contributor to water stress. SDG 6.4 aims to substantially increase water use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address - and reduce the number of people suffering from - water scarcity. It would be necessary to track this important adaptive response against climate data to measure progress despite the potential effects of climate change on water recharge and availability. Reduced water stress in the context of climate change would indicate that adaptation measures in agriculture sectors are helping reduce vulnerability to climate change.



### 3. Using Sustainable Development Goal indicators to assess the Global Goal on Adaptation

Availability and quality of productive lands	SDG 15.3.1 Proportion of land that is degraded over total land area	UNCCD Tier 1	Land degradation increases agroecological systems' vulnerability to climate impacts, influencing land users' capacity to deal with climate stress. At an ecological level, land degradation compromises food security by reducing water efficiency and soil fertility, requiring increased fertilizer use. It also compromises agro socio ecosystem resilience, defined as "the ability of a system to maintain the structure required to sustain basic system functions through periods of stress or perturbation". For example, communities that experience land degradation are more likely to be trapped in poverty and less likely to get out of the trap after experiencing climate shocks and variability. Adaptation measures that address land degradation and improve soil health can therefore reduce sensitivity to climate change and vulnerability.
Status of ecosystems supporting agriculture production	SDG 14.4.1 Proportion of fish stocks within biologically sustainable levels	FAO Tier 1	Having sustainable forest cover, fish stocks and productive land decreases an ecosystem's vulnerability to external impacts, such as climate change. For example, maintaining sustainable fish stocks increases biodiversity, stability and functionality - and therefore the ability to tolerate potential impacts of climate change - in ocean ecosystems. Adaptation measures that reduce overfishing and rebuild overfished stocks can help increase climate resilience and lessen the impacts of climate change. Proportion of fish stocks can therefore serve as a good indicator of reduced vulnerability. Mountain ecosystems are also important sources of freshwater provision in lowland areas, generating higher runoff from rain because of orographic precipitation and delaying the release of water by storing it in snow, glaciers and lake reserves. Conservation and sustainable mountain ecosystem management are important for maintaining the levels of water, food and energy security needed to meet the challenges of climate change.
	SDG 15.1.1 Forest area as a proportion of total land area	FAO Tier 1	
	SDG 15.4.2 Mountain Green Cover Index	FAO Tier 1	

**Sources:** Authors' own elaboration, based on: **Gisladottir, G. & Stocking, M.** 2005. Land degradation control and its global environmental benefits. *Land Degradation and Development*, 16: 99-112; **Webb, N.P., Marshall, N.A., Stringer, L.C., Reed, M.S., Chappell, A. & Herrick, J.E.** 2017. Land degradation and climate change: building climate resilience in agriculture. *Frontiers in Ecology and the Environment*, 15[8]: 450-459. <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fee.1530>; **Reed, M.S. & Stringer, L.C.** 2016. *Land degradation, desertification and climate change: anticipating, assessing and adapting to future change*. New York, NY: Routledge; **Gordon, L.J. & Enfors, E. I.** 2008. Land degradation, ecosystem services and resilience of smallholder farmers in Makanya catchment, Tanzania. In: D. Bossio & K. Geheb (eds.), *Conserving Land, Protecting Water*. DOI:10.1079/9781845933876.0033; **Bestelmeyer, B.T., Okin, G.S., Duniway, M.C., Archer, R.S., Sayre, N.F., Williamson, J.C. & Herrick, J.E.** 2015. Desertification, land use, and the transformation of global drylands. *Frontiers in Ecology and the Environment*, 13[1]: 28-36; **Sumaila, U.R. & Tai, T.C.** 2020. End overfishing and increase the resilience of the ocean to climate change. *Frontiers in Maritime Science*, 7. <https://doi.org/10.3389/fmars.2020.00523>; **UNDRR.** 2022. *Global climate indicators, risks and the sustainable development goals, visually mapped*. <https://www.preventionweb.net/publication/global-climate-indicators-risks-and-sustainable-development-goals-visually-mapped>; **Immerzeel, W.W., Lutz, A.F., Andrade, M., Bahl, A., Biemans, H., Bolch, T., Hyde, S., Brumby, S., Davies, B.J., Elmore, A. C., Emmer, A., Feng, M., Fernández, A., Haritashya, U., Kargel, J.S., Koppes, M., Kraaijenbrink, P.D.A., Kulkarni, A.V., Mayewski, P.A., Nepal, S., Pacheco, P., Painter, T.H., Pellicciotti, F., Rajaram, H., Rupper, S., Sinisalo, A., Shrestha, A.B., Viviroli, D., Wada, Y., Xiao, C., Yao T. & Baillie J.E.M.** 2020. Importance and vulnerability of the world's water towers. *Nature*, 577: 364-369. <https://doi.org/10.1038/s41586-019-1822-y>.

**Note:** SDG 15.4.2 has two subindicators: 15.4.2a: Mountain Green Cover Index and 15.4.2b: Proportion of degraded mountain land. <https://unstats.un.org/sdgs/metadata/files/Metadata-15-04-02.pdf>.

#### Socioeconomic drivers of vulnerability

Income levels, poverty, inequality, access to basic services and other socioeconomic dimensions of vulnerability are important factors that indicate how interaction with hazards contribute to outcomes such as loss and damage and failure of agriculture production systems (Brooks and Adger, 2003). This approach to assessing vulnerability rests within the sustainable livelihoods framework that conceptualizes well-being as a function of five asset categories: financial, human, natural, physical and social capitals (Quandt, 2018; Saxena *et al.*, 2016; Stanford *et al.*, 2017). Measuring the social drivers of vulnerability helps assess how higher incomes, reduced poverty or improved access to basic services and financial capital can help





communities and systems deal with drought, floods or other hazards (Ranjan and Abenayeke, 2014). Adaptation measures that aim to reduce vulnerability by improving access to basic services in the context of a changing climate can help achieve well-being in the long run. Table 6 outlines key agriculture-specific SDG indicators that countries can use to measure changes in their vulnerability.

**TABLE 6**

Metrics to assess the socioeconomic drivers of vulnerability

Metric	SDG indicator, custodian and tier	Rationale for the choice of socioeconomic indicator	
Secure land tenure rights	SDG 5.a.1 Percentage of people with ownership of secure rights over agricultural land (by sex)	FAO Tier 2	Many people's livelihoods - particularly among rural poor and marginalized populations, including women - depend on secure ownership of and/or control over land. Land is a source of food and shelter, and constitutes the basis for economic and social wealth, as the most valuable asset in rural areas.
	SDG 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control	FAO Tier 2	Communities that are well connected with appropriate access to resources, assets, infrastructure and technology are also better able to deal with climate hazards and reduce vulnerability. Access to infrastructure, assets and so on is a good measure of vulnerability as it shows the extent to which a community's or family's livelihood will be affected by climate change. Without productive assets such as land, infrastructure and technology, a farmer will not have physical assets to fall back on after a disaster, leaving them unproductive and vulnerable due to loss of livelihood.
Income and livelihoods	SDG 2.3.1 Volume of production per labor unit by classes of farming / pastoral / forestry enterprise type	FAO Tier 2	Low-income farmers are more susceptible to climate disturbances than richer farmers. Large-scale wealthy farmers, who have more assets, better access to resources and better ability to acquire goods and services, are more likely to adapt better to climate change due to their more favourable condition to cope. Farmers with additional disposable income also have higher savings, which can be important for recovering after a climate hazard. So, if people with more wealth are less vulnerable to climate hazards, income levels are a good measure for assessing vulnerability levels. Adaptation measures that help improve farmers' income levels from agriculture and food systems can therefore help reduce agrifood vulnerability to climate change.
	SDG 2.3.2 Average income of small-scale food producers, by sex and Indigenous status	FAO Tier 2	

**Sources:** Authors' own elaboration, based on **Doss, C.R., Grown, C. & Deere, C.D.** 2011. Gender and Asset Ownership: A Guide to Collecting Individual-Level Data. World Bank Policy Research Working Paper No. 4704. <https://ssrn.com/abstract=1260131>; **Handmer, J.W., Dovers S. & Downing, T.E.** 1999. "Societal Vulnerability to Climate Change and Variability", Mitigation and Adaptation Strategies for Global Change 4: 267-281.; **Sridevi, G., Jyotishi, A., Mahapatra, S., Jagadeesh, G. & Bedamatta, S.** 2014. *Climate change vulnerability in agriculture sectors: indexing and mapping of four southern Indian states*. <http://amsacta.unibo.it/4080/1/WP966.pdf>; **Scoones, I.** 1998. *Sustainable rural livelihoods: a framework for analysis*. IDS Working Paper 72. Brighton: IDS; **Regmi, B.R. & Adhikari, A.** 2007. *Climate change and human development - risk and vulnerability in a warming world. Country Case Study-Nepal*. In K. Watkins, Human Development Report 2007/2008, Fighting climate change: Human solidarity in a divided world. UNDP. [https://www.climatechange.org.np/sites/default/files/doc\\_resources/heet3fsz8g9\\_0.pdf](https://www.climatechange.org.np/sites/default/files/doc_resources/heet3fsz8g9_0.pdf); **Dulal, H.B., Brodnig, G., Onorioso, C.G. & Thakur, H.K.** 2010. *Capitalizing on Assets: Vulnerability and Adaptation to Climate Change in Nepal*. Social Development Working Papers, World Bank; **Dercon, S.** 2002. Income risk, coping strategies, and safety nets. *The World Bank Research Observer*, 17 [2]: 141-166; **FAO.** 2016b. *Resilience Index Measurement and Analysis II*. [www.fao.org/3/i5665e/i5665e.pdf](http://www.fao.org/3/i5665e/i5665e.pdf).



### Domain 3: Strengthening climate resilience and adaptive capacity

A system's resilience and adaptive capacity are its ability to respond to, recover from and address the adaptation deficit. Adaptive capacity is essentially linked to the existence of the knowledge, policies and institutions as well as the adaptation actions needed to help a system absorb, respond and transform in the face of climate shocks and disturbances (FAO, 2016b). Table 7 outlines key agriculture-specific SDG indicators that countries can contextually draw on to measure changes in adaptive capacity and resilience.

**TABLE 7**

Climate resilience and adaptive capacity indicators

Resilience or capacity indicator	SDG indicator, custodian and tier	Rationale for the choice of indicator	
Sustainable and resilient ecosystems	SDG 15.2.1 Sustainable forest management	FAO	Sustainable forest management and sustainable fisheries aim to maintain healthy forest and fishing systems while providing social and economic opportunities. For example, expanding forest cover under long-term management plans, certification schemes and forest systems will help communities build the climate resilience of their forest systems.  Marine and biodiversity loss are directly connected to the impact of an increase in temperature and extreme events. When combined with water scarcity and extreme events, biodiversity loss poses risks to agriculture and fishing and the communities that depend on these sectors; it also compromises food security. Indicators related to the degree of implementation of policies and regulations aimed at sustainably managing and protecting marine and coastal ecosystems indicate how adaptation actions avoid significant adverse impacts and achieve healthy and productive oceans.
	SDG 14.7.1 Sustainable fisheries as a percentage of GDP on small island states, LDC and all countries	FAO, UNEP-WCMC Tier 1	
	SDG 14.6.1 Degree of implementation of international instruments for combatting illegal, unreported and unregulated fishing	FAO	
	SDG 14.b.1 Degree of application of a legal/ regulatory/ policy/ institutional framework which recognizes and protects access rights for small-scale fisheries	FAO	
Sustainable and resilient food production systems	SDG 2.4.1 Proportion of agricultural area under productive and sustainable agriculture	FAO Tier 2	The ability to deploy sustainable agriculture practices can help farmers and communities absorb and reorganize themselves when exposed to external shocks. A greater use of economically feasible, socially acceptable and environment friendly practices and access to risk mitigation mechanisms will result in resilient production systems, and as such, is a good determinant of adaptive capacity.
Availability of water and change in water efficiency	SDG 6.4.1 Change in water use efficiency over time	FAO Tier 1	Crop production on irrigated land is approximately 2-3 times higher than rain-fed agriculture. Where this variable is impacted by climate change, agriculture productivity is highly vulnerable to climate change. Change of water efficiency could therefore be considered as an indicator of adaptive capacity, as improved water efficiency indicates improved adaptation response.



Status of diversity of genetic resources	SDG 2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities	FAO Tier 1	Status of diversity of genetic resources and crop diversity is a good measure of improved resilience. Genetic diversity safeguards systems by providing alternatives when systems change due to climatic shocks and variability. Diversity also allows regeneration and renewal after systems collapse, providing a shield against changing rainfall and temperature patterns.
	SDG 2.5.2 Proportion of local breeds classified as being at risk, not at risk, or at unknown level of risk of extinction	FAO Tier 2	
Integration of climate change measures into national policies, strategies and planning	SDG 13.1.2 Number of countries that adopt and implement national DRR strategies in line with the SFDRR	UNDRR Tier 2	Well-targeted climate policies and regulations can enhance adaptive capacity. Because strengthened institutional systems can play a role in addressing climate impact, they are a good determinant of increased adaptive capacity. The indicators related to institutions, regulations and policies indicate the extent to which institutional systems are responsible for reducing climate-induced vulnerability and strengthening adaptive capacity.
	SDG 13.1.3 Proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies	UNDRR Tier 2	
	SDG 13.2.1 Number of countries with NDCs, long-term strategies, NAPs and adaptation communications, as reported to the secretariat	UNFCCC Tier 2	
Agricultural investment	SDG 2.a.1 The Agriculture Orientation Index for Government Expenditures	FAO Tier 1	

**Sources:** Authors' own elaboration, based on **Canadian Council of Forest Ministers**. 2008. *Adapting Sustainable Forest Management to Climate Change: A Review of Assisted Tree Migration and its Potential Role in Adapting Sustainable Forest Management to Climate Change*; **FAO**. 2023. *Proportion of agricultural area under productive and sustainable agriculture*. (SDG Indicator 2.4.1): Methodological Note (Revision 11). [www.fao.org/3/ca7154en/ca7154en.pdf](http://www.fao.org/3/ca7154en/ca7154en.pdf); **Smit, B. and Pilifosova, O.** 2003. *From adaptation to adaptive capacity and vulnerability reduction*. In: J.B. Smith, R.J.T. Klein and S. Huq, eds. *Climate change, adaptive capacity and development*. Imperial College Press, London. **Gunderson, L.H., and Holling, C.S.** 2002. *Panarchy: understanding transformations in human and natural systems*. Island Press, Washington, D.C., USA; **Berkes, F., Colding, J. and Folke, C. editors.** 2003. *Navigating social-ecological systems: building resilience for complexity and change*. Cambridge University Press, Cambridge, UK; **IPCC**. 2008. Bates, B.C., Kundzewicz, Z.W., Wu, S. & Palutikof, J.P., (eds.) *Climate Change and Water*. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva. [www.ipcc.ch/site/assets/uploads/2018/03/climate-change-water-en.pdf](http://www.ipcc.ch/site/assets/uploads/2018/03/climate-change-water-en.pdf).



## Domain 4: Enabling sustainable development impacts

Adaptation success will become evident if agriculture development remains on track despite climate variability and change. Standard indicators of well-being, sustainable development, agriculture productivity, agriculture economies and loss and damage that are strongly sensitive to climate change can be good indicators of effective adaptation. Table 8 outlines key agriculture-specific SDG indicators that countries can draw on to measure the development impacts of their adaptation efforts.

**TABLE 8**

Development impact indicators

Development impact indicator	SDG and SFDRR indicator, custodian and tier	Rationale for the choice of the development impact indicator	
Food security	SDG 2.1.1 Prevalence of undernourishment	FAO Tier 1	Adaptation actions should result in enhancing development indicators in the context of climate change. Food security indicators measure the extent to which adaptation actions improve access to food in the event of climate-driven shocks and stressors. Countries should assess development impact indicators in parallel with climate parameters (see Domain 4) - for example, increased percentage of food insecurity in the face of increasing droughts.
	SDG 2.1.2 Percentage of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale	FAO Tier 1	
Impact on agricultural systems	SFDRR C-2 Direct agricultural losses attributed to disasters	FAO	Loss and damage indicators measure the extent to which adaptation interventions help reduce losses due to climate change. Reducing agricultural losses attributed to disasters shows how adaptation actions can encourage development and are therefore a good measure for assessing adaptation outcomes.
Impact on people and society	SDG 1.5.2 Direct economic loss attributed to disasters in relation to global GDP	UNDRR (FAO partner agency) Tier 2	
	SDG 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	UNDRR Tier 1	

**Source:** Authors' own elaboration.

**Notes:** The SFDRR C-2 indicator is conceived to quantify mortality rates, internally displaced persons, missing persons, total numbers affected and agricultural economic losses caused by natural disasters. Appreciating climate change impact would require distinguishing between climate and non-climate-related disasters.







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## 4. Using Sustainable Development Goal metrics to inform adaptation reporting in biennial transparency reports

The metric framework outlined in chapter 3 aims to facilitate countries in their ongoing attempts to assess and track CCA in the agriculture sectors. This chapter provides a practical approach to using the framework to monitor and report on adaptation through the BTRs, with examples of how countries can use agriculture-specific adaptation metrics to assess, track and report on adaptation progress in their NAPs, NDCs, national climate strategies or ETF reporting mechanisms. This chapter illustrates the potential use of the menu of SDG and SFDRR indicators discussed in section 3.2 to compile information for the A-BTR.

### 4.1 Reporting requirements for the adaptation section of the biennial transparency reports: information related to climate change impacts and adaptation

The ETF aims to provide a clear understanding of climate action, in light of the objectives of the Paris Agreement, including by tracking progress towards countries' NDC targets, and the BTR is its most important reporting instrument. At COP24, Parties adopted the MPGs, which outline the reporting requirements under the ETF, as part of the Katowice Climate Package to operationalize the ETF. Chapter 4 of the MPGs guides countries on how to provide information on climate change impacts and adaptation in their BTRs (see Figure 8).

The first BTR is due in 2024. Although voluntary, the A-BTR is capable of facilitating reporting on adaptation and contributes to collective understanding of adaptation (Dale, Christiansen and Neufeldt, 2020). Countries that decide to use the A-BTR could use it as their main instrument for assessing and reporting on adaptation outcomes corresponding to adaptation actions they have proposed in their planning-oriented instruments (see Figure 9). Several country submissions to the GlaSS highlighted that reporting instruments such as the BTR could be the main instruments for conveying information on their progress towards achieving the GGA. This includes context-specific information that communicates their vulnerability, climate risk context and adaptation goals, as well as information that reports progress on adaptation by monitoring implementation and evaluating adaptation results. So, while assessing progress on adaptation through the ETF is a national-level exercise, it will also help shed light to individual countries' overall progress towards reducing



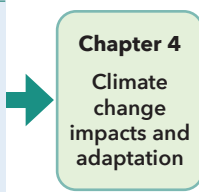


vulnerability and increasing resilience and adaptive capacity, allowing the assessment of collective progress towards the GGA.

Countries can use the metrics and corresponding SDG and SFDRR indicators outlined in section 3.2 to report under the A-BTR on agriculture-specific achievements for adaptation targets and actions they presented in their NDCs, NAPs, climate change strategies and other adaptation plans and communications.

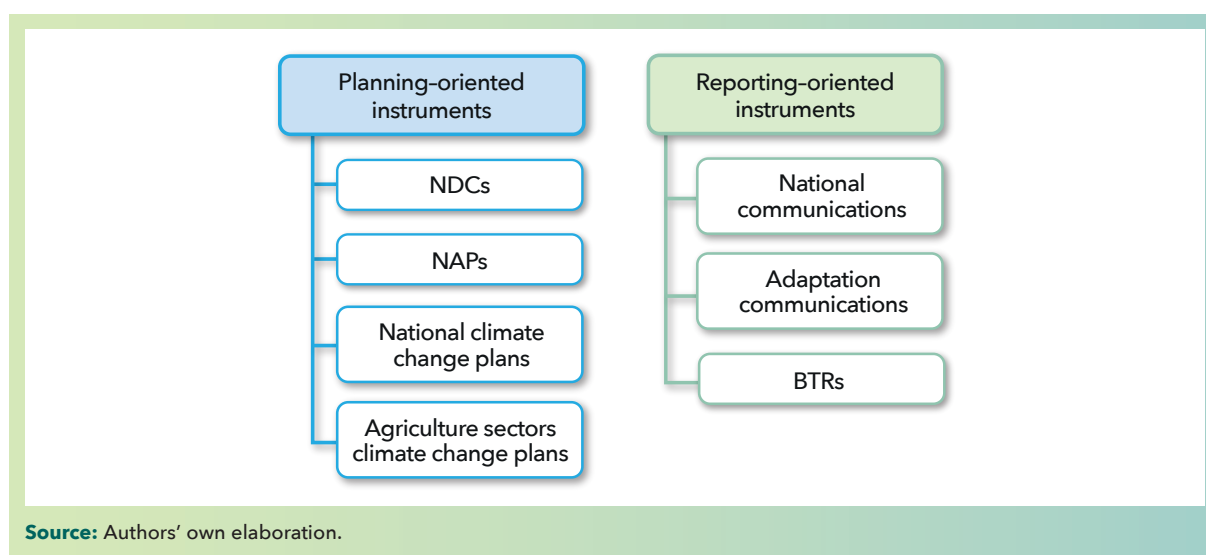
**FIGURE 8.** Chapter 4 of the MPGs outlines the A-BTR reporting requirements

Chapter	Review instrument
1. Introduction	General
2. National inventory report of anthropogenic emissions	National Inventory Reporting
3. Information necessary to track progress made in implementing and achieving NDCs	Biennial Transparency Reports
4. Information related to climate change impacts and adaptation under Article 7	
5. Information on financial, technology development and transfer and capacity-building support provided and mobilized	
6. Information on financial, technology development and transfer and capacity-building support needed and received	
7. Technical Expert Review	Technical Expert Review
8. Facilitative, multilateral consideration of progress	



**Source:** Authors’ own elaboration.

**FIGURE 9.** Planning and reporting instruments under UNFCCC and national planning processes



**BOX 3.** How to align reporting under the Paris Agreement, 2030 Agenda and SFDRR at national level: concrete steps for country planners and reporters

To capture a rigorous picture of the national progress towards adaptation, national decision-makers, planners, adaptation practitioners and those involved on reporting in the ministries of agriculture, environment and their statistics departments should consider these steps when selecting agriculture-specific SDG and SFDRR indicators as proxies.

**Step one - Preparatory phase**

- ▶ Convene a national consultation with key actors (see below) and consider the degree of overlap of climate change, development and DRR challenges and responses.
- ▶ During the consultation, take stock of key adaptation goals, targets and indicators in NDCs, NAPs, climate change strategies and their level of alignment with sectoral development and DRR strategies and policies.
- ▶ Review previous adaptation communications submitted to the UNFCCC and information relevant to the GGA.

**Step two - Implementation phase**

- ▶ Investigate whether a national M&E system to track progress of the implementation of the NDC, NAP or climate change strategies exists.
- ▶ Identify available data and information on adaptation for the agriculture sectors in existing national M&E systems on sustainable development and DRR.
- ▶ Identify essential data and information for reporting on adaptation under the GGA and compiling the A-BTR, given the national adaptation targets and goals.
- ▶ Characterize which M&E arrangements for adaptation, sustainable development and DRR exist and how they complement each other.
- ▶ Use the approach outlined in this paper to match available sustainable development and DRR data and information with the GGA and BTR elements to forge coherence between the three international frameworks.
- ▶ Use existing FAO country data on SDG indicators (see Box 4), collected through widely tested and applied methodologies while building institutional capacity for reporting on these indicators.

**Key actors - Who to involve at national level to align reporting under the three frameworks**

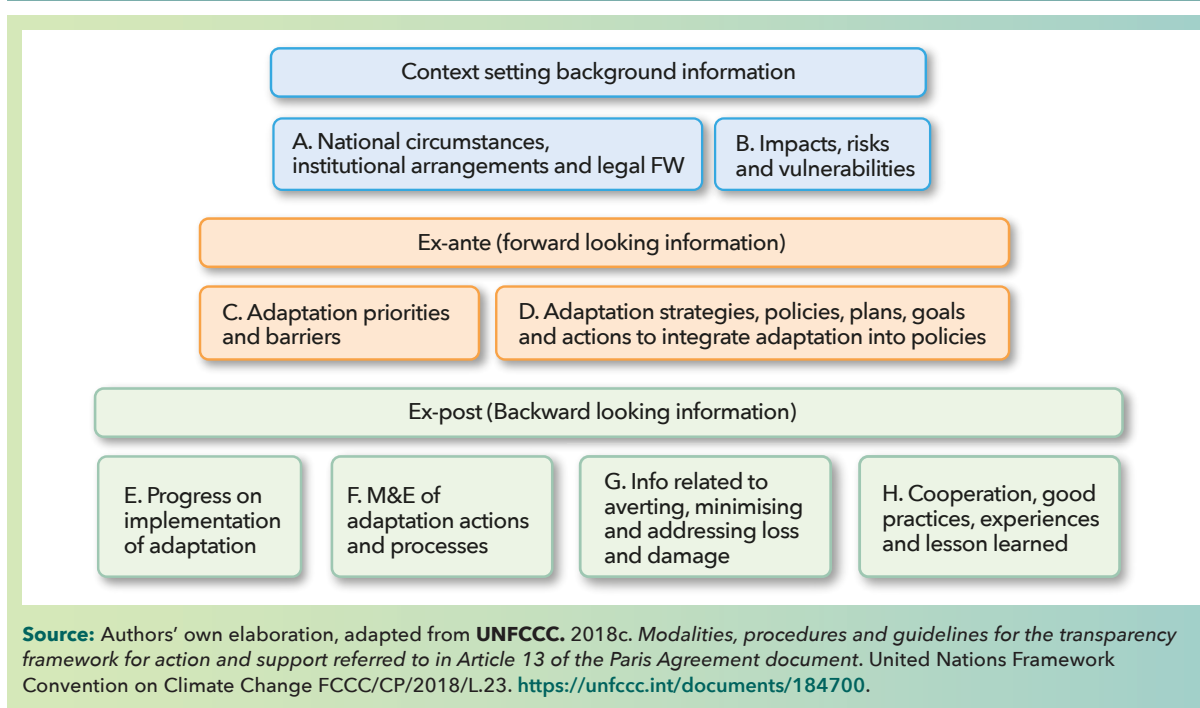
- ▶ Paris Agreement: UNFCCC country focal points; institutions responsible for compiling the BTR; government M&E staff.
- ▶ The 2030 Agenda: Members of the Inter-Agency and Expert Group on SDG Indicators; SDG country focal points.
- ▶ SFDRR: National committee or government entity responsible for DRR; SFM focal points.



## 4.2 Using Sustainable Development Goal metrics corresponding to the Global Goal on Adaptation domains to inform the adaptation section of the biennial transparency reports

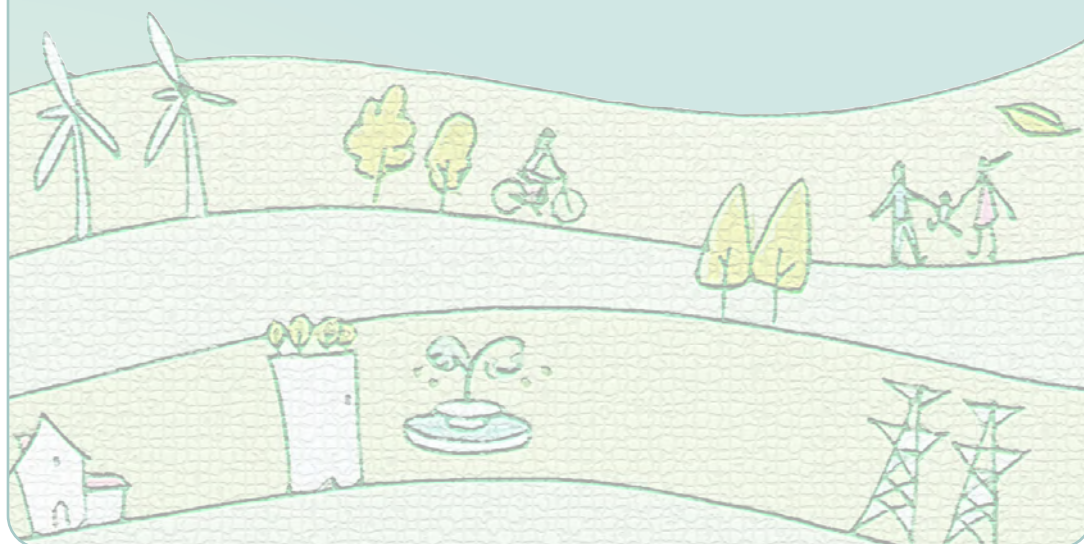
Countries can use agriculture-specific SDG/SFDRR indicators to provide information under the different elements of A-BTR (see Figure 10). This includes reporting on agriculture-specific vulnerabilities and climate risk contexts (A and B), defining agriculture-specific adaptation goals and priorities (C and D), reporting progress on adaptation in agriculture by monitoring implementation and evaluating the results of adaptation (E and F), reporting on loss and damage (G) and sharing good practice and lessons learnt (H). This section presents the metrics and relevant SDG and SFDRR indicators that can serve as meaningful proxy to report on adaptation for each element of the ETF, while reiterating their relevance for the GGA dimensions discussed in chapter 3. Countries should build on backward-looking information to report on GGA progress, revealing how vulnerability, resilience and adaptive capacity have improved over the years, contributing to agriculture development in the context of historical and current changes in climate parameters. This information would allow countries to report progress towards their national adaptation targets, as defined in their NAPs, NDCs and climate change strategies, policies and plans (forward-looking information), as well as the GGA.

**FIGURE 10.** MPG guidance for reporting on climate change impacts and adaptation



#### BOX 4. Key FAO SDG data sources

- ▶ The annual *Tracking progress on food and agriculture-related SDG indicators* report assesses trends of the 21 SDG indicators under FAO custodianship sheds light on the benefits of comparing and aggregating data at national, regional and global levels. [www.fao.org/sdg-progress-report/2021/en/](http://www.fao.org/sdg-progress-report/2021/en/)
- ▶ The *Statistical capacity assessment survey for SDG indicators* provides insights about FAO Members' national statistical systems' capacity to monitor and report. [www.fao.org/sustainable-development-goals/indicators/statistical-capacity-cp-for-sdg-indicators/en/](http://www.fao.org/sustainable-development-goals/indicators/statistical-capacity-cp-for-sdg-indicators/en/)
- ▶ The *SDG Indicator Portal* and *FAOSTAT new data domain on SDG indicators* are important data sources and concrete examples of the tangible reduction of reporting burden when linking with relevant international reporting efforts. <https://www.fao.org/sustainable-development-goals/indicators/en/>



### Element A: National circumstances, institutional arrangements and legal frameworks

Element A of the A-BTR sets out a country's baseline characteristics that are crucial for understanding where it stands in terms of adaptation planning and geographical and socioeconomic conditions. Categorized under two main items - national circumstances and institutional arrangements and legal frameworks - they present the economic, social, political and environmental contexts that may affect a country's vulnerabilities, adaptive capacities and potential responses to climate risks and hazards. In practical terms, they can serve as a baseline for setting adaptation goals and priorities (Elements C and D) and assessing adaptation progress (Elements E and F).



Countries reporting on national circumstances with respect to agriculture and land use can tap into existing national agriculture-specific statistics and surveys compiled for SDG reporting. For example, data on food security (SDG 2.1.1, 2.1.2) and secure land tenure rights (SDG 5.a.1, 5.a.2) provides information on economic assets and access to safe, nutritious and sufficient food. Likewise, the status of ecosystems supporting agriculture production (SDG 14.4.1, SDG 15.1.1, 15.4.2) provides information on overall adaptive capacity. This context-specific information will clarify different nuances of exposure, risk and vulnerability presented by climate change (under Element B). For example, the prevalence of undernourishment (SDG 2.1.1) is an estimate of the proportion of the population whose habitual food consumption does not provide the dietary energy levels they need to maintain a normal active and healthy life. An undernourished population is highly vulnerable to – and less likely to be able to respond to – climate change, and the impact of climate change on agriculture compounds this situation.

Likewise, the prevalence of moderate or severe food insecurity based on Food Security Experience Scale (SDG 2.1.2) estimates the proportion of the population that typically eats low-quality diets and might be forced, at times during the year, to reduce the quantity of food they eat. Countries can use this indicator to complement the information provided by prevalence of undernourishment, as climate change can impact food access in terms of quality as well as quantity. Food insecurity also coincides with diminishing land availability, increasing soil and biodiversity degradation, and more frequent and severe weather events. At the same time, poor land tenure rights hinder access to complementary services and resources such as credit, crop insurance and extension services, so security of ownership of and/or control over land are important indicators when describing national circumstances – for example, women's weaker land tenure rights mean they can be disproportionately impacted by disaster (Huyer, 2021). Ownership rights and control over agricultural land are also associated with higher levels of investment and productivity, higher revenues and greater economic well-being, and as such can provide a proxy for the degree of success of adaptation investments in natural resource management and agriculture.

Table 9 gives examples of SDG indicators that countries can use to provide national socioeconomic and regulatory context for establishing their agriculture-specific characteristics. BTR reporting is flexible, allowing countries to identify other aspects of national circumstances that are relevant to adaptation by tapping into the SDG indicators described here. In addition to contextual information from SDGs, countries can use information – on policies, regulations, socioeconomic demographics, climate-sensitive agriculture sectors' share of GDP and so on – that they have already provided through national communications, NAPs, NDCs or their national statistics offices.



**TABLE 9**

SDG indicators that can contribute to A-BTR reporting on national circumstances, institutional arrangements and legal frameworks (Element A)

Aspect of Element A	Metric	SDG indicator and custodian		GGA domain
A.a National circumstances relevant to adaptation actions, including biogeophysical characteristics, demographics, economy, infrastructure and information on adaptive capacity	Food security	SDG 2.1.1 SDG 2.1.2	FAO FAO	Development impact
	Secure land tenure rights	SDG 5.a.1 SDG 5.a.2	FAO FAO	Vulnerability (socioeconomic)
	Sustainable and resilient food production systems	SDG 2.4.1	FAO	Resilience and adaptive capacity
	Status of ecosystems supporting agriculture production	SDG 14.4.1 SDG 15.1.1 SDG 15.4.2	FAO FAO FAO	Vulnerability (ecological)
A.b Institutional arrangements and governance and legal frameworks for assessing impacts, addressing climate change at sectoral level, decision-making, planning, coordination, addressing cross-cutting issues, adjusting priorities and activities, participation, implementation, data governance, M&E and reporting	Integration of climate change measures into national policies, strategies and planning	SDG 13.1.3 SDG 13.2.1	UNDRR UNFCCC	Resilience and adaptive capacity

Source: Authors' own elaboration.

## Element B: Climate impacts, risks and vulnerabilities

Under Element B of the A-BTR, countries provide information on the current and future climate impacts they face, to help understand their risks and vulnerabilities. This includes how climate parameters are shifting and how this is impacting socioeconomic dimensions. Since reducing vulnerability is an important GGA objective, providing this information is crucial to highlight a country's current vulnerability levels, establish its needs, develop targets to reduce its vulnerability and set a baseline for assessing adaptation results in terms of vulnerability reduction. It involves a specific process of assessing vulnerability and linking this information with climate data.

To report on climate impacts, risks and vulnerabilities within the agriculture sectors, countries can use physical manifestations on the agriculture sectors, including changes in variability, long-term historical and projected changes and changes in climate extremes, based on available meteorological and climate information systems. To describe how these climatic shifts have impacted climate-sensitive sectors such as agriculture, SDG and SFDRR indicators can help provide indicative information on vulnerability.

Countries can report on the ecological and socioeconomic dimensions of vulnerability by selecting agriculture-specific SDG and SFDRR indicators as proxies of vulnerability (see Table 10 and section 3.2). For example, an absence or lack of natural resources or inadequate



socioeconomic conditions increases a community's or agrisystem's susceptibility to the impacts of climate change. Data and information on availability, efficiency and sustainability of water usage<sup>7</sup> (SDG 6.4.2) will be crucial to show the extent to which communities are water-stressed and subsequently more susceptible to climate change, as water scarcity will put pressure on food production, health and environment. In addition to precipitation, availability of water resources for irrigation is a major determinant of global crop production, particularly in arid and semi-arid countries. Where this variable is impacted by climate change, agriculture productivity is highly vulnerable; as such, irrigation is one of the main ways to stabilize and increase food production and rural incomes (FAO, 2021b). Countries can report on climate vulnerability by mapping how natural resources and socioeconomic dimensions of vulnerability are affected by past, current and projected changes in the country's climate, including changes in the frequency and severity of climate-related hazards.

To describe climate impacts on the agriculture sectors, countries can also use information that they already report on elsewhere - for example, on proportion of the population and physical assets affected by disasters (SDG 13.1.1, SFDRR C-2, SDG 1.5.2) and direct agricultural losses attributed to disasters (SFDRR C-2). Screening climate impacts, risks and vulnerabilities in agricultural systems and economies would give a sense of the type of adaptation responses a country needs, based on its exposure to climate change. Countries may also review rural income and livelihood data. Although these are scarce in many countries, the methodology for SDG 2.3.1 and 2.3.2 offers a complete breakdown of who small-scale producers are, what they earn and how much they produce. Data on water stress, labour productivity and small-scale food producer incomes are crucial for identifying where food production might face more severe constraints due to climate change.

Information on land cover, land cover change and land productivity plays an important role in the climate system, as climate change exacerbates land degradation and increasingly impacts people living in already degraded or desertified areas. By monitoring land cover change, net productivity and carbon stock, countries will gain a measure of optimal land productivity and potential performance of measures to combat desertification and improve degraded lands and soils, and lands affected by drought and flooding. Evidence is crucial for planning, implementing and monitoring adaptation.

The status of ecosystems that support agriculture production can also complement the overview. Indicators under SDG 15 monitor forest land and mountain vegetation cover, giving countries a measure of the state, conservation and health of their forest ecosystems, which play a crucial role in lessening the impact of climate change. FAO manages all forest cover data and collects data for indicators 15.1.1 and 15.2.1 through its Global Forest Resources Assessment,<sup>8</sup> and officially nominated national focal points already submit data in their country reports. Forest-related indicators are relevant, as sustainably managed forests

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<sup>7</sup> *Water usage* is defined as water that is directly abstracted or received by an industry or household from another industry. Distinct from *water abstraction* or *water withdrawal*, which are defined as water removed from a river, lake, reservoir or aquifer.

<sup>8</sup> [www.fao.org/forest-resources-assessment/en/](http://www.fao.org/forest-resources-assessment/en/).



provide a range of products and services – such as soil protection, clean air and water, food, fuel and medicines – that are important for forest-dependent people, local communities and the global community, and are therefore central to developing adaptation solutions. Indicators under SDG 14 provide a picture of fish stock sustainability within FAO fishing areas and marine activities, giving countries intelligence on optimum levels of fishing and aquatic resources. When coupled with an analysis of vulnerability and adaptive responses in fisheries and their dependent communities, this is crucial information for tackling the impacts of climate change.

**TABLE 10**

SDG and SFDRR indicators that can contribute to A-BTR reporting on climate impacts, risks and vulnerabilities (Element B)

Aspect of Element B	Metric	SDG and SFDRR indicator and custodian		GGA domain
B.a Current and projected climate trends and hazards	Changes in temperature and precipitation			
	Extreme climate and weather events			
	Other impacts deriving from climate change			
B.b Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities	Availability of water and change in water efficiency	SDG 6.4.2	FAO	Vulnerability (ecological)
	Availability and quality of productive lands	SDG 6.4.2	FAO	Vulnerability (ecological)
	Status of ecosystems supporting agriculture production	SDG 6.4.2	FAO	Vulnerability (ecological)
	Income and livelihoods	SDG 6.4.2	FAO	Vulnerability (ecological)
	Impact on people and society	SDG 6.4.2	FAO	Vulnerability (ecological)
	Impacts on agricultural systems	SDG 6.4.2	FAO	Vulnerability (ecological)

Source: Authors' own elaboration.

## Elements C and D: Adaptation priorities, barriers, strategies, policies, plans, goals and actions

Within Elements C and D, countries can describe their national adaptation goals and targets, and their progress towards these, as well as the conceptualization and implementation status of their NDCs, NAPs and long-term strategies, and how these contribute to and integrate with their national development policies and targets.

When reporting on Element C, countries can set out priority areas, which could be climate-sensitive sectors or stakeholders, hotspots, natural ecosystems or regions that are vulnerable to climate change. For Element D, they can outline adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies.

When reporting on agriculture-specific adaptation priorities under Element C, countries can articulate any sectoral agriculture priorities stipulated in their NAPs or national climate



change strategies. This can include information on how they set priorities for climate risks and vulnerabilities (Element B). Providing an overview of these adaptation priorities will set out the context for adaptation actions and targets planned under Element D.

Countries can find much of the information they need to report under Element D in their national plans and strategies. Including information on how adaptation actions are likely to enhance adaptive capacity, strengthen resilience, reduce vulnerability to climate change and contribute to targets associated with sustainable development will also provide a basis or reference point for assessing adaptation results under Elements E and F. Countries can provide information on agriculture-specific planned adaptation targets, strategies, objectives and actions corresponding to the SDG targets outlined in Table 11 and how they:

- Reduce ecological and socioeconomic vulnerability, by reducing water stress or the proportion of degraded land owing to climate change, improving livelihoods and income levels, and so on.
- Strengthen resilience and enhance adaptive capacity, by enabling improved practices in sustainable and resilient ecosystems, food production systems, genetic resource diversity and integration of climate change into national policies, plans and strategies, and so on.
- Achieve development impacts, by sustaining agricultural development, enabling food security, reducing economic losses in agriculture, improving impacts on people and society, and so on.

**TABLE 11**

SDG and SFDRR goals and targets that can contribute to A-BTR reporting on adaptation priorities and strategies (Elements C and D)

Aspects of Elements C and D	Metric	SDG and SFDRR targets	GGA domain
C. Adaptation priorities and barriers	SDG 1. End poverty in all its forms everywhere		
	Impacts on agricultural systems	1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters.	Vulnerability (socioeconomic) Development impact
D. Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies	SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture		
	Food security	2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.	Development impact
	Income and livelihoods	2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.	Vulnerability (ecological)



#### 4. Using Sustainable Development Goal metrics to inform adaptation reporting in biennial transparency reports

Sustainable and resilient food production systems	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.	Resilience and adaptive capacity
Status of diversity of genetic resources	2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources.	Resilience and adaptive capacity
Agricultural investments	2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular LDCs.	Resilience and adaptive capacity
SDG 5. Achieve gender equality and empower all women and girls		
Secure land tenure rights	5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.	Vulnerability (socioeconomic)
SDG 6. Ensure availability and sustainable management of water and sanitation for all		
Availability of water and change in water efficiency	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.	Vulnerability (ecological) Resilience and adaptive capacity
SDG 13. Take urgent action to combat climate change and its impacts		
Availability of water and change in water efficiency	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. 13.2 Integrate climate change measures into national policies, strategies and planning.	Resilience and adaptive capacity Development impact
SDG 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development		
Status of ecosystems supporting agriculture production	14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.	Vulnerability (ecological)
Sustainable and resilient ecosystems	14.6 By 2020, prohibit certain forms of fisheries subsidies that contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing countries and LDCs should be an integral part of the World Trade Organization fisheries subsidies negotiation. 14.7 By 2030, increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism. 14.b Provide access for small-scale artisanal fishers to marine resources and markets.	Resilience and adaptive capacity



SDG 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss		
Status of ecosystems supporting agriculture production	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements. 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.	Vulnerability (ecological)
Sustainable and resilient ecosystems	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	Resilience and adaptive capacity
Availability and quality of productive land	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods.	Vulnerability (ecological)
SFDRR Global target C: Reduce direct disaster economic loss in relation to global GDP by 2030		Resilience and adaptive capacity Development impact

Source: Authors’ own elaboration.

## Elements E, F and H: Progress on implementation and monitoring and evaluation of adaptation actions and processes, including good practices, experiences and lessons learned

Within Elements E and F, countries can describe their progress on implementing adaptation actions put forward in the NDCs, NAPs, adaptation and sustainable development policies and strategies, and provide information on outcomes, impacts and results of adaptation actions. Within Element H, they can consider describing their efforts to share information, good practices, experiences and lessons learned at local, national and international levels.

Under Element E, countries can detail outputs or progress with respect to the SDG targets, using output-based indicators as proxies to describe milestones reached for actions reported under section D. These include indicators on sustainable and resilient fisheries (SDG 14.6.1, 14.b.1 and 14.7.1) and forest resources (SDG 15.2.1), increased water use efficiency (SDG 6.4.1), sustainable food production systems, particularly crops and livestock (SDG 2.4.1), level of agricultural investments (SDG 2.a.1), as well as integration of adaptation measures into national policies, strategies and planning (SDG 13.1.2, 13.1.3, 13.2.1).

SDG 14.6.1, 14.b.1 and 14.7.1 measure the economic contribution of sustainable fisheries; efforts to combat illegal, unreported and unregulated fishing; and the degree of implementation of international instruments to promote and protect small-scale fisheries, which fulfil a vital role in nourishing dependent communities and households. It is more important than ever for countries to support small-scale fishers as key contributors to sustainable food systems. This can include adopting specific initiatives to implement the internationally agreed Voluntary



Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication, an internationally agreed instrument that promotes improved small-scale fisheries governance and has a dedicated chapter on disaster risks and climate change.

SDG 15.2.1 monitors forest cover, biomass stock change, proportion of forest area located within legally established protected areas and forest management plans or certification schemes to ensure the conservation, restoration and sustainable use of forests, wetlands, mountains and drylands. It also assesses progress towards sustainable forest management, quantifying: above-ground biomass stock in forest; forest area annual net change rate; forest area with independent forest management certification; and proportion of forest area under long-term management plans and within legally established protected areas. Forests are habitats for biodiversity, holding more than three-quarters of the world's terrestrial biodiversity; they also provide important environmental services, sustain livelihoods and provide food, medicine and fuel for more than a billion people, all of which are important in the context of adaptation. Forest ecosystems' capacity to adapt to climate change is crucial and countries should consider the role of the forest in adapting to the negative effects of climate change. Sustainable forest management can play an important role in reducing forest-related GHG emissions and increasing adaptability and resilience to environmental alterations induced by climate change. Sustainably managed forests can enhance both the adaptive capacity and resilience of people and ecosystems.

SDG 2.4.1 provides evidence on the implementation of different types of agricultural technique that are sensitive to climate change and environmentally, socially and economically sustainable. It highlights resilient agricultural practices that increase productivity and profitability, by ensuring decent working conditions and well-being for farmers and helps maintain ecosystem services that are crucial for responding to climate variability and extreme weather events. The indicator is assessed through 11 subindicators that capture the multidimensional nature of sustainable agriculture.

To assess agricultural investment levels, countries can use SDG 2.a.1, which quantifies government expenditure in rural infrastructure, agricultural research and extension services, technology development to enhance the agriculture sectors' productive capacity, including investments that can contribute to adaptation, such as building or operating flood control, irrigation and drainage systems, pest and disease control, reforestation, forest protection and fire prevention, rationalized exploitation of fish stocks and protecting habitats and landscapes. It is worth noting that governments tend to collect and consolidate expenditure data for the three main agriculture subsectors - agriculture, forestry and fishing - with no further breakdown for adaptation; so, to fully capture investment in adaptation, countries should clearly identify activities that advance efforts towards achieving national adaptation targets.

Element E would also benefit from information on the genetic diversity and conservation status of seeds, cultivated plants, farmed and domesticated animals and their related wild species (SDG 2.5.1, 2.5.2). Conserving and using a range of plant and animal diversity can enhance the adaptability and resilience of agricultural systems in the face of climate change,





emerging diseases, pressures on feed and water supplies, and shifting market demands. Under SDG 2.5, countries commit to establish soundly managed and diversified seed and plant banks, promote access to genetic resources and associated traditional knowledge, and fairly and equitably share benefits arising from their use. These resources are widely recognized as essential for increasing the resilience of production systems to the effects of climate change, as diversity increases the choices available to producers in their efforts to adapt production systems and to breeders in their efforts to develop better-adapted plant and animal populations. Associated biodiversity can also contribute to adaptation by buffering against the potential loss or decline of individual species involved in the supply of ecosystem services, such as pollination (FAO, 2019e).

Under Element F, countries should articulate the outcomes, impacts and effectiveness of their adaptation actions. Although results will be context-specific and should be reported based on existing M&E systems, countries can use SDG and SFDRR indicators as proxies for assessing and reporting on progress against the different dimensions of the GGA (see Table 7 and section 3.2).

In selecting these proxies, countries may use indicators that are relevant to their specific adaptation context and priorities and build on existing M&E processes and systems. But they should bear in mind that the different dimensions of the GGA influence each other and collectively contribute towards the adaptation goals. As such, they can jointly assess how adaptation actions contribute to reduced vulnerability, strengthened resilience, enhance adaptive capacity and improved agricultural development in the context of changing climate.

Countries can use climate parameters to show how adaptation is delivering development impacts in the context of climate hazards and variability, reporting changes over different time periods and timescales in indicators of vulnerability, adaptive capacity and development impacts in the context of intensifying climate stress and variability. For example, indicators of vulnerability under Element B would highlight the state of vulnerability in the reporting year. But assessing vulnerability as a measure of progress under Element F would show changes in vulnerability indicators over the past few years, highlighting results of adaptation measures taken in previous years.

Ultimately, countries should assess and interpret different dimensions of the GGA in an interlinked manner. This means studying results from impact indicators in combination with results from vulnerability indicators and climate information to understand whether reduced vulnerability has contributed to improved impacts in the context of worsening climate hazards.



**TABLE 12**

SDG indicators that can contribute to A-BTR reporting on the implementation and M&E of adaptation actions and processes (Elements E, F and H)

Aspects of Element, E, F, H	Metric	SDG and SFDRR indicator and custodian		GGA domain
E. Progress on implementation of adaptation	Availability of water and change in water efficiency	SDG 6.4.2	FAO	Vulnerability
	Availability and quality of productive lands	SDG 15.3.1	UNCCD (FAO partner agency)	Vulnerability
	Status of ecosystems supporting agriculture production	SDG 14.4.1 SDG 15.1.1	FAO FAO	Vulnerability
	Secure land tenure rights	SDG 5.a.1 SDG 5.a.2	FAO FAO	Vulnerability
	Income and livelihoods	SDG 2.3.1. SDG 2.3.2.	FAO FAO	Vulnerability
F. Monitoring and evaluation of adaptation actions and processes	Sustainable and resilient ecosystems	SDG 15.2.1 SDG 14.7.1 SDG 14.6.1 SDG 14.b.1	FAO FAO, UNEP-WCMC FAO FAO	Resilience/ adaptive capacity
	Sustainable and resilient food production systems	SDG 2.4.1.	FAO	Resilience/ adaptive capacity
	Availability of water and change in water efficiency	SDG 6.4.1	FAO	Resilience/ adaptive capacity
	Status of diversity of genetic resources	SDG 2.5.1 SDG 2.5.2	FAO	Resilience/ adaptive capacity
	Integration of climate change measures into national policies, strategies and planning	SDG 13.1.2 SDG 13.1.3 SDG 13.2.1	UNDRR UNDRR UNFCCC	Resilience/ adaptive capacity
	Agricultural investment	SDG 2.a.1	FAO	Development impact
H. Cooperation, good practices, experience and lessons learned	Food security	SDG 2.1.1 SDG 2.1.2	FAO	Development impact
	Impacts on agricultural systems	SFDRR C-2	FAO	Development impact
	Impact on people and society	SDG 1.5.2 SDG 13.1.1	UNDRR	Resilience/ adaptive capacity

Source: Authors' own elaboration.

## Element G: Loss and damage

Element G allows countries to report on observed and potential climate change impacts, including those related to extreme weather events and slow onset events, as well as activities related to averting, minimizing and addressing associated loss and damage. Two indicators from the 2030 Agenda and SFDRR refer to the concept of loss attributed to natural disasters (see Table 13). SDG 1.5.2 assesses the monetary value of total or partial destruction of physical



assets in the affected area as a share of GDP, while SFDRR C-2 differentiates between the total or partial destruction of physical assets (production and asset damage) and changes in economic flows (production loss) arising from a range of disaster events, including climate-related events. SFDRR C-2 quantifies baseline data that can be disaggregated by agricultural commodity type, hazard and subnational administrative level, information that countries can use to standardize disaster impact assessments in agriculture by monitoring global targets on climate resilience of crops, livestock, forestry, aquaculture and fisheries.

**TABLE 13**

SDG indicators that can contribute to A-BTR reporting on loss and damage (Element G)

Aspect of Element G	Metric	SDG and SFDRR indicator and custodian		GGA domain
G. Information related to averting, minimizing and addressing loss and damage associated with climate change impacts	Impacts on agricultural systems	SFDRR C-2 SDG 1.5.2	UNDRR FAO	Development impact

**Source:** Authors’ own elaboration.

### 4.3 The way forward

Integrating adaptation reporting with SDG and SFDRR global measurable targets and their corresponding indicators allows countries to leverage existing statistical information, methodologies for data collection and reporting systems. Indeed, countries are advised to define adaptation targets together with development goals that will be affected by climate-related challenges. But countries cannot monitor adaptation solely with the selection of global SDG and SFDRR indicators presented in this paper. Rather, these can provide an incentive to start using statistical data that has already been collected through internationally established quantitative methodologies and standards for assessing the status of achievements of the SDGs.





This section takes a step forward in the global discussion on approaches to review and aggregate progress towards the GGA, by making a case for using key adaptation metrics that allow countries to balance the needs for context-specificity to capture the multisectoral aspects of adaptation in agriculture on the one hand and for combining and aggregating information under the GGA on the other. Table 14 can guide countries in exploring how reporting for the SDG indicators that are under FAO custodianship can help them compile information for the A-BTR.

The applicability of this model depends on a country’s capacity to build a common understanding of adaptation goals and targets, and review their achievements. Although there is a long way to go for a common global understanding of how to measure progress on the GGA, an applicable metric framework for assessing adaptation in the agriculture sectors that works at multiple scales can inform the definition of a set of globally applicable

review criteria at national level. To test the applicability of the approach proposed here, countries are encouraged to identify which SDG indicators relate to specific adaptation challenges, responses and expected impacts.




**TABLE 14**

SDG indicators that can contribute to A-BTR reporting on loss and damage (Element G)

Goal	Indicator	Custodian	Tier	Element of the MPGs	Metric	
	1.5.2	Direct economic loss	UNDRR (FAO partner agency)	2	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process G. Loss and damage	Impacts on agricultural systems
	2.1.1	Hunger	FAO	1	A. National circumstances E. Implementation of adaptation F. M&E of adaptation action and process	Food security
	2.1.2	Severity of food insecurity	FAO	1	A. National circumstances E. Implementation of adaptation F. M&E of adaptation action and process	Food security
	2.3.1	Productivity of small-scale food producers	FAO	2	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process	Income and livelihoods
	2.3.2	Income of small-scale food producers	FAO	1	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process	Income and livelihoods
	2.4.1	Agricultural sustainability	FAO	2	A. National circumstances E. Implementation of adaptation F. M&E of adaptation action and process	Sustainable and resilient food production systems
	2.5.1	Conservation of plant and animal genetic resources for food and agriculture	FAO	1	E. Implementation of adaptation F. M&E of adaptation action and process	Status of diversity of genetic resources
	2.5.2	Risk status of livestock breeds	FAO	2	E. Implementation of adaptation F. M&E of adaptation action and process	Status of diversity of genetic resources
	2.a.1	Public investment in agriculture	FAO	1	E. Implementation of adaptation F. M&E of adaptation action and process	Agricultural investments
		5.a.1	Women's ownership of agricultural land	FAO	2	A. National circumstances E. Implementation of adaptation F. M&E of adaptation action and process
5.a.2		Women's equal rights to land ownership	FAO	2	A. National circumstances E. Implementation of adaptation F. M&E of adaptation action and process	Secure land tenure rights
	6.4.1	Water-use efficiency	FAO	1	E. Implementation of adaptation F. M&E of adaptation action and process	Availability of water and change in water efficiency
	6.4.2	Water stress	FAO	1	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process	Availability of water and change in water efficiency



## Using metrics to assess progress towards the Paris Agreement's Global Goal on Adaptation

	13.1.1	Number of deaths and directly affected persons attributed to disasters	UNDRR	1	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process	Impact on people and society
	13.1.2	Number of countries that adopt and implement national DRR strategies	UNDRR	2	C. Adaptation priorities D. Adaptation strategies E. Implementation of adaptation F. M&E of adaptation action and process	Integration of climate change measures into national policies, strategies and planning
	13.1.3	Proportion of local governments that adopt and implement local DRR strategies	UNDRR	2	A. National circumstances C. Adaptation priorities D. Adaptation strategies E. Implementation of adaptation F. M&E of adaptation action and process	Integration of climate change measures into national policies, strategies and planning
	13.2.1	Number of countries with NDC, long-term strategies, NAP and AC	UNFCCC	2	A. National circumstances C. Adaptation priorities D. Adaptation strategies E. Implementation of adaptation F. M&E of adaptation action and process	Integration of climate change measures into national policies, strategies and planning
	14.4.1	Fish stock sustainability	FAO	1	A. National circumstances B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process	Status of ecosystems supporting agriculture production
	14.6.1	Illegal, unreported and unregulated fishing	FAO	1	E. Implementation of adaptation F. M&E of adaptation action and process	Sustainable and resilient ecosystems
	14.7.1	Value added of sustainable fisheries	FAO, UNEP-WCMC	1	E. Implementation of adaptation F. M&E of adaptation action and process	Sustainable and resilient ecosystems
	14.b.1	Access rights for small-scale fisheries	FAO	1	E. Implementation of adaptation F. M&E of adaptation action and process	Sustainable and resilient ecosystems
	15.1.1	Forest area	FAO	1	A. National circumstances B. Impacts, risks and vulnerabilities	Status of ecosystems supporting agriculture production
	15.2.1	Sustainable forest management	FAO	1	E. Implementation of adaptation F. M&E of adaptation action and process	Sustainable and resilient ecosystems
	15.3.1	Land degradation	UNCCD (FAO partner agency)	1	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process	Availability and quality of productive land
	15.4.2 15.4.2a 15.4.2b	Mountain Green Cover Mountain Green Cover Index Proportion of degraded mountain land	FAO	1	A. National circumstances B. Impacts, risks and vulnerabilities	Status of ecosystems supporting agriculture production
	SFDRR C-2	Direct agricultural loss attributed to disasters	FAO	-	B. Impacts, risks and vulnerabilities E. Implementation of adaptation F. M&E of adaptation action and process G. Loss and damage	Impacts on agricultural systems

Source: Authors' own elaboration.



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## 5. Conclusions

Assessing adaptation progress towards the GGA is complex. A key challenge is the lack of methodology and universal metrics that can easily capture enhanced adaptation across a range of contexts (UNFCCC, 2022), while national capacity issues make reporting burdensome under different framework conventions. This document proposes a conceptual framework and approach that allows countries to identify agriculture-specific SDG metrics that they can use to report adaptation progress against the GGA's three domains. These are designed to contribute to the Paris Agreement's EFT, which provides a uniform overarching process for tracking progress on national adaptation through the GGA and the A-BTR.

At a time when countries are advancing the design and implementation of national M&E for adaptation, reflecting and reaching a common understanding around a set of adaptation metrics for assessing and reporting on the adaptation goals and targets countries have defined under their NDCs and NAPs is vital. The challenge is twofold, as the metrics should assess progress towards the GGA at national and local levels in a way that reflects national priorities and country's determination and ambition, while also providing valuable information to inform the GGA. To be successful at local, national and international levels, conceptual clarity on how to measure the three GGA domains - vulnerability, adaptive capacity and resilience - is a cornerstone of these efforts. Recognizing the methodological challenges, this paper outlines a possible way forward and aims to help countries report on adaptation in the agriculture sectors, in the context of the Paris Agreement.

The paper starts by recalling the international policy context for adaptation reporting under the ETF, GGA and GST, and highlights how these processes provide an opportunity to establish and advance on national M&E systems while creating an evidence-based set of adaptation metrics. It unpacks the key domains of the GGA, how countries can identify adaptation metrics for the agriculture sectors to capture progress towards reducing climate vulnerability and enhancing resilience and adaptive capacity in the short, medium and long terms.

It elaborates on the linkages between adaptation, the SDGs and DRR, and how progress towards the 2030 Agenda and SFDRR are likely to increase the adaptive capacity and resilience of societies, livelihoods and ecosystems. Comparing the common adaptation objectives of the three international agreements makes a clear case for the benefits of aligning reporting efforts and the pertinence of making reference to adaptation metrics by using SDG and SFDRR indicators under FAO custodianship. On the basis of the widely recognized consideration that adaptation actions in the agriculture sectors are key to achieving the GGA, the paper focuses on effectively guiding ongoing national efforts to identify what to track - by acquiring conceptual clarity of the three elements of the GGA - and how to track it. It does so by outlining the agriculture-specific SDG indicators that countries can consider as proxies to capture a rigorous picture of national progress





towards adaptation and how they can use them to compile information for the different sections of the A-BTR.

The approach proposed in this publication is aligned with country and international organizations' submissions to the GlaSS, which emphasized the usefulness of synthesizing information and targets from multilateral frameworks, such as the 2030 Agenda and SFDRR. Their advantages lay in adopting universally agreed statistical standards, mutual accountability, comparability and aggregability of data, as well as getting support from the international agencies responsible for collecting, validating, harmonizing and publishing or sharing data from national sources, estimating regional and global aggregates. The main assumption is that, while countries can complement global indicators with national- or sector-specific indicators, aligning national with global indicators will help decrease their reporting burden (FAO, 2016c).

This paper also recognizes the importance of striking a balance between maintaining a limited number of indicators and ensuring a wide enough range to assess the diversity of adaptation responses and the context in which these are implemented. On this basis, it proposes a broad range of indicators classified into 13 metrics (see Table 3). Going beyond simply identifying indicators from the 2030 Agenda and SFDRR global monitoring frameworks, and assuming an ample variability of data quality and availability in national datasets, this paper suggests methodologies for compiling and analysing data, including an option to compile information from existing international datasets.

This approach is in line with FAO's mandate and commitment to the 2030 Agenda to get back the world on track and assess progress towards the goals of eradicating hunger and all forms of malnutrition (SDG 2), ending poverty (SDG 1) and reducing inequalities (SDG 10) by 2030, while also ensuring clean water (SDG 6), sustainable production and consumption (SDG 12), sustainable natural resource management (SDGs 14 and 15) and climate action (SDG 13). It also complements ongoing efforts to deliver the FAO Strategy on Climate Change (2022-2031) as tangible action on national and local levels, guiding countries to fulfil their commitments to the UNFCCC and Paris Agreement, enabling them to set baselines, monitor and report on their progress towards their NDC and NAP commitments.

Integrating adaptation reporting with global Paris Agreement, SDG and SFDRR measurable targets and indicators will help countries reach a common understanding of how to assess the different elements of the GGA, track implementation of adaptation action and measures, and quantify adaptation impacts and results, while also informing progress towards the GGA and ultimately improving reporting on adaptation under the UNFCCC. This paper intends to guide countries towards progressively more comprehensive and rigorous assessments of the GGA, while striking a balance between the top-down metrics and indicators and the context-specificity of local adaptation. The paper can be considered the beginning of a discussion that can only be advanced by countries testing the approach in their adaptation reporting systems.



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# Glossary

## **Adaptation communication (AC)**

The adaptation communication was established in Article 7 of the Paris Agreement and subsequent CMA decisions. Its purposes are to: (i) enhance visibility and profile of adaptation, and balance with mitigation; (ii) provide input to the GST; (iii) strengthen adaptation action and support for developing countries; and (iv) enhance learning and understanding of adaptation needs and actions. It can be submitted and updated, as a component of/in conjunction with other communications, including a NAP, an NDC, a national communication and/or a BTR. It can also be submitted as a stand-alone document. It should be submitted in time to inform each GST (UNFCCC, 2021b).

## **Adaptation metric**

*Metric* refers to a system or standard of measurement. The term is often used interchangeably in the literature with *indicator*. Adaptation metrics are standards to measure adaptation to climate change. They are essential for assessing vulnerability, risk, resilience or climate impacts, tracking implementation of adaptive responses, and monitoring and measuring adaptation results (IPAM, 2023).

## **Adaptive capacity**

Adaptive capacity are a system's ability to respond, recover and address the adaptation deficit. *Adaptive capacity* is essentially linked to the existence of the knowledge, policies, institutions that can help a system become resilient, where *resilience* is the capacity to absorb, respond and transform in the face of climate shocks and disturbances (FAO, 2016b). *Resilience* is a broader state or attribute, while *adaptive capacity* can be considered as the capabilities that can be harnessed to enable resilient (food) systems. (FAO, 2014)

## **Agriculture sectors**

The term *agriculture sectors*, used throughout this paper, refers to crop-based farming systems and livestock systems, including rangelands and pasturelands, forestry and fisheries, including capture fisheries (fish caught from wild stocks in marine, coastal, offshore and freshwater ecosystems) and aquaculture (breeding, rearing and harvesting plants and animals in all types of aquatic environment). Forests are land spanning more than 0.5 hectares with trees higher than 5 metres and more than 10 percent canopy cover, or trees able to reach these thresholds in situ (FAO, 2017b).

## **Biennial transparency report (BTR)**

Under the ETF, countries will submit a BTR, with the scope of including voluntary information on nine areas on adaptation, known as Elements A-I. This includes planning-oriented



information on planned actions, priorities and goals and reporting-oriented information on progress against adaptation goals and strategies. Countries will submit their first BTRs in 2024, in accordance with the MPGs (see **ETF modalities, procedures and guidelines**). The adaptation component of the BTR (A-BTR) is voluntary; but it is the only instrument under the ETF capable of facilitating reporting on adaptation and contributes to collective understanding of adaptation (Dale, Christiansen and Neufeldt, 2020).

### **Climate resilience**

FAO defines *climate resilience of agricultural systems* as “the ability to prevent disasters and crises as well as to anticipate, absorb, accommodate, or recover from them in a timely, efficient, and sustainable manner. This includes protecting, restoring and improving livelihoods systems in the face of threats that impact agriculture, nutrition, food security and food safety” (FAO, 2014).

### **Climate risks and hazards**

IPCC observes global climate hazards as “the potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.” (IPCC, 2018). It defines climate risks as the potential for adverse consequences for human or ecological systems, recognising the diversity of values associated with such systems (IPCCC, 2022a).

### **Climate variability**

IPCC defines climate variability as variations in the mean state and other statistics (such as standard deviations or the occurrence of extremes) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability) (IPCC, 2019b).

### **Disaster risk reduction (DRR)**

DRR denotes both a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazards or vulnerability; and improving resilience (IPCC, 2019b).

### **Enhanced Transparency Framework (ETF)**

Aiming to strengthen the global response to the threat of climate change, Parties adopted the Paris Agreement in 2015 and through it, established the ETF. The Paris Agreement's ETF for action and support specifies how countries should report on their progress in mitigating and adapting to climate change (UNFCCC, 2016; 2023b).

### **ETF modalities, procedures and guidelines (MPGs)**

The Paris Agreement contains additional provisions on adaptation reporting under the ETF (Article 13), and its MPGs. The MPGs were adopted at COP24 and provide more robust,



clearer and more effective principles to collect, manage, and share relevant and high-quality data to inform and advance climate action (Dale, Christiansen and Neufeldt, 2020).

### **Global Goal on Adaptation (GGA)**

The UNFCCC Paris Agreement set a GGA under Article 7.1 for enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response to climate change impacts. The GGA was decided to drive and enhance global adaptation ambition setting and action to give an equal weight to the long-term goal to limit global warming to 1.5 °C as referred to in Article 2 (UNFCCC, 2016).

### **Global Stocktake (GST)**

Established under Article 14 of the Paris Agreement, the GST is designed to “to assess the collective progress towards achieving the purpose of [the Paris] Agreement and its long-term goals.” In other words, it will evaluate progress at global – not individual country – level and identify overall trends that should inform countries’ national climate commitments (or NDCs), which they are required to update at least every five years. The current GST will inform NDCs to be brought forward in 2025 (UNFCCC, 2016; 2023a).

### **Monitoring and evaluation (M&E)**

M&E is a continuous management function to assess whether progress is made in achieving expected results, spot bottlenecks in implementation and highlight any unintended effects (positive or negative) of an investment plan, programme or project and its activities. M&E facilitates learning from past successes and challenges and those encountered during implementation (FAO, 2023a).

### **National communications**

Parties to the UNFCCC are required to submit national communications on a periodic basis as their reporting obligation. To meet their commitments for reporting under the UNFCCC, Annex I Parties<sup>1</sup> are required to prepare national communications every four years (UNFCCC, 2023c). Non-Annex I Parties<sup>2</sup> should provide a description of their national and regional development priorities, objectives and circumstances, on the basis of which they will address climate change and its adverse impacts. This description may include information on features of their geography, climate and economy that may affect their ability to deal with mitigating and adapting to climate change, and on their specific needs and concerns arising from the adverse effects of climate change and/or the impact of implementing response measures (UNFCCC, 2002).

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1 UNFCCC distinguishes Annex I parties as industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

2 UNFCCC defines non-Annex I parties as developing countries.



### **Nationally determined contributions (NDCs)**

A UNFCCC mechanism for countries that have joined the Paris Agreement to outline their plans for reducing GHG emissions. Some countries' NDCs also address how they will adapt to climate change impacts, and what support they need from, or will provide to, other countries to adopt low-carbon pathways and build climate resilience. According to Article 4 (paragraph 2) of the Paris Agreement, each Party shall prepare, communicate and maintain the successive NDCs it intends to achieve. In the lead-up to the COP21 in Paris in 2015, countries submitted their intended NDCs, which, unless they decide otherwise, becomes their first NDC on joining the Paris Agreement (IPCC, 2019b).

### **Prevalence of undernourishment**

The *prevalence of undernourishment* is an estimate of the proportion of the population whose habitual food consumption is insufficient to provide the dietary energy levels required to maintain a normal active and healthy life. It is expressed as a percentage. This indicator will measure progress towards SDG Target 2.1. (FAO, 2023b).

### **Sendai Framework for Disaster Risk Reduction (SFDRR)**

The SFDRR 2015-2030 outlines seven clear targets and four priorities for action to prevent new - and reduce existing - disaster risks. The voluntary, non-binding agreement recognises that the state has the primary role to reduce disaster risk but that responsibility should be shared with local government, the private sector and other stakeholders, to substantially reduce disaster risk and loss of lives, livelihoods, health and the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries (IPCC, 2019b).

### **Vulnerability**

IPCC explains *vulnerability* in terms of susceptibility to harm and as a function of exposure, sensitivity and adaptive capacity (IPCC 2014). Drawing on the conceptual framings of livelihoods and poverty frameworks, it can also be defined in terms of the "degree to which a system is susceptible to injury, damage or harm" (Smit & Pilifosova, 2003).





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# Annexes

## Annex 1. SDG and SFDRR indicators

- 1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product.
- 2.1.1 Prevalence of undernourishment.
- 2.1.2 Percentage of moderate or severe food insecurity in the population based on the Food Insecurity Experience Scale.
- 2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size.
- 2.3.2 Average income of small-scale food producers, by sex and indigenous status.
- 2.4.1. Proportion of agricultural area under productive and sustainable agriculture.
- 2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities.
- 2.5.2 Proportion of local breeds classified as being at risk, not-at-risk or at unknown level of risk of extinction.
- 2.a.1 The Agriculture Orientation Index for Government Expenditures.
- 5.a.1 Percentage of people with ownership of secure rights over agricultural land (by sex).
- 5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.
- 6.4.1 Change in water-use efficiency by sector.
- 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources.
- 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population.
- 13.1.2 Number of countries that adopt and implement national DRR strategies in line with the SFDRR.
- 13.1.3 Proportion of local governments that adopt and implement local DRR strategies in line with national DRR strategies.
- 13.2.1 Number of countries with nationally determined contributions, long-term strategies, NAPs and adaptation communications, as reported to the secretariat of the UNFCCC.





- 14.2.1 Proportion of national exclusive economic zones managed using ecosystem-based approaches.
  - 14.4.1 Proportion of fish stocks within biologically sustainable levels.
  - 14.6.1 Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing.
  - 14.7.1 Sustainable fisheries as a percentage of GDP on small island states, LDC and all countries.
  - 14.b.1 Degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries.
  - 15.1.1 Forest area as a proportion of total land area.
  - 15.2.1 Progress towards sustainable forest management.
  - 15.3.1 Proportion of land that is degraded over total land area.
  - 15.4.2 Mountain Green Cover Index [15.4.2a: Mountain Green Cover Index and 15.4.2b: Proportion of degraded mountain land].
- SFDRR C-2 Direct agricultural loss attributed to disasters.

**Sources:** FAO SDG Indicator portal: <https://www.fao.org/sustainable-development-goals/indicators/en/> and UNDRR Monitoring Sendai Framework: <https://www.undrr.org/monitoring-sendai-framework>.



## Annex 2. Case study: Applicability of SDGs to the Guatemala adaptation monitoring, evaluation and reporting system for agriculture

This case study aims to illustrate the applicability of Guatemala's proposed approach by shedding light on the coherence between selected SDGs and the indicators of Guatemala's monitoring, evaluation and reporting system (MER-agriculture), the Sistema de Monitoreo, Evaluación y Reporte (SIPSE). FAO supported Guatemala in developing a national system to track adaptation progress in the agriculture sectors. The effort was led by the Ministry of Agriculture, Livestock and Food Security, Ministerio de Agricultura, Ganadería y Alimentación (MAGA), in close collaboration with the Ministry of Environment and Natural Resources, Ministerio de Ambiente y Recursos Naturales.

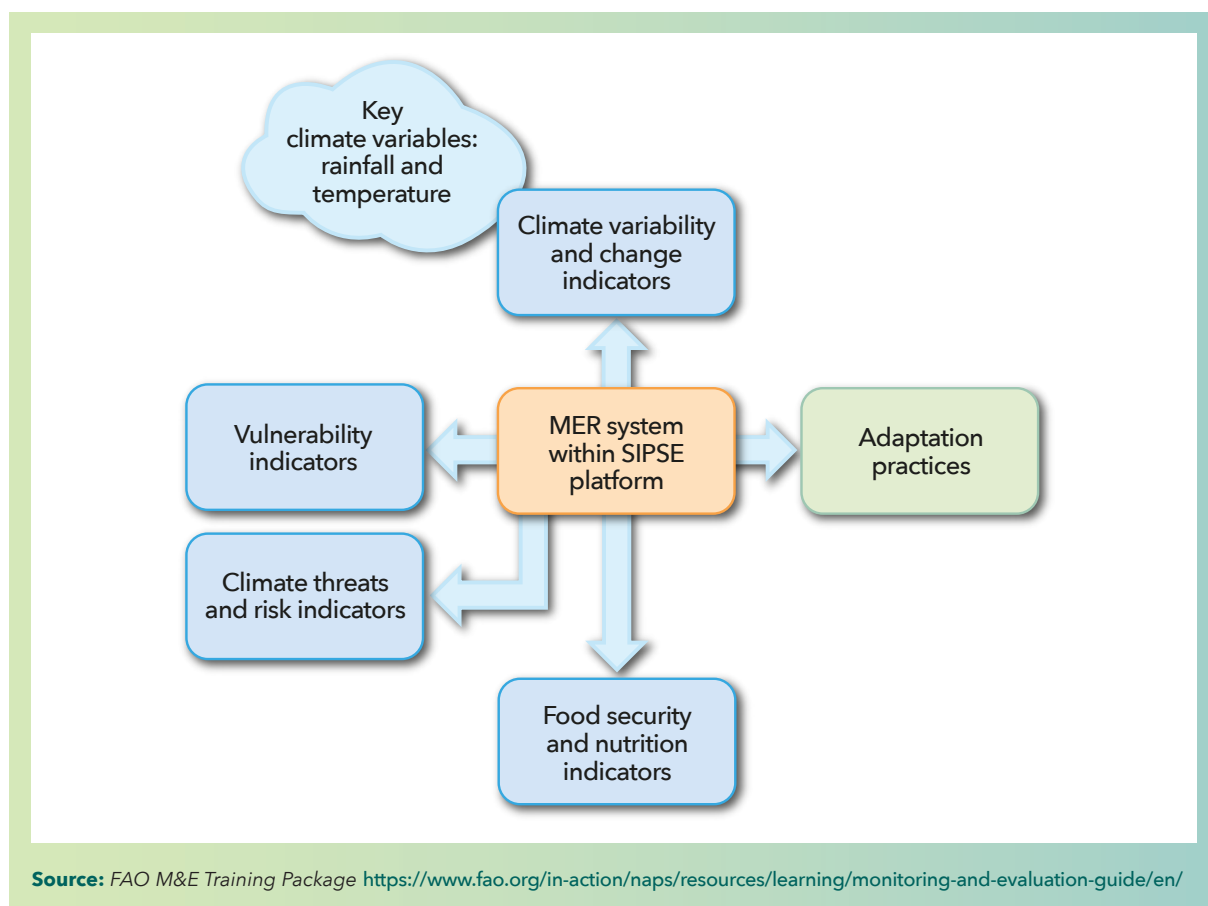
MER-agriculture is a results-based system that defines indicators for measuring the results of implementing adaptation policy goals and actions. It was designed to cover adaptation actions in four important agriculture subsectors - agriculture, livestock, forestry and fisheries, with food security as a cross-cutting theme. The indicators were identified and categorised into five subsystems (see Figure 12):

- Climate variability, such as data on rainfall and temperature.
- Vulnerability, broken down into sensitivity and adaptive capacity and considering the diverse physical, economic, social and cultural aspects of vulnerability.
- Risks and threats to biophysical systems and dependent human systems.
- Food security.
- Adaptation practices, including a set of prioritised practices implemented by MAGA.

MER-agriculture comprises 102 indicators. Table 14 presents a selection of these, organized by subsystem, with their most pertinent SDG indicator, highlighting opportunities for coordinating data generation, gathering and analysis between the entities responsible for adaptation reporting and those engaged in reporting under the 2030 Agenda. The table also illustrates how these data could inform different elements of the A-BTR.



**FIGURE A2.1.** Design of Guatemala MER-agriculture and its categories of indicators



**Source:** FAO M&E Training Package <https://www.fao.org/in-action/naps/resources/learning/monitoring-and-evaluation-guide/en/>

**TABLE A2.1**

A sample of adaptation indicators for the agriculture sectors in Guatemala's M&E system, with corresponding SDG indicators and elements of the A-BTR

MER-agriculture subsystem	MER-agriculture indicator	SDG indicator	Element of the A-BTR
Vulnerability	Minimum wage for agricultural, non-agricultural activities	2.3.2 Income of small-scale food producers	E. Progress on implementation of adaptation
	Budget allocation according to the Strategic Plan for Food and Nutritional Security	SDG 2.a.1 Public investment in agriculture	Vulnerability
	Public investment in areas with high and very high rates of the Index of Vulnerability to Nutritional Food Insecurity		
Risks and threats	Proportion of the forest area in the total extension of the country (%) Forest cover (hectares) by forest type	SDG 15.1.1 Forest area	A. National circumstances B. Impacts, risks and vulnerabilities
	Annual deforestation rate - national and departmental Forest fires: type of fire and area affected Forest fires by forest type and affected area	SDG 15.2.1 Progress towards sustainable forest management	B. Impacts, risks and vulnerabilities D. Adaptation strategies E. Implementation of adaptation
	Protected areas: quantity and extension (hectares) by management category	SDG 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	A. National circumstances B. Impacts, risks and vulnerabilities
Food security and nutrition	Prevalence of food and nutrition insecurity (in households)	SDG 2.1.2 Severity of food insecurity	A. National circumstances B. Impacts, risks and vulnerabilities
	Proportion of children < five years who are underweight for age - global malnutrition Proportion of children < five years with chronic malnutrition	SDG 2.1.1 Prevalence of undernourishment	A. National circumstances B. Impacts, risks and vulnerabilities
Adaptation practices	Hectares under improved agricultural productive systems	SDG 2.4.1 Proportion of agricultural area under productive and sustainable agriculture	A. National circumstances E. Progress on implementation of adaptation
	Vulnerable families affected by agroclimatic phenomena and others, benefited from the delivery of food rations	SDG 13.1.1 Number of deaths and directly affected persons attributed to disasters	B. Impacts, risks and vulnerabilities

**Source:** Adapted from **FAO & UNDP**. 2020. *Guatemala's progress in developing a national monitoring and evaluation system for adaptation in the agriculture sectors*. Rome. <https://www.fao.org/3/cb2454en/cb2454en.pdf>.



### **Annex 3. Case study: Applicability of SDGs to the Colombia information system on vulnerability, risk and adaptation**

This case study aims to illustrate the applicability of Colombia's proposed approach by shedding light on the coherence between selected SDGs and the indicators of the Colombia Climate Change Information System (Sistema Nacional de Información sobre Cambio Climático, SNICC). This system is informed by the Subsystem on Information on Vulnerability, Risk and Adaptation (Sub-Sistema Integrador de Información sobre Vulnerabilidad, Riesgo y Adaptación, SIIVRA) under the management of the Institute of Hydrology, Meteorology and Environmental Studies (Instituto de Hidrología, Meteorología y Estudios Ambientales, IDEAM).

FAO has been working with the Ministry of Agriculture and Rural Development (Ministerio de Agricultura y Desarrollo Rural, MADR) to improve adaptation reporting under the Paris Agreement. On the basis of the theoretical approach adopted by Colombia's Third National Communication to the UNFCCC and the original set of 113 adaptation indicators for assessing vulnerability and risk in six priority areas – food security, water resources, biodiversity, health, human habitat and infrastructure – these were further refined, selected and classified into hazards, sensitivity and adaptive capacity indicators.

Indicators were chosen based on a set of criteria, which had already been applied for the Third National Communication – availability of information for the required time period/baseline, data availability at departmental and municipal scale, and relevance to the agriculture sectors – and a focus on three priority areas: food security, water resources and biodiversity. The analysis included more targeted indicators, based on information and microdata from the National Department of Statistics' (Departamento Administrativo Nacional de Estadística, DANE) most recent National Agricultural Census. Based on these data, information was identified for the country's 1 122 municipalities, obtaining 23 sensitivity indicators, 15 adaptive capacity indicators and 28 threat indicators.

Table 15 presents a selection of these adaptation indicators, organized by type and dimension, with their most pertinent SDG indicator, illustrating opportunities for coordinating data generation, gathering and analysis between the entities responsible for adaptation reporting and those engaged in reporting under the 2030 Agenda. The table also illustrates how these data could inform different elements of the A-BTR.



**TABLE A3.1**

A sample of adaptation indicators for the agriculture sectors in Colombia's M&E system, with corresponding SDG indicators and elements of the A-BTR

Indicator type	Dimension	Indicator	SDG indicator	Element of the A-BTR
Hazard	Food security and nutrition	Economic losses in the agriculture sectors due to extreme weather events Change in surface of optimal agroclimatic zones in potato/ sugar cane/ banana/ coffee/ mays/ rice/ bean cultivation/ forest plantations/ palm oil/beef/ pasture	SDG 1.5.2 Direct economic loss attributed to disasters in relation to global GDP	B. Impacts, risks and vulnerabilities G. Loss and damage
	Biodiversity	Average performance in aquaculture Annual average fish catch within safe biological limits Productivity of fish populations	SDG 14.4.1 Proportion of fish stocks within biologically sustainable levels	B. Impacts, risks and vulnerabilities
	Water	Projected change in water supply/demand for agricultural/ livestock use	SDG 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	B. Impacts, risks and vulnerabilities
Sensitivity	Food security and nutrition	Percentage of degraded land and agricultural land	SDG 15.3.1 Proportion of land that is degraded over total land area	B. Impacts, risks and vulnerabilities
	Biodiversity	Percentage of area by municipality corresponding to forest	SDG 15.1.1 Forest area as a proportion of total land area	B. Impacts, risks and vulnerabilities
	Water	Index of efficiency in the use of water	SDG 6.4.2 Change in water-use efficiency over time	B. Impacts, risks and vulnerabilities
Adaptive capacity	Food security and nutrition	Proportion of agricultural area under sustainable agriculture	SDG 2.4.1 Proportion of agricultural area under productive and sustainable agriculture	A. National circumstances E. Progress on implementation of adaptation
		Percentage of people with property rights over agricultural land (in proportion to the rural population) by sex	SDG 5.a.1 Percentage of people with ownership of secure rights over agricultural land (by sex)	A. National circumstances
	Water	Sectoral investments of territorial entities inside and outside the Departmental Water Plan	SDG 2.a.1 Public investment in agriculture	E. Progress on implementation of adaptation
	Biodiversity	Proportion of five dominant crop varieties to overall crops at the municipal level	SDG 2.5.1 Conservation of plant and animal genetic resources for food and agriculture	E. Progress on implementation of adaptation

**Source:** Adapted from **FAO and UNDP**. 2022. *Colombia: advancing monitoring and evaluation of adaptation in the agriculture sector*. Rome. [www.fao.org/documents/card/en/c/cb9890en](http://www.fao.org/documents/card/en/c/cb9890en)





## Annex 4. Methodologies and resources for the compilation of data from the SDG indicators under FAO custodianship

FAOSTAT SDG Indicators. Data domain. [www.fao.org/faostat/en/#data/SDGB](http://www.fao.org/faostat/en/#data/SDGB)

Factsheets on the 21 SDG indicators under FAO custodianship. [www.fao.org/3/ca8958en/CA8958EN.pdf](http://www.fao.org/3/ca8958en/CA8958EN.pdf)

**TABLE A4.1**

SDG indicators: methodologies and resources

Methodologies	Resources
SDG 2.1.1 Hunger	
FAO webpage	<a href="http://www.fao.org/sustainable-development-goals/indicators/211/en/">www.fao.org/sustainable-development-goals/indicators/211/en/</a>
SDG 2.1.1 e-learning course	<a href="https://elearning.fao.org/course/view.php?id=386">https://elearning.fao.org/course/view.php?id=386</a>
SDG 2.1.2 Severity of food insecurity	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/212/en/">www.fao.org/sustainabledevelopment-goals/indicators/212/en/</a>
SDG 2.1.2 e-learning course	<a href="https://elearning.fao.org/course/view.php?id=360">https://elearning.fao.org/course/view.php?id=360</a>
SDG 2.3.1 Productivity of small-scale food producers	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/231/en/">www.fao.org/sustainabledevelopment-goals/indicators/231/en/</a>
SDG 2.3.2 Income of small-scale food producers	
FAO webpage	<a href="http://www.fao.org/sustainable-development-goals/indicators/232/en/">www.fao.org/sustainable-development-goals/indicators/232/en/</a>
E-Learning course for SDG 2.3.1 and 2.3.2	<a href="https://elearning.fao.org/course/view.php?id=483">https://elearning.fao.org/course/view.php?id=483</a>
SDG 2.4.1. Agricultural sustainability	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/241/en/">www.fao.org/sustainabledevelopment-goals/indicators/241/en/</a>
Methodological note for SDG 2.4.1	<a href="http://www.fao.org/3/ca7154en/ca7154en.pdf">www.fao.org/3/ca7154en/ca7154en.pdf</a>
FAO data collection process	<a href="http://www.fao.org/statistics/data-collection/en/">www.fao.org/statistics/data-collection/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=503">https://elearning.fao.org/course/view.php?id=503</a>
SDG 2.5.1 Conservation of plant and animal genetic resources for food and agriculture	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/251a/en/">www.fao.org/sustainabledevelopment-goals/indicators/251a/en/</a>
SDG 2.5.2 Risk status of livestock breeds	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/252/en/">www.fao.org/sustainabledevelopment-goals/indicators/252/en/</a>
E-Learning course for SDG 2.5.1 and 2.5.2	<a href="https://elearning.fao.org/course/view.php?id=392">https://elearning.fao.org/course/view.php?id=392</a>
SDG 2.a.1 Public investment in agriculture	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/2a1/en/">www.fao.org/sustainabledevelopment-goals/indicators/2a1/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=361">https://elearning.fao.org/course/view.php?id=361</a>



SDG 5.a.1 Women's ownership of agricultural land	
FAO webpage	<a href="http://www.fao.org/sustainable-development-goals/indicators/5a1/en/">www.fao.org/sustainable-development-goals/indicators/5a1/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=363">https://elearning.fao.org/course/view.php?id=363</a>
SDG 5.a.2 Women's equal rights to land ownership	
FAO webpage	<a href="http://www.fao.org/sustainable-development-goals/indicators/5a2/en/">www.fao.org/sustainable-development-goals/indicators/5a2/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=364">https://elearning.fao.org/course/view.php?id=364</a>
SDG 6.4.1 Water-use efficiency	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/641/en/">www.fao.org/sustainabledevelopment-goals/indicators/641/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=475">https://elearning.fao.org/course/view.php?id=475</a>
SDG 6.4.2 Water stress	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/642/en/">www.fao.org/sustainabledevelopment-goals/indicators/642/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=365&amp;lang=en">https://elearning.fao.org/course/view.php?id=365&amp;lang=en</a>
SDG 14.4.1 Fish stocks sustainability	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/1441/en/">www.fao.org/sustainabledevelopment-goals/indicators/1441/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=502">https://elearning.fao.org/course/view.php?id=502</a>
SDG 14.6.1 Illegal, unreported and unregulated fishing	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/1461/en/">www.fao.org/sustainabledevelopment-goals/indicators/1461/en/</a>
SDG 14.7.1 Value added of sustainable fisheries	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/1471/en/">www.fao.org/sustainabledevelopment-goals/indicators/1471/en/</a>
SDG 14.b.1 Access rights for small-scale fisheries	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/14b1/en/">www.fao.org/sustainabledevelopment-goals/indicators/14b1/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=348&amp;lang=en">https://elearning.fao.org/course/view.php?id=348&amp;lang=en</a>
SDG 15.1.1 Forest area	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/1511/en/">www.fao.org/sustainabledevelopment-goals/indicators/1511/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=446">https://elearning.fao.org/course/view.php?id=446</a>
SDG 15.2.1 Sustainable forest management	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/1521/en/">www.fao.org/sustainabledevelopment-goals/indicators/1521/en/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=446">https://elearning.fao.org/course/view.php?id=446</a>
SDG 15.4.2 Mountain Green Cover	
FAO webpage	<a href="http://www.fao.org/sustainabledevelopment-goals/indicators/1542/en/">www.fao.org/sustainabledevelopment-goals/indicators/1542/en/</a>
FAO's Damage and Loss Assessment methodology	
FAO working paper	<a href="http://www.fao.org/publications/card/en/c/CA6990EN/">www.fao.org/publications/card/en/c/CA6990EN/</a>
E-Learning course	<a href="https://elearning.fao.org/course/view.php?id=608">https://elearning.fao.org/course/view.php?id=608</a>
Overview of FAO's Damage and Loss Assessment methodology and using it to report on adaptation in the agriculture sectors under the ETF	<a href="http://www.fao.org/documents/card/fr/c/CB4265EN/">www.fao.org/documents/card/fr/c/CB4265EN/</a>

**Source:** Authors' own elaboration.



## **Annex 5. Overview of information to be communicated on climate change impacts and adaptation under chapter 4 of the MPGs**

Overview of information to be communicated on climate change impacts and adaptation under MPGs chapter 4.

### **A. National circumstances, institutional arrangements and legal frameworks**

(a) National circumstances relevant to its adaptation actions, including biogeophysical characteristics, demographics, economy, infrastructure and information on adaptive capacity.

(b) Institutional arrangements and governance, including for assessing impacts, addressing climate change at the sectoral level, decision-making, planning, coordination, addressing cross-cutting issues, adjusting priorities and activities, consultation, participation, implementation, data governance, M&E, and reporting.

(c) Legal and policy frameworks and regulations.

### **B. Impacts, risks and vulnerabilities, as appropriate**

(a) Current and projected climate trends and hazards; (b) Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities; (c) Approaches, methodologies and tools, and associated uncertainties and challenges, in relation to paragraph 107(a) and (b) above.

### **C. Adaptation priorities and barriers**

(a) Domestic priorities and progress towards those priorities; (b) Adaptation challenges and gaps, and barriers to adaptation.

### **D. Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies**

(a) Implementation of adaptation actions in accordance with the GGA as set out in Article 7, paragraph 1, of the Paris Agreement.

(b) Adaptation goals, actions, objectives, undertakings, efforts, plans (for example NAPs and subnational plans), strategies, policies, priorities (for example priority sectors, priority regions or integrated plans for coastal management, water and agriculture), programmes and efforts to build resilience.

(c) How best available science, gender perspectives and indigenous, traditional and local knowledge are integrated into adaptation.

(d) Development priorities related to CCA and impacts.



(e) Any adaptation actions and/or economic diversification plans leading to mitigation co-benefits.

(f) Efforts to integrate climate change into development efforts, plans, policies and programming, including related capacity-building activities.

(g) Nature-based solutions to CCA.

(h) Stakeholder involvement, including subnational, community-level and private sector plans, priorities, actions and programmes.

### **E. Progress on implementation of adaptation**

(a) Implementation of the actions identified in chapter IV.D above.

(b) Steps taken to formulate, implement, publish and update national and regional programmes, strategies and measures, policy frameworks (for example NAPs) and other relevant information.

(c) Implementation of adaptation actions identified in current and past adaptation communications, including efforts towards meeting adaptation needs, as appropriate.

(d) Implementation of adaptation actions identified in the adaptation component of NDCs, as applicable.

(e) Coordination activities and changes in regulations, policies and planning.

### **F. Monitoring and evaluation of adaptation actions and processes**

In order to enhance their adaptation actions and to facilitate reporting, as appropriate, each Party should report on the establishment or use of domestic systems to monitor and evaluate the implementation of adaptation actions. Parties should report on approaches and systems for M&E, including those in place or under development, including:

(a) Achievements, impacts, resilience, review, effectiveness and results.

(b) Approaches and systems used, and their outputs.

(c) Assessment of and indicators for: (i) How adaptation increased resilience and reduced impacts; (ii) When adaptation is not sufficient to avert impacts; (iii) How effective implemented adaptation measures are.

(d) Implementation, in particular on: (i) Transparency of planning and implementation; (ii) How support programmes meet specific vulnerabilities and adaptation needs; (iii) How adaptation actions influence other development goals; (iv) Good practices, experience and lessons learned from policy and regulatory changes, actions and coordination mechanisms, including:

(d1) Ownership, stakeholder engagement, alignment of adaptation actions with national and subnational policies, and replicability.

(d2) The results of adaptation actions and the sustainability of those results.



### **G. Information related to averting, minimizing and addressing loss and damage associated with climate change impacts**

Each interested Party may provide, as appropriate, information related to enhancing understanding, action and support, on a cooperative and facilitative basis, to avert, minimize and address loss and damage associated with climate change impacts, taking into account projected changes in climate-related risks, vulnerabilities, adaptive capacities and exposure, including, as appropriate, on:

- (a) Observed and potential climate change impacts, including those related to extreme weather events and slow onset events, drawing upon the best available science;
- (b) Activities related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change;
- (c) Institutional arrangements to facilitate the implementation of the activities referred to in paragraph 115(b) above.

### **H. Cooperation, good practices, experience and lessons learned**

- (a) Efforts to share information, good practices, experience and lessons learned, including as they relate to: (i) Science, planning and policies relevant to adaptation; (ii) Policy innovation and pilot and demonstration projects; (iii) Integration of adaptation actions into planning at different levels; (iv) Cooperation to share information and to strengthen science, institutions and adaptation; (v) Area, scale and types of cooperation and good practices; (vi) Improving durability and effectiveness of adaptation actions; (vii) Helping developing countries to identify effective adaptation practices, needs, priorities, and challenges and gaps in a way that is consistent with encouraging good practices;
- (b) Strengthening scientific research and knowledge related to: (i) climate, including research and systematic observation and early warning systems, to inform climate services and decision-making; (ii) vulnerability and adaptation; (iii) monitoring and evaluation.

### **I. Any other information related to climate change impacts and adaptation under Article 7 of the Paris Agreement**

Each Party may provide, as appropriate, any other information related to climate change impacts and adaptation under Article 7.





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