

Built for drought resilience

Proposing a global Drought
Resilience Capacity Index



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List of abbreviations

ASEAN	Association of Southeast Asian Nations	MEAs	Multilateral environmental agreements
CBD	Convention on Biological Diversity	MEL	Monitoring, evaluation and learning
CGIAR	Consultative Group on International Agricultural Research	NAP	National adaptation plan
COP	Conference of the Parties	NASA	National Aeronautics and Space Administration
DEWS	Drought Early Warning System	OECD	Organisation for Economic Co-operation and Development
DHI	Danish Hydraulic Institute	PRAIS	Performance Review and Assessment Implementation System
DRCI	Drought Resilience Capacity Index	REWarD	Reversing ecosystem and water degradation
DRI	Drought Resilience Index	SDGs	Sustainable Development Goals
DSS	Decision support system	SO	Strategic objective
DVI	Drought Vulnerability Index	SPEI	Standardized Precipitation Evapotranspiration Index
EC	European Commission	SPI	Standardized Precipitation Index
EO	Earth Observation	UN	United Nations
EU	European Union	UNCCD	United Nations Convention to Combat Desertification
EW4All	Early Warnings for All	UNDP	United Nations Development Programme
EWS	Early warning system	UNDRR	United Nations Office for Disaster Risk Reduction
FAO	Food and Agriculture Organization	UNEP	United Nations Environment Programme
GBF	Global Biodiversity Framework	UNFCCC	United Nations Framework Convention on Climate Change
GEF	Global Environment Facility	UN SPIDER	United Nations Platform for Space-based Information for Disaster Management and Emergency Response
GGA	Global Goal on Adaptation	USD	United States Dollar
GWP	Global Water Partnership	WMO	World Meteorological Organization
IDMP	Integrated Drought Management Programme		
IDRA	International Drought Resilience Alliance		
IDRO	International Drought Resilience Observatory		
IGAD	Intergovernmental Authority on Development		
IPCC	Intergovernmental Panel on Climate Change		
IUCN	International Union for Conservation of Nature		
IWRM	Integrated Water Resources Management		

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Foreword

Drought affects water supplies, food production, livelihoods and ecosystems. As nature loss and climate change accelerate, and pressures on land and water increase, the impacts of droughts are becoming more severe and more costly.

Many countries are getting better at monitoring drought and forecasting risk thanks to sophisticated early warning systems. Yet understanding when drought is occurring is only part of the challenge. What is often less clear is whether the systems needed to prepare for and adapt to drought are actually in place.

This is the gap that the Drought Resilience Capacity Index (DRCI) seeks to address.

UNEP developed the DRCI to help governments understand their capacity for drought resilience in a structured and comparable way. The Index provides a practical way to assess the policies, institutions, financing and information systems that help countries prepare for drought before crises emerge.

By showing where resilience systems are strong and where weaknesses persist, the DRCI can help governments move from reactive crisis management to more proactive and strategic investment. It can help decision-makers improve coordination across sectors and identify where action will have the greatest impact.

Ultimately, drought resilience is about people. Stronger resilience means farmers receiving timely information before crops fail. It means communities better prepared to manage water shortages. It means governments acting earlier, reducing human suffering and economic losses while strengthening long-term resilience.

Many of these benefits depend on healthy ecosystems. Wetlands, forests, grasslands and healthy soils help regulate water cycles, retain moisture and buffer the impacts of climate variability. They are natural infrastructure for drought resilience. Protecting and restoring these ecosystems strengthens resilience long before a drought begins.

Shaped through consultations with governments and technical experts from around the world, the DRCI reflects UNEP's commitment to supporting countries with practical tools that connect science, policy and implementation.

UNEP is grateful to the United Nations Convention to Combat Desertification Secretariat for its partnership throughout this process and to the European Commission for its generous support.

This report is offered as a contribution to global efforts to strengthen drought resilience. It reflects one of UNEP's core strengths: translating scientific knowledge and global ambition into practical guidance that countries can apply, adapt and scale. We hope the DRCI will help countries identify where action is needed, direct investment more effectively and strengthen preparedness before the next drought arrives.



Susan Gardner
Director, Ecosystems Division
United Nations Environment Programme

A stylized, handwritten signature in blue ink, consisting of a large 'S' and 'G' intertwined.

Foreword

Drought is an increasingly systemic, global risk with far-reaching impacts on water availability, food production, ecosystems, livelihoods, public health and economic and financial stability. As climate change manifests itself and pressures on land and water resources grow, drought is becoming more severe, recurrent, complex and costly across all regions of the world. Strengthening drought resilience is urgent and essential for safeguarding long-term sustainable development and human well-being.

We are pleased to support the development of a Drought Resilience Capacity Index (DRCI) as a practical contribution to advancing work on understanding the capacity for drought resilience. Indicators and reporting processes relevant to drought already exist, but remain fragmented and unable to provide a coherent picture of countries' capacity to anticipate, prepare and adapt to drought. This report is a first step in a technical and scientific conversation to create a Drought Resilience Capacity Index as a practical and comparable tool to assess the strength and performance of governance systems, institutions, and management practices with a focus on operational capacity. I hope this report creates a space for further dialogue, testing and refinement to help strengthen drought resilience monitoring and decision-making at all levels.

The European Union thanks UNEP for leading this process as well as the UNCCD Secretariat, the International Drought Resilience Alliance and the many technical experts and institutions involved for their contributions and the good collaboration.

Thank you to the experts and representatives from more than 65 countries for participating in our regional workshops. The proposed approach is grounded in practical realities and diverse national experiences. It is critical for future refinement and application of the methodology, as well as for supporting local and regional initiatives and the ongoing development of the International Drought Resilience Observatory led by the International Drought Resilience Alliance.

Drought resilience matters profoundly for people, ecosystems and economies, and the European Union is very pleased to support this work.



Monika Hencsey
Director, Green Diplomacy and Multilateralism
Director-General Environment
European Commission

A handwritten signature in blue ink, which appears to read 'Monika Hencsey'.

Executive summary

Drought is increasingly recognized as a systemic, accelerating global risk, extending far beyond water scarcity to affect food systems, ecosystems, economies and livelihoods. Its impacts are interconnected and often cascade across sectors, driven by growing pressures on land and water resources and compounded by rising climate variability and extremes. Acting as a threat multiplier, drought intensifies existing vulnerabilities and amplifies risks, particularly in fragile and highly exposed contexts.

As a result, drought is a central challenge for sustainable development, economic stability and human well-being. Addressing this challenge requires a shift from fragmented, sectoral responses towards integrated and proactive approaches that strengthen the capacity of governance and management systems to anticipate, prepare for and adapt to drought over time.

While not requested through a formal negotiation process, this report takes a first step towards addressing a key gap in drought resilience monitoring by **proposing a Drought Resilience Capacity Index (DRCI)** as a simple and practical tool.

The proposed Drought Resilience Capacity Index offers a pragmatic, globally comparable and actionable signal on drought resilience.

The DRCI measures resilience across three core functions – anticipate, prepare and adapt – using a concise set of nine capacity-based indicators to assess the strength and performance of governance systems, institutions and management practices. By focusing on operational capacity rather than complex outcomes, the DRCI offers a **pragmatic, globally comparable and actionable signal** that can complement existing MEAs and support more integrated decision-making at multiple levels.

Furthermore, the design of the DRCI has been guided by the need to connect monitoring with policy and investment decisions in order to strengthen drought resilience on the ground. The suggested approach does this by identifying strengths and gaps in areas such as early warning, risk assessment, governance, preparedness and long-term adaptation. Such information has the potential to **inform more targeted policy responses and resource allocation**, supporting a shift from reactive crisis management to proactive, risk-informed approaches.

A substantial body of drought-related indicators already exists across multilateral environmental agreements (MEAs) and related global arrangements. This includes the United Nations Convention to Combat Desertification (UNCCD), the Global Goal on Adaptation (GGA), the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals (SDGs), the Convention on Biological Diversity (CBD) and the Ramsar Convention, and global institutions such as the World Meteorological Organization (WMO) and certain national and regional institutions that provide regional and global outlooks.

While these provide some information related to drought resilience, they remain fragmented, designed for different purposes, and often embedded in broader multi-hazard approaches where drought is not explicitly distinguished. They are therefore difficult to understand, leaving countries without a clear, integrated signal to guide policy and investment.

It should be stressed that the proposed DRCI presented in this report is intended as a technical starting point to discussions on drought resilience at different levels and for different processes. It may be useful for global, regional and national institutions with a mandate for drought resilience wishing to develop or strengthen drought resilience monitoring and reporting. However, the index methodology and data collection processes described in this report are not final. They require further piloting, consultation and refinement at different levels before adoption and practical application at scale.



Key messages

1. The proposed Drought Resilience Capacity Index (DRCI) provides a practical and comparable approach to monitoring drought resilience capacity at basin, national, regional and global levels. The proposed methodology requires further piloting, consultation and refinement.
2. The proposed Drought Resilience Capacity Index (DRCI) has the potential to catalyse a step change in global efforts to improve drought resilience capacity. Supported by continued multilateral cooperation and strengthened post-2030 arrangements, this can transform fragmented efforts into integrated action to support resilient ecosystems, societies and economies.

1 Introduction

1.1 Context

Drought is increasingly recognized as a systemic and accelerating challenge, with impacts extending across water resources, food systems, ecosystems, economies and livelihoods (European Commission Joint Research Centre and UNCCD 2024). Global estimates of drought damages are in the order of magnitude of USD 300 billion per year, but costs tend to be underestimated as impacts are often cascading and cross-sectoral, reflecting the interconnected nature of the systems on which societies depend (Thomas *et al.* 2024).

As climate variability and extremes intensify, and pressures on land and water resources increase, drought is a central risk for sustainable development, ecosystem function, economic stability and human well-being (UNCCD 2023a; World Bank 2024a).

A recent global study identified 10 key insights from science from the past decade on drought management and 10 critical areas to strengthen drought resilience through policy and practice (Wens *et al.* 2026, see [table 1.1](#)).

Table 1.1: Overview of insights from the past decade, and their relevance for policy and practice

From science	... to policy and practice
1. Drought risks are systemic in nature	... and should be managed as such, rather than siloed in separate sectors, to avoid maladaptation and trade-offs.
2. Drought hazards are strongly influenced by human behaviour	... and, thus, policies should consider socio-hydrological interactions to prevent maladaptation and upstream–downstream conflict.
3. Climate change makes droughts more frequent, severe and complex	... which affects predictability, requiring new monitoring and management practices.
4. Droughts deteriorate water quality	... which worsens drought impacts. Water quality should not be ignored in disaster risk management and adaptation.
5. Droughts have severe consequences for human health	... so droughts should be seen and managed as a public health issue.
6. Healthy ecosystems are essential for coping with drought impacts	... so ecosystem restoration and nature-based solutions should be considered when strengthening disaster risk management and adaptation efforts.
7. Drought monitoring and early warning systems have improved massively	... but uptake by users lags behind.
8. Droughts disproportionately affect disadvantaged groups and individuals	... and, therefore, reducing socioeconomic inequalities and injustices is essential to reduce drought risks.
9. Barriers to disaster risk management and adaptation are better understood	... and this knowledge should be used in disaster risk management plans and adaptation scaling efforts.
10. Drought resilience is built through a multilevel governance approach	... and building resilience requires the active participation of all actors in a whole-of-society approach.

Source: Wens *et al.* 2026

Drought resilience requires approaches that move beyond sectoral and reactive approaches. It requires approaches that strengthen the capacity of systems to anticipate, prepare for and adapt to drought over time. Other recent international work emphasizes the importance of proactive, risk-informed approaches that reduce impacts before crises emerge (UNCCD 2019a; World Bank 2024a; OECD 2025; Stefanski *et al.* 2025; UNDRR 2025).

In this context, drought resilience has become an increasingly important objective for policy and practice. However, resilience itself is complex as it reflects the capacity of systems to cope with, respond to and adapt to drought across multiple domains and scales. While this complexity is well recognized, it poses a significant challenge for measurement, monitoring and decision-making. While important progress has been made in developing indicators related to drought risk and impacts (see [section 2.1](#) and [section 2.2](#) for definitions and [section 2.3](#) for existing work), there is a **lack of a clear, global policy signal on drought resilience capacity** that can support prioritization and guide action. The need for this is further expanded in [section 2.1](#).

1.2 Objectives

The core objective of this report is to **propose a simple, globally applicable index to assess and monitor drought resilience capacity** that can catalyse a step change in global efforts to improve drought resilience capacity.

In support of this, the report also aims to:

- i. Clarify key concepts related to drought risk and resilience (see [section 2](#))
- ii. **Propose a practical Drought Resilience Capacity Index (DRCI)** and scoring approach (see [section 3](#)), which represents the core of this report
- iii. Illustrate how the DRCI can be useful as an entry point for strengthening drought resilience implementation in countries (see [section 4](#)), although this report is not intended as a comprehensive implementation guide for increasing drought resilience

- iv. Make the case for investing in drought resilience and introduce some practical approaches for doing so (see [section 5](#))
- v. Identify overlaps and gaps in drought-related indicators across multilateral environmental agreements (MEAs), which can help inform post-2030 discussions (see [section 6](#))
- vi. Propose some next steps to pilot the DRCI and harmonize global monitoring across MEAs (see [section 7](#))
- vii. Provide guidance on gender-responsive indicators (see [section 6](#)) and practices (see [section 4](#)) related to proactive drought management.

The report is intended as a technical input and first step to inform conversations on drought resilience monitoring and reporting at global, regional and national levels. Further consultation and testing are needed before the approach is ready to be applied.

At the global and regional level, the report is intended for colleagues working in institutions linked to drought-relevant MEAs and related arrangements who are seeking to strengthen how drought resilience is monitored and reported. At the national and basin level, it is intended for colleagues seeking to develop or improve drought resilience within their own countries or river basins. It is also intended for finance and planning ministries, international financial institutions and investors seeking to better integrate drought risk into investment decisions, as well as for practitioners and policymakers working to ensure drought resilience policies and programmes are gender-responsive and socially inclusive.



2 Drought risk and resilience: concepts and scope

2.1 Understanding and measuring drought risk and resilience

Understanding both drought risk and resilience is important for proactive¹ and integrated drought management (see [section 2.2](#)) (World Bank 2024a). Both perspectives are essential. Risk analysis helps identify what may happen and where, while resilience highlights whether systems are able to respond effectively and adjust before risks become crises (UNCCD 2023a). Drought resilience, specifically, focuses on the capacity of systems to manage and respond to drought risks over time, including the ability to anticipate risks and implement longer term adaptations. However, there is a lack of a standardised approach to monitoring drought resilience. Furthermore, resilience is strongly related to vulnerability, which has proved challenging to monitor (as described below). This section highlights **the need to explore alternative approaches to capture aspects of drought vulnerability, and thus resilience, that can provide a clear globally-comparable policy-relevant signal that is useful at all levels**. This is the need that the proposed Drought Resilience Capacity Index aims to address.

Drought **risk** reflects the likelihood and severity of adverse impacts arising from the interaction of drought **hazard, exposure and vulnerability** (IPCC 2023; UNCCD 2025a). Over the past decade, significant progress has been made in measuring drought risk, particularly through indicators and indices on hazard (e.g. frequency, duration, spatial extent and intensity of drought events) and exposure (e.g. people, livelihoods, water-dependent sectors, infrastructure and ecosystems in areas affected by drought) (Marin-Ferrer *et al.* 2017; AghaKouchak *et al.* 2021; AghaKouchak *et al.* 2023).

While global indicators covering hazard and exposure are continually being refined, in part influenced by emerging technologies and data sets, indicators covering vulnerability are generally seen as being significantly less advanced. This is largely because vulnerability is more complex to define and measure. It is related to the susceptibility of systems to drought impacts and “encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt” (IPCC 2022).

The challenges in measuring vulnerability can be illustrated through monitoring and reporting under the United Nations Convention to Combat Desertification (UNCCD), which is the most relevant and specific global mechanism for monitoring drought. The UNCCD 2018–2030 Strategic Framework has five strategic objectives (UNCCD 2017). Strategic Objective (SO) 3 is “[t]o mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems”. When the 2018–2030 Strategic Framework was published, this was the only SO that didn’t have suggested indicators to monitor progress towards it, suggesting the challenges in doing so. Subsequently, indicators and guidelines for national data collection were produced in 2021 (UNCCD 2021b). The three indicators under SO3 cover the three elements of drought risk as shown in [Table 2.1](#).

SO3-3 (vulnerability) is measured through various aspects of vulnerability to produce a Drought Vulnerability Index (DVI). Many of these aspects relate to general levels of vulnerability – such as literacy rates, life expectancy and government effectiveness – which are not explicitly linked to drought (UNCCD and World Overview of Conservation Approaches and Technologies 2024). Due to the complexity of SO3-3, there is no global picture on vulnerability (as shown by the fact that, as of 2022, there is no publicly available country data on this indicator – see [table 2.1](#)).

1 Proactive drought management: A proactive approach to drought risk management includes appropriate measures being designed in advance, with related planning tools and stakeholder participation. The proactive approach is based on both short-term and long-term measures and includes monitoring systems for a timely warning of drought conditions, the identification of the most vulnerable part of the population and tailored measures to mitigate drought risk and improve preparedness. The proactive approach entails the planning of necessary measures to prevent or minimize drought impacts in advance. This approach is reflected in the three pillars of integrated drought management ([IDMP glossary](#)).

Table 2.1: UNCCD 2018–2030 Strategic Framework, Strategic Objective 3

UNCCD SO3 indicators	No. of countries reporting with comparable data (2022)*
SO3-1 (Level 1: Hazard): Trends in the proportion of land under drought over the total land area	107
SO3-2 (Level 2: Exposure): Trends in the proportion of the total population exposed to drought	104
SO3-3 (Level 3: Vulnerability): Trends in the degree of drought vulnerability.	0

* Publicly available through the [UNCCD Data Dashboard](#)

The fourth data collection round on the strategic objectives under the current Strategic Framework (UNCCD Performance Review and Assessment Implementation System – [PRAIS4](#) – 2026–27), may see an increase in the number of countries reporting, but it is not expected to result in a globally comparable data set. In fact, the SO3-3 guidance explicitly states that “the DVI is calculated for each country individually, and as such, comparisons between countries should not be made”.

Furthermore, several decisions of the UNCCD Conference of the Parties (COP) and statements by parties point to the need to strengthen vulnerability and resilience monitoring, including:

- “Some Parties encouraged the secretariat ... to improve the assessment, data gathering and reporting methodologies for the SO3 indicators by ... (e) Improving the methodology for reporting on drought vulnerability to overcome the challenges related to lack of comparability between default and national data and the fact that vulnerability components are diverse and difficult to measure” (UNCCD 2023b).
- The Convention “needs to have access to more information on drought preparedness and resilience building. This is critically important also for national level planning” (UNCCD 2023c).

- “Welcome[d] the establishment of an Intergovernmental Working Group on the Future Strategic Framework of the Convention ... to ... (ii) conduct a thorough analysis of current indicators for national reporting on the strategic objectives of the 2018–2030 Strategic Framework of the United Nations Convention to Combat Desertification with a view to making them more responsive for a post-2030 strategic framework of the Convention, while ensuring that future methodologies are feasible, simple to understand and within the capacities of Parties” (UNCCD 2024a).
- The SO3-3 (vulnerability) indicators were “conceptually strong but operationally fragile. Only 39 per cent of respondents considered the index maintainable within existing systems. National Focal Points considered it essential for understanding resilience, yet pointed to limited socioeconomic time series, and inconsistent definitions of adaptive capacity as barriers” (UNCCD 2025b).

Given the complexity of drought *vulnerability* definitions and assessment, it is pertinent to explore ways to assess drought *resilience* instead. Global efforts focusing on drought resilience include work by the International Drought Resilience Observatory ([IDRO](#)), which is developing a Drought Resilience Index (DRI). The DRI analyses drought resilience in four ‘domains’ (built environment, natural environment, people and community, and economy) and across three resilience ‘dimensions’: anticipate, prepare and adapt (see [box 2.1](#)).

The Drought Resilience Capacity Index (DRCI) proposed in this report is intended to be complementary to the DRI. It is intended to be a simpler assessment of proactive and integrated drought management and governance **capacity**, aligned with the three dimensions which, in turn, supports progress on the four domains. It offers a standardized self-assessment approach that can be readily applied by countries, drawing on existing reporting processes under multilateral environmental agreements (MEAs). Taken together, the DRI and the DRCI approaches are mutually reinforcing.

Some academics have also made noteworthy efforts to develop drought resilience indicators. For example, Sarma and Brüntrup (2026) propose a global framework for measuring drought resilience comprising 12 global targets, 45 sub-targets and 129 indicators. This proposal is assessed by the authors of this report to be technically robust, but its significant complexity is expected to hamper practical application.

Box 2.1: The development of the Drought Resilience Index, a sister index to the Drought Resilience Capacity Index

The International Drought Resilience Alliance ([IDRA](#)) is a global multi-partner initiative hosted by the United Nations Convention to Combat Desertification (UNCCD) and co-chaired by Senegal and Spain. It was first announced at the 77th session of the United Nations General Assembly in September 2022 and formally launched at the 27th Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) in November 2022.

The International Drought Resilience Observatory ([IDRO](#)) has been developed as an initiative under IDRA, led by UNCCD and involving several other key partners. IDRO is designed as a global data and knowledge platform to bring together indicators related to drought resilience based on data sets in a single, accessible system to support decision-making. For an overview of IDRO and other global and regional drought-related platforms, see [annex III](#).

As part of this broader effort, [work is underway](#) within IDRA/IDRO to develop a Drought Resilience Index (DRI). The development and piloting of the DRI is a multi-year effort involving more than 20 national and international institutions.

The DRI is conceived as a tool to assess resilience across systems, sectors and geographies. It analyses drought resilience in four 'domains' – built environment, natural environment, people and community, and economy – and across three resilience 'dimensions' of anticipate, prepare and adapt. The ongoing work on developing the DRI aims to provide a technically sophisticated and robust index, including a mixture of impact and outcome indicators that is as comprehensive as possible given data limitations.

The Drought Resilience Capacity Index (DRCI) proposed in this report (see [section 3](#)) is intended to complement this work. Pending further discussion with key partners, results of the DRCI could potentially be shown through the IDRO platform.

2.2 Definitions of concepts used in this report

Drought

There are many different definitions of drought. These definitions generally include: (a) significant changes in precipitation and hydrological flows; and (b) impact on society, economy and ecosystems (FAO 2023; WMO 2023; World Bank 2024a; UNCCD 2025a). The UNCCD defines drought as “the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems” (UNCCD 2025a).

Furthermore, there are many different physical manifestations of drought across countries and regions, with varying impacts across locations and sectors. Many countries may historically be considered to be relatively water abundant, and therefore may not have specific plans and measures in place to address drought risk. Nevertheless, all countries have experienced, or can expect, significant changes or reductions in precipitation leading to some water scarcity that has some social, economic or environmental impact. Even the countries that are historically water-rich implement various activities to ensure water resilience and cope with climatic variability, even if they may not be labelled as ‘drought resilient’ activities (as described by several countries during regional consultations in the development of this report (see [annex IV](#))). An example of this is the European Water Resilience Strategy (EC 2025).

Therefore, with the definition of drought encompassing significantly reduced precipitation and its impacts, the proposed Drought Resilience Capacity Index (DRCI) is expected to be relevant to all countries. At the same time, it is important to acknowledge the different physical expression of drought across regions, and that some countries face greater drought risk than others.

Drought resilience

This report takes, as its starting point, the Intergovernmental Panel on Climate Change (IPCC) definition of ‘resilience’ as “the capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation” (IPCC 2023). A few concepts in this definition are worth noting:

1. In the context of resilience, social, economic and ecological systems are **interconnected** (Ceglar *et al.* 2025a; Ceglar *et al.* 2025b). It is important to address all three aspects in an integrated manner, both through monitoring approaches and design and implementation of proactive and prospective drought management.
2. Resilience depends on **capacity** to cope with a hazardous event or trend, and maintaining a capacity for adaptation, learning and/or transformation.
3. The adopted UNCCD approach to drought resilience of ‘anticipate, prepare and adapt’ speaks to the elements of ‘cope’, ‘respond or reorganize’, ‘adaptation, learning and/or transformation’ in the IPCC definition of resilience.

There is no globally agreed definition of drought resilience.² Nevertheless, there is broad convergence across international bodies on descriptions of drought resilience, either specifically or to resilience more generally in the context of disaster risk reduction (see [table 2.2](#)).

2 In 2023, the UNCCD Science-Policy Interface recommended establishing “two science-based operational definitions of drought resilience that (a) focus on resistance to drought impacts and (b) emphasize the generation of benefits from improved resilience” (UNCCD 2023a). This recommendation does not appear to have resulted in concrete definitions.

Table 2.2: Global institutional definitions of drought resilience or resilience

Institution / programme	Definition or description
Food and Agriculture Organization (FAO)	No formal definition. In its description of its climate action and resilience work , the FAO says there is a need to “strengthen the capacity of local communities and institutions to prevent, anticipate, absorb, adapt and transform in the face of shocks and stresses.”
Integrated Drought Management Programme (IDMP) ³	No formal definition. IDMP uses 3 pillars of integrated drought management: (1) monitoring and early warning; (2) risk and impact assessment; and (3) risk mitigation, preparedness and response. IDMP Glossary uses the UNDRR (2017) definition of resilience (see below).
IPCC (2023)	No formal definition of drought resilience. Resilience: the capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation.
UNCCD (through IDRO / IDRA)	No formal definition of drought resilience. Emerging definition: a system’s inherent capacity to anticipate, prepare for and adapt to drought. It involves comprehensive early warning systems, proactive preparation and flexible adaptation strategies. By combining these elements, countries, regions, communities, cities and ecosystems can withstand, recover, transform and build back better from drought more effectively.
United Nations Office for Disaster Risk Reduction (UNDRR) (2017)	Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.
World Bank	No formal definition. The report ‘Drought Risk and Resilience Assessment Methodology’ (World Bank 2024a) refers to the IPCC (2023) definition of resilience (see above) and does not define drought resilience.

Given UNCCD is the primary global mechanism for harmonization of approaches to drought resilience, this report has developed a definition of drought resilience based on the emerging UNCCD definition: **‘a system’s capacity to anticipate, prepare for and adapt to drought**. It involves integrated early warning systems, proactive preparation and flexible adaptation strategies. By combining these elements, populations and ecosystems can withstand, recover from, transform and build back better from drought more effectively’.

Gender lens: Drought risks and resilience capacities are also shaped by gender and social inequalities. Women, girls and marginalized groups may face differentiated impacts because of unequal access to land, water, finance, information, services and decision-making, as well as increased unpaid care and water-collection burdens during drought. Strengthening drought resilience therefore requires gender-responsive and socially inclusive approaches that address structural barriers while recognizing women and local organizations as key actors in anticipatory action, preparedness, adaptation and ecosystem stewardship (Ewbank *et al.* 2019; Awiti 2022; Kreibich 2026). However, incorporating gender dimensions into drought indicators and monitoring remains a challenge, including in UNCCD Strategic Objective 3 indicators (see [box 6.1](#)).

3 The IDMP is hosted by the World Meteorological Organization (WMO) and the Global Water Partnership (GWP).

Systems

Drought resilience is increasingly recognized as being made up of highly interdependent systems, including socioeconomic, ecological, technical, institutional and financial (UNCCD 2023a; World Bank 2024a). Furthermore, because drought impacts can cascade across water, food, energy, ecosystems, livelihoods and economies, drought risk should be understood as systemic rather than confined to a single sector.

1. **Socioeconomic:** livelihoods, infrastructure, services and social protection systems that determine how people, economies and financial systems cope with drought.
2. **Ecological:** the capacity of natural systems, including soil, vegetation and the related hydrological processes to buffer, absorb and recover from drought stress.
3. **Technology and information:** monitoring, early warning and decision-support systems that enable anticipation and informed action.
4. **Governance:** policies, institutions, planning processes and coordination mechanisms that enable coherent and sustained resilience-building.
5. **Financial:** finance required to translate plans into action.

Drought resilience is strengthened when capacities across these systems are developed over time. However, in the context of the proposed drought resilience **capacity** indicators, which are the focus of this report, the most relevant systems are governance, management and financial systems (which, in turn, impact the socioeconomic and ecological systems).

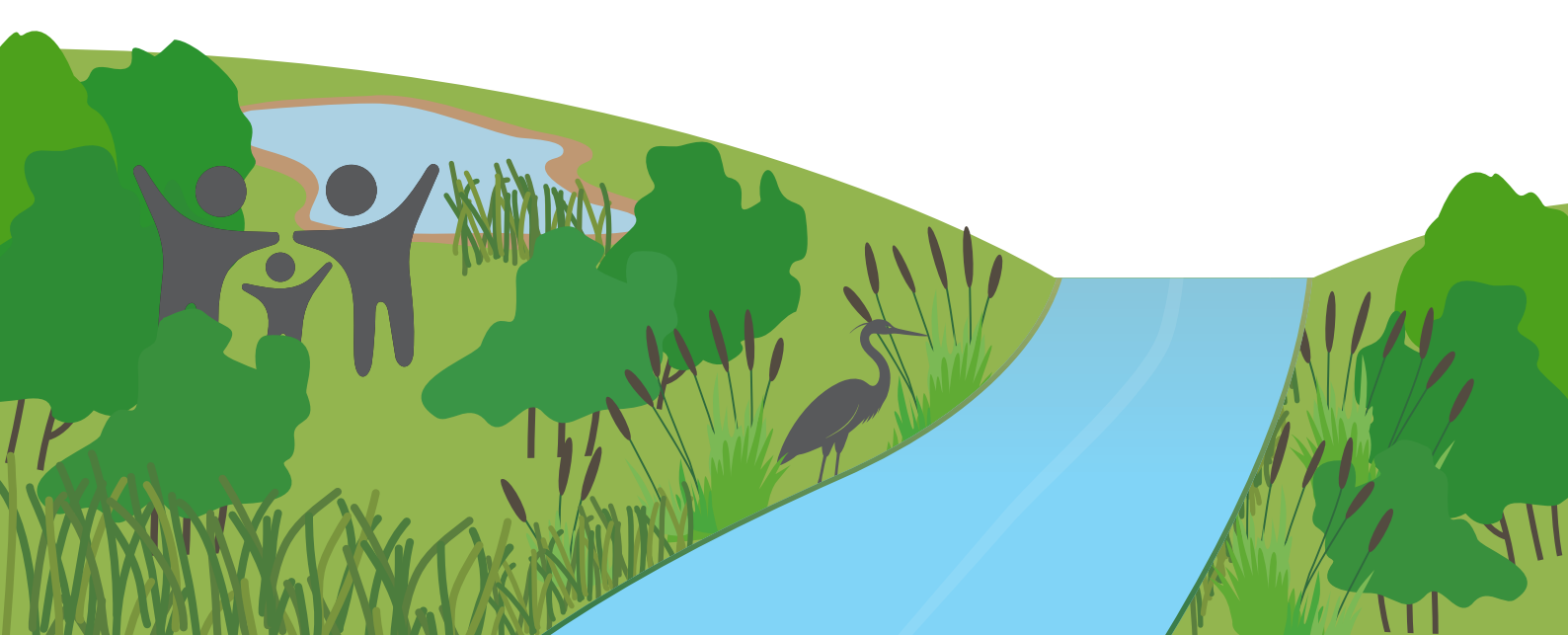
Capacity

Capacity, in this context, is not simply the existence of technologies, plans and institutions, but is also the ability of institutions and actors to perform key functions effectively and consistently over time, particularly across the three resilience dimensions of anticipating risks, preparing responses and adapting to changing conditions. This includes different aspects of capacity, which support actions across these three resilience dimensions, such as (World Bank 2024a):

- **institutional capacity**, e.g. mandates, coordination arrangements and governance processes
- **human and organizational capacity**, e.g. skills, staffing and implementation capability
- **technical capacity**, e.g. data systems, early warning and decision-support tools
- **financial capacity**, e.g. sustained funding and investment mechanisms.

Capacity needs to exist at multiple levels, from regional and national to sub-national and basin level, and even local level as appropriate.

In the scoring thresholds of proposed drought resilience capacity indicators (see [section 3](#)), it is important that the various relevant capacities and levels are addressed.



2.3 Existing drought resilience indicators across multilateral environmental agreements and related initiatives

The United Nations Convention to Combat Desertification (UNCCD) is the only legally binding global framework set up to address desertification and the effects of drought. In its 2018–2030 Strategic Framework, all five strategic objectives implicitly cover drought risk and resilience. As described in [section 2.1](#), Strategic Objective 3 explicitly aims “[t]o mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems” (UNCCD 2025a). The indicators for measuring progress towards this objective, and their inherent challenges, are discussed in [section 2.1](#).

Other MEAs address disaster risk reduction and resilience more broadly, but do not explicitly report on drought. The main ones are the Sendai Framework for Disaster Risk Reduction (2015–2030), and the Global Goal on Adaptation’s proposed Belém Adaptation Indicators. While drought is considered as a ‘disaster’ or ‘climate-related hazard’ in these frameworks, the global reporting frameworks do not generally disaggregate results to explicitly capture drought.

Other global frameworks capture elements of drought risk and resilience indirectly through development outcomes. The main example of this is the 2030 Agenda for Sustainable Development, with its 17 Sustainable Development Goals (SDGs).

Other MEAs focus on varying aspects of ecosystem health and resilience, which broadly support drought resilience but, again, the monitoring and reporting frameworks do not explicitly capture drought risk and resilience. The primary frameworks in this category are the Kunming–Montreal Global Biodiversity Framework (GBF) of the Convention on Biological Diversity (CBD), with its targets for 2030 and 2050, and the Ramsar Convention on Wetlands, currently operating under its Fifth Strategic Plan 2025–2034.

Across these six MEAs and global frameworks (hereafter, collectively referred to as MEAs), there is a large number of indicators which directly or indirectly relate to drought risk and resilience (see [section 6](#)). However, there are a number of challenges related to monitoring and reporting on the indicators including:

- Significant results gaps, e.g. related to lack of data or complex methodologies (UNCCD 2023b)
- Similarities in indicator topics, but varying methods and data requirements
- Significant reporting burden for countries
- Very few indicators explicitly on drought and even fewer on drought resilience.

The result is that there is a lack of a globally comparable picture on drought resilience that can support policy and guide investment at global and regional levels while also supporting implementation on the ground.

The current status of how MEAs address various areas of drought, the level of harmonization between relevant indicators and opportunities for further alignment, particularly in the post-2030 context, are further discussed in [section 6](#) and [annex II](#). This includes consideration of incorporating gender aspects in drought-related indicators.

3 Proposal for a global Drought Resilience Capacity Index

3.1 Index design and consultation process

The proposed Drought Resilience Capacity Index (DRCI) was developed with inputs from thematic experts and country consultations. All UNCCD national focal points, in their expert capacity, and other government and thematic experts, were invited to in-person or online consultations across four regional workshops. More than 65 countries participated in the workshops. An expert review group was formed from more than 15 organizations globally with expertise in drought resilience. A summary of the consultation process is provided in [annex IV](#).

3.2 Design principles and limitations for further consideration

In response to the challenges and needs identified, the proposed DRCI is designed to:

- **Provide a clear global policy signal on drought resilience capacity**, that can inform global, regional and national coordination, prioritization (key issues and geographies) and financing
- **Be globally comparable, accounting for differences in national contexts**, such as varying levels of socioeconomic development, different physical manifestations of drought and impacts of drought, and varying levels of drought risk
- **Be useful at national levels as a simple diagnostic tool** to identify priority areas to increase drought resilience, primarily through an assessment of the underlying indicators

- **Be 'holistic' without attempting to be comprehensive**, addressing core capacities for drought resilience to support the objectives of the index, without attempting to provide a detailed, comprehensive assessment of drought resilience capacity (that may become too complicated to be practical)
- **Be aligned with existing MEA monitoring and processes**, and related global efforts, minimizing reporting burden, avoiding duplication, ensuring added value and supporting the increase of drought resilience capacity worldwide
- **Support tracking progress over time**, by establishing a baseline and through periodic reporting using consistent methodology to track change
- **Be practically applicable in the near future**, simple to apply, with an easy-to-understand methodology, building on existing global reporting processes.

While the proposed DRCI attempts to address the above, the following limitations and constraints are acknowledged:

- The approach explicitly captures the capacity to act, and the effectiveness of implementation, rather than attempting to measure direct drought outcomes and impacts. For example, an outcome indicator could include a direct physical or economic consequence (e.g. a 20 per cent reduction in local crop yield), while an impact indicator could include the resulting socioeconomic or livelihood damage (e.g. a spike in poverty or unemployment rates).
- To support prioritization, results would need to be paired with drought risk analysis. For example, low drought resilience capacity may not necessarily be a priority issue in an area with low drought risk. On the other hand, low drought resilience capacity in an area of high drought risk is likely to be a high priority.

- It is recognized that drought impacts and resilience interact with wider climate and development risks, but drought resilience is considered here as a distinct and policy-relevant entry point. At the same time, drought can be a threat multiplier, potentially amplifying impacts of other risks.
- While the approach supports identification of key issues at the national level, it does not attempt to replace more detailed national or sectoral analyses of drought resilience. Furthermore, as the index is primarily designed for national level assessments, further analysis and testing is required (e.g. through piloting) to explore if and how the index can address vertical integration (i.e. the need for coordinated resilience from national to local levels, where many of the resilience activities need to be undertaken) and differences across countries (e.g. for large countries and federated states).
- The methodology builds on a self-assessment reporting instrument. While descriptions and threshold criteria are well defined, subjectivity cannot be totally avoided.
- The overall index score is best interpreted through disaggregation to the underlying dimension and indicator scores (thus it is important that these can also be easily understood).
- **The DRCI is a proposal only. It requires piloting, proof of concept and refinement** before further roll-out and application, and potential consideration in MEA processes or similar (see [section 3.9](#)).

3.3 Key dimensions of the DRCI

As described in [section 2.1](#) and [section 2.2](#), the index is built on the three dimensions of drought resilience: Anticipate, Prepare and Adapt.

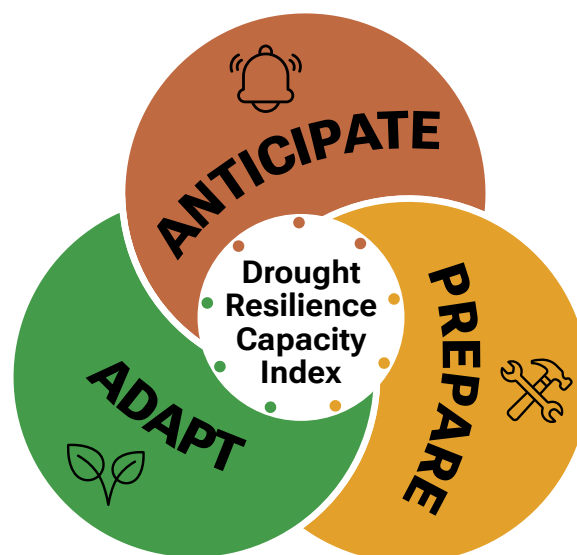


Figure 3.1: The three interlinked dimensions of the Drought Resilience Capacity Index

- **Anticipate:** The ability to foresee drought risk, generate actionable information, and undertake early response actions.
- **Prepare:** The ability to plan, to undertake scenario and development analysis to reduce drought risk and increase resilience, and to have mechanisms in place to minimize socioeconomic impacts and support rapid recovery from drought events.
- **Adapt:** The ability to sustain long-term adjustments and continually increase resilience over time.

The three dimensions are highly interdependent as illustrated in [figure 3.1](#). Actions taken in each dimension support the other dimensions. In other words, the dimensions must be treated holistically rather than as silos.

3.4 Proposed indicators and best practice examples

While indicators have been selected for each resilience dimension (anticipate, prepare, adapt) for the purposes of developing an index, the functions they provide support all dimensions. The indicators selected represent the most consistently measurable and policy-relevant capacities across countries, while maintaining alignment with existing global MEA reporting (see [section 3.8](#)). Each dimension contains three indicators shown in [figure 3.2](#). The 'best practice' for each indicator is provided in the following pages to support indicator scoring (see [section 3.6](#)).

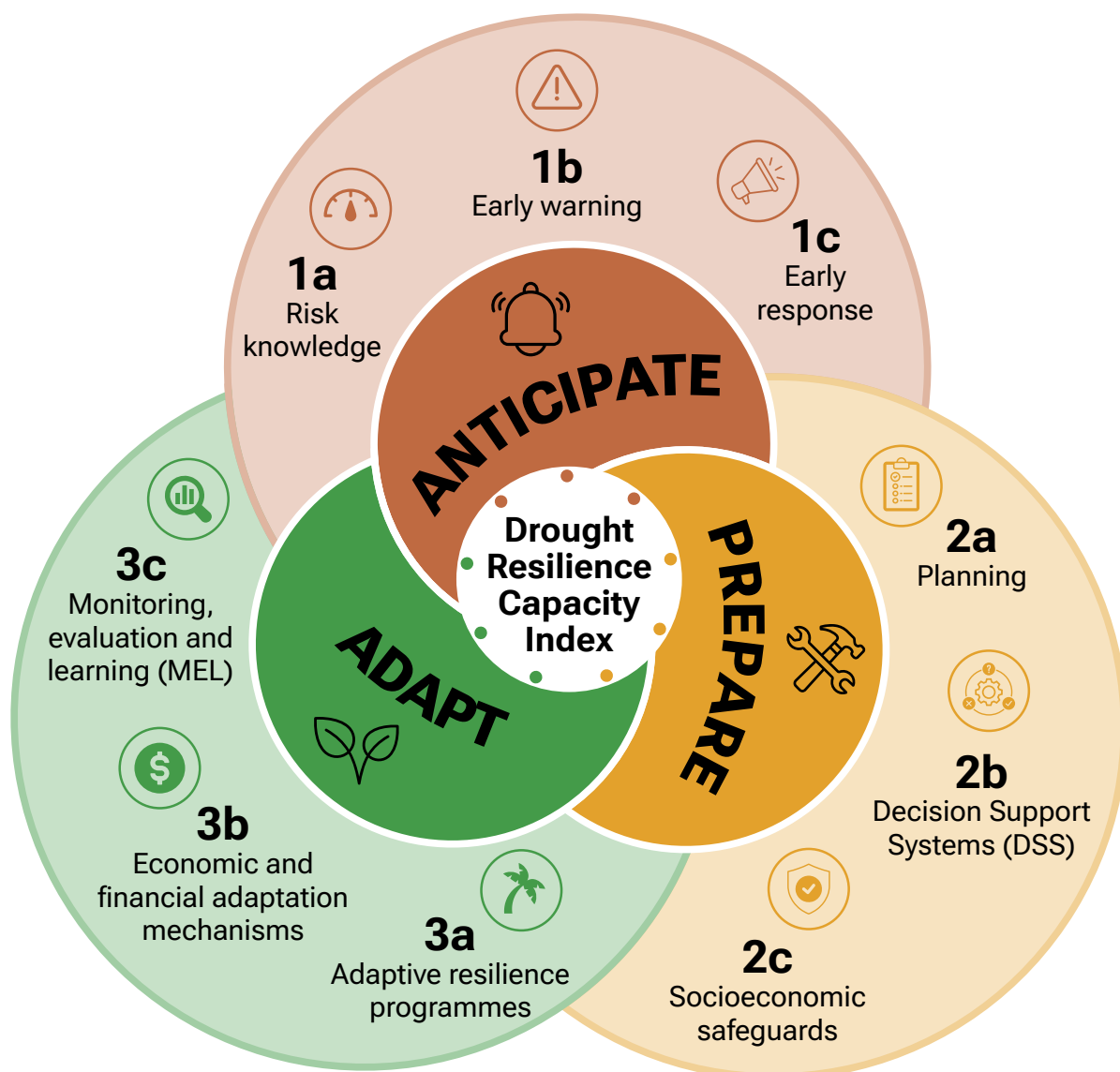


Figure 3.2: The nine interlinked indicators of the Drought Resilience Capacity Index



ANTICIPATE

See [section 4.2](#) for further description and implementation examples for each indicator.

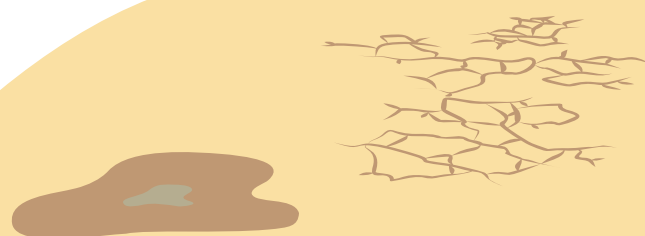
- **1a Risk knowledge:** Risk assessments are comprehensive, regularly updated, and decision-oriented, integrating hazard, exposure and vulnerability across sectors and scales. Assessments combine national and sub-national data with global and regional data sets, where relevant, and explicitly account for evolving risks including climate change and human drivers. Results are routinely used to inform planning, early warning, investment prioritization and policy decisions, supported by clear institutional mandates and coordination mechanisms.
- **1b Early warning:** Early warning is impact-based, user-centred and action-oriented, integrating monitoring, forecasting, communication and response. Systems combine multi-source data (e.g. Earth Observation, in situ, models) to generate drought indicators and forecasts, translated into clear alerts and expected impacts for key sectors. Selection of indicators is relevant in the country context (e.g. precipitation, soil moisture, river flows, groundwater levels). Information is co-designed with users, widely accessible and systematically linked to predefined triggers, coordination mechanisms and financing, enabling early and anticipatory action in line with 'Early Warning for All' (EW4All) good practice.
- **1c Early response:** Early response is fully anticipatory, coordinated and reliably activated, based on pre-agreed triggers linked to early warning and risk analysis. Clear protocols define roles, actions and timelines across institutions and sectors, supported by pre-arranged resources and financing. Response actions are implemented before impacts escalate (e.g. forecast-based action), with strong vertical coordination (national to local) and inclusion of vulnerable groups. Effectiveness is routinely monitored and improved through feedback mechanisms.



PREPARE

See [section 4.3](#) for further description and implementation examples for each indicator.

- **2a Planning:** Drought planning is fully integrated into national, sectoral and financial systems, aligning with development, climate and disaster risk reduction mechanisms (e.g. national adaptation plans and nationally determined contributions). Plans are operational, costed, and linked to implementation mechanisms, financing strategies and institutional responsibilities. They are regularly updated based on risk assessments and monitoring, evaluation and learning (MEL), and cover multiple scales (national, basin, local). Planning processes are inclusive, coordinated across sectors and actively guide decision-making and investment.
- **2b Decision support systems (DSS):** Decision support systems provide integrated, user-oriented sectoral platforms that translate monitoring, forecasts and scenario analysis into actionable insights for policy and operations. They support decision-making under uncertainty (including climate scenarios and predictions), enable evaluation of trade-offs across sectors (e.g. water allocation) and are used routinely across institutions. Systems link directly with early warning, planning and operational processes, ensuring that data and analysis actively inform management and decision-making in relevant processes.
- **2c Socioeconomic safeguards:** Socioeconomic safeguards are comprehensive, anticipatory and scalable, protecting populations and sectors from drought impacts. Mechanisms are fully integrated with risk information, early warning and planning, enabling early activation. Coverage is near-universal for vulnerable groups and key sectors. Financing and delivery systems are rapid, predictable and pre-arranged, and continuously improved through MEL. These mechanisms effectively minimize impacts and support rapid recovery.



See [section 4.4](#) for further description and implementation examples for each indicator.

- **3a Adaptive resilience programmes:** Adaptive resilience programmes deliver coordinated, large-scale implementation across sectors, supported by stable institutions and long-term financing. Programmes address structural drivers of drought risk (e.g. water systems, land use, livelihoods) and integrate ecosystem-based approaches, infrastructure and socioeconomic measures. Implementation is continuous rather than project-based, with strong coordination across sectors and levels, and informed by ongoing monitoring and learning.
- **3b Economic and financial adaptation mechanisms:** Financial systems systematically integrate drought risk and resilience considerations across public and private investment. Financing is mobilized at scale and diversified (public, private, blended, insurance), incentivizing risk reduction and adaptive behaviour. Decision-making uses risk screening, cost-benefit analysis and avoided losses. Financial flows are aligned with planning, early warning and MEL, supporting long-term transformation and measurable resilience outcomes.
- **3c Monitoring, evaluation and learning:** MEL is fully institutionalized and drives adaptive management, with continuous feedback across monitoring, planning, financing and implementation. Both implementation and outcomes are tracked, enabling learning at multiple levels, and across resilience dimensions of anticipate, prepare and adapt. Results are routinely used to identify capacity development needs and adjust policies, programmes and investments. MEL processes are inclusive, transparent and aligned with national and global reporting systems, supporting continuous improvement and transformation over time.

Gender lens: to provide a meaningful signal of resilience capacity, assessment of system functionality should include whether capacities are gender-responsive and socially inclusive. For example, this means examining: whether early warning information reaches and is usable by women and marginalized groups; whether drought planning and coordination mechanisms enable their participation and leadership; and whether adaptation, finance, implementation and learning systems address structural inequalities in access to land, water, finance, technology, services and decision-making.



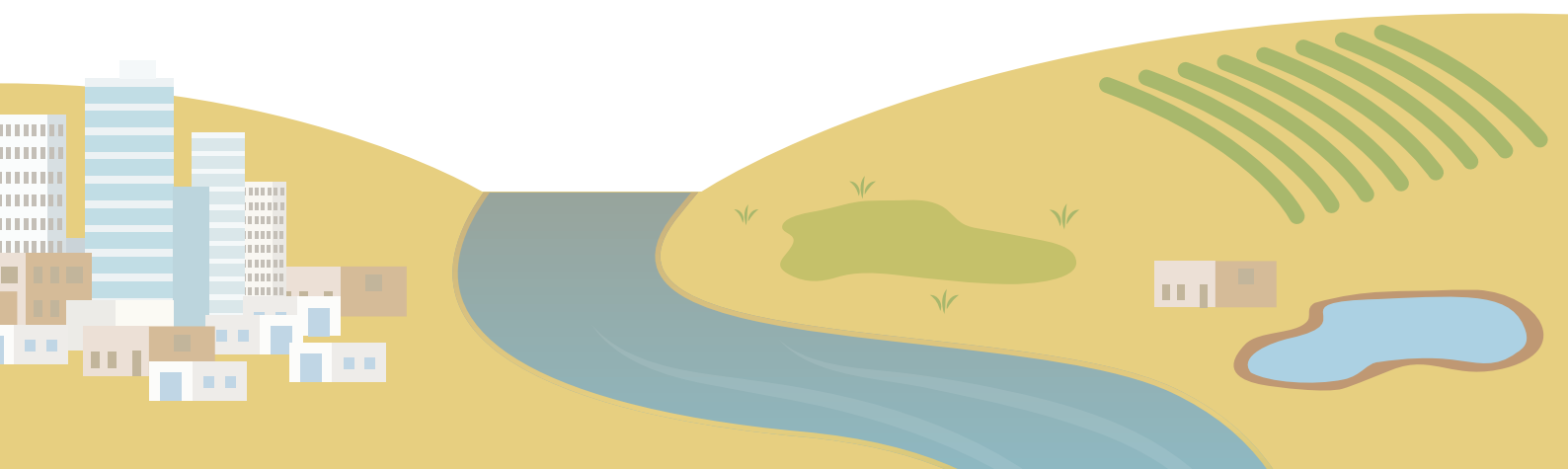
3.5 Index overview

The three indicators in each dimension are combined to form a dimension score, and each dimension score is combined to create the overall index. Table 3.1 summarizes the structure of the index, including its three dimensions, underlying indicators and scoring approach.

Table 3.1: Indicators and dimensions of the Drought Resilience Capacity Index

Drought Resilience Dimensions		
ANTICIPATE	PREPARE	ADAPT
Indicators (degree of implementation, 0–100 per cent)		
 1a Risk knowledge	 2a Planning	 3a Adaptive resilience programmes
 1b Early warning	 2b Decision support systems	 3b Economic and financial adaptation mechanisms
 1c Early response	 2c Socioeconomic safeguards	 3c Monitoring, evaluation and learning
Indicator scoring	Indicators are scored based on implementation categories, based on threshold descriptions for each category (see section 3.6).	
Dimension score	Dimension scores calculated from indicator scores (see section 3.7)	
Index score	Index score calculated from dimension scores (see section 3.7)	

As noted in [section 3.2](#) and [section 3.3](#), the dimensions should not be treated as silos. When designed and implemented in an integrated manner, actions under each dimension support the other dimensions, thus increasing resilience overall. Similarly, for highly effective drought resilience, integration and feedback loops are required between each of the indicators across the dimensions.



3.6 Indicator scoring approach and maturity levels

5 maturity levels														
Emerging (0-20%)			Established (21-40%)			Operational (41-60%)			Integrated (61-80%)			Transformative (81-100%)		
L (5)	M (10)	H (15)	L (25)	M (30)	H (35)	L (45)	M (50)	H (55)	L (65)	M (70)	H (75)	L (85)	M (90)	H (95)

Each indicator is scored on a 0–100 scale, reflecting the degree of implementation of the relevant capacity. Each indicator is first assigned a maturity level (emerging to transformative) based on the ‘general interpretation’ row and the specific threshold descriptions for that indicator (see [table 3.2](#)). Within each maturity level, countries should further select one of the following, based on the threshold descriptions:

- L (Low): meets the minimum requirements for that threshold (and preceding thresholds)
- M (Medium): some way advanced beyond the minimum requirements (based on threshold descriptions)
- H (High): considerably advanced in that level but not yet reaching all the minimum requirements of the next level.

Based on the selection of L, M and H, scores are assigned in increments of 5 (see [table 3.2](#)). The scoring approach can be tested as part of piloting (see [section 3.9](#)).

While the threshold descriptions for each maturity level in [table 3.2](#) are relatively brief, these would need to be expanded and made more explicit during a piloting exercise.

Gender lens: In applying maturity levels, ‘inclusive’ should be interpreted as a measurable feature of system performance. Higher maturity scores should require evidence that drought resilience systems are accessible and beneficial to women and marginalized groups, that affected groups participate meaningfully in planning and coordination, and that monitoring systems track differentiated outcomes. A system should not be scored as ‘Integrated’ or ‘transformative’ if it is operational at the national level but excludes women, local organizations or marginalized users from information flows, decision-making, finance or implementation benefits.

To support objective indicator scoring countries would be asked to complete three free text fields for each indicator:

- Status: describing the level of implementation in the country as it relates to the threshold descriptions, providing concrete examples and references to further information where possible
- Progress: activities undertaken, progress made since previous reporting round (blank in the baseline round)
- Priorities: identifying key priorities to be addressed in order to advance towards higher categories.

As far as possible, free text responses should be based on evidence from related monitoring and reporting processes, with links to further information. If there are data and information gaps, country consultations among relevant stakeholders should result in agreed scores and responses. Responses would then be based on best available information and stakeholder and expert experience of the degree of implementation on the ground (see [section 3.8](#)).

Table 3.2: Indicator maturity level thresholds and scoring in the Drought Resilience Capacity Index

		Maturity Level Thresholds														
		Emerging (0-20%)			Established (21-40%)			Operational (41-60%)			Integrated (61-80%)			Transformative (81-100%)		
		L (5)	M (10)	H (15)	L (25)	M (30)	H (35)	L (45)	M (50)	H (55)	L (65)	M (70)	H (75)	L (85)	M (90)	H (95)
General interpretation →		Does not exist; under development, draft, partial, pilot, ad hoc, limited			Established; approved; some implementation; likely incomplete geographic and/or sectoral coverage; limited use in practice and limited financing for implementation			Functional; being implemented by majority of relevant authorities; some cross-sector coordination occurring; systems and programmes consider varying sectoral needs			Effective cross-sector implementation by all relevant authorities; systems integrated into decision-making processes and broader planning arrangements			Objectives consistently achieved; adequate resources; outcomes/ impacts monitored; periodic review and revision informed by effective monitoring, evaluation and learning cycles (and see best practices and gender considerations for each indicator in section 3.4)		
↓ Indicator																
ANTICIPATE	1a Risk knowledge	Ad hoc assessments; limited scope			Periodic assessments; partial coverage of risk components			Up-to-date, multi-sector risk assessments used in some planning			Regular, multi-scale assessments embedded in planning			Comprehensive, high-resolution risk understanding routinely applied		
	1b Early warning	Pilot or partial monitoring and early warning			Basic early warning established; limited dissemination			Routine forecasts/alerts with broad coverage			Reliable, multi-source information used in decision-making			Impact-oriented early warning fully linked to action and governance		
	1c Early response	Response protocols absent or under development			Basic protocols approved; trigger thresholds defined			Trigger-based response mechanisms in place			Coordinated cross-sector response with pre-arranged resources			Fully integrated with risk knowledge and early warning to enable anticipatory action		
PREPARE	2a Planning	Draft or partial plans; weak policy links			Plans approved; partial policy alignment			Plans being implemented across most relevant institutions			Embedded across sectoral and national planning			Objectives consistently achieved; fully embedded in development and financial systems; regularly updated		
	2b Decision support systems	Limited or pilot decision support tools			Tools used in some sectors or processes			Scenario tools applied across sectors for planning			Institutionalized and used at different scales			Integrated platforms translating data into actionable decisions under uncertainty		
	2c Socioeconomic safeguards	Ad hoc mechanisms; limited coverage; reactive			Basic mechanisms established; partial coverage; weak linkage to risk			Institutionalized safeguards increasingly linked to triggers			Coordinated arrangements reliably triggered; timely support delivered			Comprehensive, anticipatory and scalable arrangements protecting populations and sectors		
ADAPT	3a Adaptive resilience programmes	Isolated pilots; limited continuity			Programmes established but fragmented			Programmes being implemented, with some coordination across sectors			Sustained implementation within institutions			Scaled, system-wide implementation with feedback loops		
	3b Economic and financial adaptation mechanisms	Pilot, fragmented investments; limited risk integration			Mechanisms identified; partial integration; limited scale			Coordinated investment and emerging financial instruments			Adaptation finance mainstreamed across sectors and systems			Financial systems fully aligned with risk, planning and outcomes at scale		
	3c Monitoring, evaluation and learning (MEL)	Limited monitoring; little feedback			MEL systems established but inconsistent			MEL informs planning, implementation and capacity development			Continuous MEL embedded in institutions			Fully adaptive systems with iterative learning shaping decisions, and with feedback loops across to each indicator		

3.7 Index scoring, interpretation and policy relevance

Indicator scores → dimension scores → index score

The recommended approach for aggregating indicator scores to dimension scores, and dimension scores to index scores, is using the geometric mean. This approach is most aligned with the rationale that robust resilience is only achieved if all aspects of resilience are functioning well. It ‘rewards’ balanced, holistic resilience across indicators and dimensions. In cases of significant variation in indicator or index scores, the index score is ‘pulled down’ more by low scores using the geometric mean approach compared to the arithmetic mean (simple averaging). Furthermore, this approach has been used in the Human Development Index since 2010 (UNDP 2010), and is therefore well tested and widely accepted. The geometric mean (and other methods) could be tested during piloting as needed (see [section 3.9](#)).

Using geometric mean:

- Dimension scores:
Anticipate (An) = $(1a \times 1b \times 1c)^{1/3}$
(repeat logic for each dimension)
- DRCI = $(An \times P \times Ad)^{1/3}$

A comparison of geometric mean vs. arithmetic mean is given below.

Country	Anticipate (Dimension 1)	Prepare (Dimension 2)	Adapt (Dimension 3)	Arithmetic Mean (Index score)	Geometric Mean (Index score)
Country A (Even progress)	50	50	50	50	50
Country B (Varied progress)	90	50	10	50	36

Alternative approaches tested include:

- **Arithmetic mean (simple average):** simple to calculate and explain but can mask important variations in indicator and index scores.
- **Minimum rule:** dimension score is minimum of indicator scores, and index score is minimum of index scores. It follows the logic that resilience is only as strong as the weakest component. However, this is less aligned with the logic being used that balanced resilience (across indicators) leads to more robust resilience. Furthermore, it is too dependent on the lowest indicator score and does not adequately recognize progress in other areas.

The general interpretation of the DRCI score is provided in [table 3.3](#). The overall index and this form of interpretation is expected to be broadly useful for global level assessments and comparisons. However, the index score can mask significant differences in maturity between dimensions and between indicators. Therefore, for a full understanding, DRCI scores and interpretations should always be viewed in conjunction with dimension and indicator scores and interpretations.

Table 3.3: Maturity levels and general interpretation

Maturity level	Score range (per cent)	General DRCI score interpretation*
Transformative	81-100	Adaptive, inclusive and forward-looking systems. Continuous learning and innovation. Governance, economies and ecosystems restructured to reduce underlying vulnerability and systemic drought risk.
Integrated	61-80	Cross-sectoral systems are fully coordinated, institutionalized and routinely used. Clear linkages across policies, planning, finance and implementation. Sustained resourcing and mainstreaming.
Operational	41-60	Multiple systems or sectors are functioning with increasing alignment. Increasing coordination, data sharing and policy coherence, but still not fully integrated or consistently applied.
Established	21-40	Formal national or sectoral systems in place. Basic policies, institutions and tools exist but coverage, consistency and effectiveness remain uneven.
Emerging	0-20	Isolated pilots or ad hoc measures exist. Fragmented coverage, weak institutionalization and limited capacity.

* May mask significant differences between dimensions and between indicators, so DRCI scores should always be viewed in conjunction with dimension and indicator scores and interpretations.

The DRCI is designed as a **diagnostic tool**, rather than a purely descriptive metric (see [table 3.4](#)). By breaking down resilience into three dimensions and nine indicators, it enables users to:

- Identify relative strengths and weaknesses across resilience functions
- Prioritize areas for investment and institutional strengthening
- Track progress in a structured and comparable way.

Table 3.4: Example of how indicator and dimension results allow identification of priority areas for investment and action.

Indicator maturity level	1a Risk knowledge Integrated (70)	2a Planning Operational (45)	3a Adaptive resilience programmes Established (25)
	1b Early warning Operational (45)	2b Decision support systems Established (35)	3b Economic and financial adaptation mechanisms Emerging (15)
	1c Early response Operational (50)	2c Socioeconomic safeguards Established (25)	3c Monitoring, evaluation and learning Emerging (5)
Dimension maturity level	ANTICIPATE Operational (55)	PREPARE Established (34)	ADAPT Emerging (12)
Drought Resilience Capacity Index score Established (28)			

In the example above, while the index score shows that overall drought resilience capacity can be categorised as 'established', the dimension and indicator scores show which aspects of drought resilience capacity are stronger (e.g. in 'anticipate', particularly in indicator 1a Risk knowledge), and which are lagging (particularly in the 'adapt' dimension).

[Table 3.4](#) illustrates how indicator, dimension and overall scores can be interpreted in practice, and how they can be used to identify priority areas for action. The DRCI is designed with the potential to be applied by policymakers and organizations as part of a three-step cycle linking **monitoring, prioritization and implementation**:

1. **Monitor:** Assess drought resilience capacity using the DRCI.
2. **Prioritize and design:** Identify priority areas for strengthening resilience and for designing targeted interventions. This would use the DRCI results as a starting point but would require further consultation and more detailed analysis to identify appropriate interventions and implementation pathways. Importantly, this should include the identification of realistic funding sources, and interventions should be designed in alignment with specific funding streams to increase the likelihood of securing funding (see [Section 5](#)).
3. **Implement:** Secure funding and implement actions. Improvements in drought resilience capacity should be able to be tracked through increases in DRCI scores over time (Step 1).

This approach would require further discussion and development, identification of global and regional partners, and identification of funding sources.

Response options for addressing the various indicator areas, as well as related drought resilience actions, are given in [section 4](#).

3.8 Data collection and alignment with existing systems

The design of the DRCI draws on **existing MEA monitoring and reporting processes** (see [annex I](#)), and it is therefore likely to be aligned with national reporting arrangements. While MEA indicator methodologies do not correspond directly to existing indicators, they cover similar topic areas. This allows countries to draw on existing data, information and reporting (through MEA, regional and national processes) while applying a new scoring approach focused on system functionality and maturity. Data gaps can be addressed by using best available information and stakeholder consultations to agree on the best estimated scores and responses to the free text fields.

It is proposed that a global institution develop a zero draft DRCI for each country, based on publicly available information. This would then be shared with country focal points for review, validation and finalization, with appropriate stakeholder inputs at the relevant levels.

This approach aims to balance: comparability across countries; practical feasibility; country reporting burden; and country ownership of results.

As this is a qualitative assessment, it is acknowledged there will always be an element of subjectivity in country scores for each indicator. However, objectivity is enhanced through:

1. Detailed threshold descriptions for each maturity level, best practice and gender descriptions, and further clarification of terms (see [section 3.4](#) and [section 3.5](#)).
2. Use of free text fields for each indicator, particularly 'status' and 'progress' (see [section 3.6](#)). These facilitate stakeholder discussions and consensus, ensuring scores are based on evidence of implementation on the ground, as well as supporting transparency and comparability at the global level.
3. In-country multi-stakeholder consultation processes to agree on indicator scores and free text (e.g. between ministries with responsibility for drought, and other relevant non-governmental organizations). Guidelines can be prepared for these consultation processes, though ultimately it is likely to be up to each country how they choose to run this process.

4. A quality assurance process undertaken by global institution(s) (TBD), in which scores can be checked against free text responses provided and other available data sources. This can facilitate a dialogue between the global institution and the country focal point on appropriate scoring, though ultimately it is likely to be up to the country to finalize the indicator scores.

Global institutional responsibility for data collection from countries requires further discussion, though it would seem that UNCCD is the natural 'home' for this index as part of reporting under the Convention, and its work on the Drought Resilience Index and the International Drought Resilience Observatory (IDRO) (see [section 2.3](#)).

3.9 Piloting and next steps

As an initial step, the DRCI could be piloted in selected countries to test scoring approaches, data collection, comparability and usefulness as a policy-relevant signal at national, regional and global levels. During regional consultations, more than 20 countries informally expressed interest in participating in piloting activities (see [annex IV](#)).

The following elements could be considered for a pilot phase:

- **Timeline:** 12 months (e.g. Q1–Q4 2027).
- **Country selection:** 10–20 countries, using balanced selection criteria. Considerations include: geographic diversity (regions, sub-regions, latitudes); varied climatic conditions (e.g. arid through to more water abundant); varied levels of socioeconomic development, governance and likely levels of drought resilience capacity. UNCCD national focal points could be logical focal points for this process in each country, based on feedback from the regional consultations undertaken in the development of this report (see section 3.1 and annex IV).
- **Methodology validation:** global institution (or partners) draft DRCI responses for each country using publicly available data. Drafts are shared with each country for review, stakeholder consultation and validation.

- **Capacity support and feedback:** Global partner(s) provide reporting guidelines and online training, as well as develop evaluation criteria for the appropriateness and success of the index methodology and data collection approach. In addition, country feedback is solicited for refinement of the DRCI (e.g. through regional webinars or in-person consultations). Consider including gender and social inclusion expertise in the piloting and consultation process.
- **Budget:** Funding would need to be identified for a centralized team for coordination, consultation, analysis and reporting, and potentially budget for countries to run national consultation processes (all pending design of piloting).
- **Outputs:** Validated DRCI data collection and scoring methodology (potentially including suggestions for further review and refinement, for example after three years of implementation); lessons learned report to inform refinement of the methodology, data collection, and potential implementation modalities; and a proposal for integration into MEA processes, with consideration of post-2030 arrangements (e.g. UNCCD or GGA processes).

Partnerships and financing would need to be determined to undertake piloting.

Building on this work in a sub-set of countries (e.g. 3–4), further analysis could be done to identify key priorities and design actions to address them, though this would require additional budget (see [section 3.7](#)).

4 Using the Drought Resilience Capacity Index as an entry point for strengthening drought resilience: examples for implementation

4.1 Purpose

This section provides some examples and links to further information to support countries to move up the maturity levels of the Drought Resilience Capacity Index (DRCI) (see [section 3](#)). It also identifies which actions support progress on various MEA targets and indicators (see text in square brackets in italics in each section, and [annex I](#) and [annex II](#)).

While this section provides an entry point to implementing drought resilience in countries and basins, it is not intended as a comprehensive guide for building drought resilience.

As outlined in [section 3](#), actions under the DRCI dimensions and indicators need to be implemented in an integrated manner to build robust drought resilience. In this way, while some of the actions presented are clearly aligned with a particular indicator, others are more cross-cutting in nature. In practical application, they need to be linked and operate more on a continuum between the dimensions.

Actions presented in this section are complemented by the best practice descriptions for each indicator in [section 3.4](#).

4.2 Anticipate

This dimension focuses on the ability to monitor and foresee drought risk and translate information into timely decisions, as covered by DRCI indicators 1a Risk knowledge, 1b Early warning, and 1c Early response.

1a Risk knowledge

Drought anticipation capacity starts with a sound and regularly updated understanding of drought risk (**1a**), including all three dimensions of risk: hazard, exposure and vulnerability. This requires institutional and technical capacity to conduct drought risk assessments on a regular basis, as these provide the foundation for monitoring, early warning, preparedness planning and longer-term adaptation. Such assessments help identify who and what is at risk, where vulnerabilities are concentrated and how drought risks are changing over time. Further guidance and resources are available from the [Vulnerability and Risk Assessment](#) pillar of the UNCCD Drought ToolBox and the World Bank's Drought Risk and Resilience Assessment methodology (World Bank 2024a), among others. [*Supports: Sendai G-5; GGA 10(a)-b; UNCCD SO3*]

1b Early warning

Building on this risk understanding, technical tools typically involve integrated drought monitoring, early warning and forecasting systems (**1b**), using globally available Earth Observation (EO) data, in situ monitoring networks, numerical weather prediction products, hydrological models and, increasingly, incorporating artificial intelligence and machine learning techniques for anomaly detection and forecast enhancement (see [box 4.1](#) for examples). Monitoring typically combines climate indices (e.g. Standardized Precipitation Index (SPI), Standardized Precipitation Evapotranspiration Index (SPEI), hydrological data and satellite-derived indicators such as vegetation stress and soil moisture (e.g. Normalized Difference Vegetation Index ([NDVI](#)), Normalized Difference Water Index ([NDWI](#)), and Relative Greenness ([RG](#))). As drought is generally a slow-onset hazard, monitoring itself can provide an important indication of increasing drought risk and can trigger early action before severe impacts occur. However, effective early warning should account for all the different phases of a drought.

Effective drought monitoring systems therefore need to be tailored to the vulnerability profile and dominant drought risks of a country or basin. For example, in predominantly agricultural systems, indicators such as soil moisture, vegetation condition and rainfall anomalies may be particularly important while, in other contexts, hydrological variables such as streamflow, reservoir storage, groundwater levels and inflows may provide more relevant signals for preparedness and response. For example, streamflow can be important for the well-being of freshwater ecosystems, river transport and cooling of thermal power plants.

Forecasting provides additional lead time and strengthens anticipatory decision-making. In the context of drought, sub-seasonal to seasonal (S2S) forecasting is particularly important as these timescales are often most relevant for agricultural planning, water resource management, reservoir operations and preparedness measures. Compared to rapid-onset hazards such as floods, drought management relies more heavily on the progressive

accumulation of monitoring information and medium-range forecasting to identify emerging risks and support proactive action. However, the emergence of fast-evolving drought events, so-called flash drought, makes it important to also address shorter timescales by monitoring and forecasting compounding factors.

Underlying data are often spatially gridded, facilitating use across different spatial scales from local catchments to national or regional assessments. Such technical tools may either rely directly on globally available data, models and forecast products, or be tailored to better represent local conditions and context (see [box 4.1](#) for examples).

Further guidance and resources are available from: the [Monitoring and Early Warning](#) pillar of the UNCCD Drought ToolBox, the Integrated Drought Management Programme (IDMP) and the Early Warnings for All (EW4All) initiative [resources](#) page (though EW4All contains multi-hazard guidelines, not drought-specific). [Supports: Sendai G-1, G-2, G-3; GGA 10(a)-a, 10(a)-c; SDG 3.d.1; UNCCD SO3]



Box 4.1: Anticipate: Early warning systems for drought resilience in the Volta Basin and Thailand

Volta Basin Drought Early Warning System: Enabling proactive drought risk management and resilience

The Volta Basin Drought Early Warning System (DEWS) is a basin-wide system, operational since 2025, integrated within a web-based decision support system (DSS) to monitor, forecast and communicate meteorological, agricultural and hydrological drought conditions across the transboundary Volta Basin. It has been developed by DHI under the REWarD (Reversing ecosystem and water degradation) programme funded by the Global Environment Facility (GEF) and implemented by the United Nations Environment Programme (UNEP) and the International Union for Conservation of Nature (IUCN), with contributions from Volta Basin countries. Its purpose is to shift drought management from reactive monitoring to proactive, actionable early warning by generating drought indicators, seasonal forecasts based on an operational hydrological model, and impact based information, which will be disseminated through national authorities to communities, including farmers and pastoralists.

By providing timely, accessible and locally relevant information and strengthening coordination between regional institutions, such as the Volta Basin Authority and national stakeholders, the system will enable early decision making, support risk informed planning and enhance community preparedness. In doing so, the DEWS will contribute to drought resilience by reducing vulnerability to climate variability, improving water resource management, safeguarding livelihoods and supporting ecosystem sustainability across the basin.

Strengthening drought preparedness and climate resilience in Thailand through the integrated national water monitoring and forecasting system

The Thailand national water monitoring and forecasting system, developed by DHI in collaboration with the Hydro-Informatics Institute, provides an integrated operating system for real-time water status monitoring, drought and flood forecasting, and impact-based analysis across the country. The system has been operational since 2023 and has been routinely updated. The system combines Earth Observation data, national hydrometeorological data sets, and operational forecasting models to identify areas experiencing water deficits and to predict drought risks at national to local scales.

The system supports proactive risk management through probabilistic drought risk indicators, while spatial impact-based analysis enables the assessment of potential impacts on population, infrastructure, crops and other vulnerable assets. Delivered through a web-based platform, the system allows decision makers to visualize, analyse and disseminate forecasts and early warnings in near real time, strengthening coordination between agencies and supporting timely preparedness and response actions. By linking monitoring, forecasting and impact assessment within a unified national platform, the system enhances Thailand's capacity to anticipate, manage and mitigate drought risks, contributing to more resilient and climate-informed water resources management.

1c Early response

Effective early warning systems (EWS) link forecasts to predefined triggers (based on agreed indicators, thresholds and decision rules), financing mechanisms and early actions. Further guidance and resources are available from the [Monitoring and Early Warning](#) pillar of the UNCCD Drought ToolBox and the EW4All 2025 status report (UNDRR and WMO 2025). *[Supports: Sendai G-4, G-6; GGA 10(a)-e; UNCCD SO3]*

Cross-cutting policy response options and capacity considerations:

- The **design, operation and long-term sustainability of monitoring, early warning and forecasting systems** require adequate institutional capacity including trained personnel, robust data management workflows and clear operational mandates. Outputs must be generated in appropriate, user-oriented formats – such as maps, dashboards, indicators and bulletins – to directly support decision-making, preparedness and drought resilience actions (linked to 'Prepare').
- **Institutional coordination and early activation protocols:** Defined coordination mechanisms are activated when thresholds are reached. *[Supports: Sendai E and G4; GGA 10(b); SDG 11.b]*
- **Risk-informed communication and preparedness engagement:** Ensure warnings are accessible and actionable for users. User-oriented information formats should be designed through gender-responsive and inclusive communication approaches. This includes identifying who receives warnings, through which channels, in which languages and formats, and whether women, persons with disabilities, pastoralists, smallholder farmers and other at-risk groups can act on the information. Early warning systems should therefore combine technical accuracy with trusted local dissemination channels, feedback mechanisms and links to anticipatory support. *[Supports: Sendai G5; GGA 10(a); SDG 13.3]*

4.3 Prepare

Technical and management tools and policy response options in this dimension are strongly linked to the 'anticipate' dimension. They cover planning (2a), decision support systems (2b) and socioeconomic safeguards (2c) that reduce vulnerability of societies, economies and ecosystems.

Gender lens: Preparedness systems should include gender analysis, gender-responsive budgeting and participatory planning processes that engage women's organizations and representatives of marginalized groups. Preparedness measures should also address drought-related increases in unpaid care work, water collection, food insecurity and livelihood stress, and should ensure that social protection, water allocation, agricultural support and contingency measures are accessible to those facing structural barriers (UNCCD and FAO 2024).

2a Plans

- **Drought management and investment plans** are developed and implemented across national, basin and sectoral levels, incorporating investment needs and, ideally, funding streams. *[Supports: Sendai E1; SDG 6.5.1, 13.1.2; GGA 10(b); UNCCD SO3]*
- **Ecosystem-based approaches** are integrated into planning and are mainstreamed in drought strategies. *[Supports: CBD Target 14; GGA 10(b); UNCCD SO3]*

[Planning supports: Sendai E-1, E-2; GGA 10(b)-a; SDG 1.5.3; UNCCD Implementation Framework]

2b Decision support systems

Decision support systems for drought management planning and preparedness integrate hydrological, climate and socioeconomic modelling to assess water availability, sectoral impacts and risk trade-offs under different climate and drought scenarios, supporting anticipatory action, management decisions, investment prioritization and resilience planning at national and sub-national scales.

Importantly, DSS should be integrated with early warning and forecasting systems (1b). Planning supported by DSS is extremely relevant at shorter time scales as well, e.g. seasonal forecasts, especially through the incorporation of climate predictions. Scenario-based analysis allows decision makers to explore 'what-if' futures, test policy or management options, and understand the implications of uncertainty related to future climate change scenarios and socioeconomic development (see [box 4.2](#) for examples). Gridded global data sets of drought indices (such as SPI and SPEI), and planetary boundaries for food production, for current and future timeframes, have been modelled which may support planning at the national level (Araujo *et al.* 2025; Beier *et al.* 2025). Transparency, traceability of assumptions, and the co-development of indicators and outputs with stakeholders should be emphasized to ensure relevance and uptake.

- **Infrastructure/reservoir and water management:** By incorporating reservoir operations, water user demands and risk thresholds into the decision support tools (above), systems can inform storage, release, allocation and contingency decisions across sectors, helping governments optimize water resource management and reduce drought impacts under variable and extreme conditions. Decision support approaches

typically enable comparison of alternative operating rules and prioritization strategies, explicitly linking hydrological scenarios or forecasts with operational constraints and policy objectives. Such tools may operate in both scenario-based and operational modes, with operational mode utilizing seasonal forecasts to enable users to make ongoing comparisons of alternative operating rules and prioritization strategies, e.g. ahead of the next dry season. This supports proactive rather than reactive drought management, particularly where there are competing water uses and transboundary considerations.

- **Agricultural management options for drought preparedness:** These options include: adjusting crop selection and varieties (e.g. drought-tolerant or early-maturing crops); modifying planting calendars and crop rotations; improving soil moisture conservation and water-use efficiency; improving soil health through practices such as minimal tillage, controlled traffic farming, and bringing livestock back into agricultural systems where appropriate; diversifying production systems; and integrating risk-aware practices such as supplemental irrigation, agroforestry and contingency planning to reduce vulnerability to water scarcity.



Box 4.2: Prepare: Strengthening drought preparedness and resilience through integrated decision support systems in Tanzania and the Volta Basin

Tanzania has strengthened drought preparedness through a national Operational Decision Support System (ODSS) for the Ministry of Water that supports integrated, risk informed water resource management. Operational since 2023, and developed with technical support from DHI and funded by the World Bank, the ODSS includes dam operation support and water use permitting analysis tools based on hydrological and water resources modelling which enable anticipatory decision making before drought conditions intensify. The dam operation support tool generates seasonal inflow forecasts and allows reservoir operators and hydroelectricity supply companies (TANESCO – the Tanzania Electric Supply Company) to evaluate reservoir operation strategies in advance, helping plan dam operations for the upcoming dry season and secure priority water uses in drought conditions.

The water use permitting analysis tool enables Basin Water Board officers to assess cumulative abstraction impacts and test permit scenarios in dry and very dry conditions before drought occurs, strengthening early, evidence based allocation decisions and preparedness planning. Together, these tools enhance institutional preparedness, strengthen drought resilience, and support sustainable water management aligned with national policy and development priorities (DHI 2021; World Bank 2021a).

The **Volta Basin** decision support system (DSS) provides an integrated platform to strengthen drought preparedness and resilience across the transboundary basin by combining monitoring, forecasting and planning capabilities within a single operational framework. It is currently being developed by DHI under the REWarD programme funded by the Global Environment Facility (GEF) and implemented by UNEP and IUCN. At its core, the system enhances proactive drought risk management through a Drought Early Warning System (DEWS) (see [box 4.1](#)) that generates and disseminates timely, actionable information to national authorities and local communities, enabling early decision-making and preparedness.

Complementing this, the DSS includes a knowledge base that supports continuous monitoring and analysis of hydrological and climate conditions, facilitating improved understanding of evolving drought risks, while the planning tool enables scenario analysis under climate change and development pathways, allowing decision makers to evaluate long-term strategies for water resource management. By linking real-time monitoring with forward-looking scenario planning, the DSS strengthens institutional coordination, supports evidence-based decision-making, and enhances the capacity of the Volta Basin Authority and basin countries and communities to anticipate and prepare for drought impacts, thereby contributing to sustainable and climate-resilient water resources management in the Volta Basin.

2c Socioeconomic safeguards

- **Pre-arranged and forecast-linked financing:** Establish contingency funds, forecast-based financing or parametric instruments. *[Supports: Sendai F; SDG 1.5]*
- **Establish pre-agreed actions** triggered by forecasts, e.g. livelihood protection, agricultural advisories, water allocation measures. *[Supports: Sendai G4; GGA 10(a); SDG 13.1]*
- **Drought response and relief protocols:** Establish structured mechanisms for activation of relief and response measures. *[Supports: Sendai B & D; SDG 11.5]*
- **Social protection and safety nets:** Scale assistance early (e.g. cash, food, public works) based on forecasts. *[Supports: SDG 1.3 & 2.1; GGA 9(f); Sendai B]*

Cross-cutting policy response options and capacity considerations:

- **Landscape and watershed restoration:** Restore ecosystems that enhance water retention and buffering capacity. *[Supports: UNCCD SO1 & SO2; SDG 6.6; CBD Target 2; Ramsar Goal 1; GGA 9(d)]*
- **Sustainable land and soil management:** Implement practices to reduce land degradation and improve soil moisture retention. *[Supports: UNCCD SO1; UNCCD COP16 Decision 19; SDG 2.4, 15.3; GGA 9(b); CBD Target 1]*
- **Nature-based water regulation and storage:** Protect wetlands, aquifers and riparian systems. *[Supports: Ramsar Strategic Plan; CBD Targets 2 and 8; SDG 6.6]*
- **Social and community engagement** (including gender): Ensure inclusive planning, integrating local knowledge and addressing differentiated vulnerabilities. *[Supports: SDG 5; SDG 10; GGA 9(f); CBD Target 22]*

4.4 Adapt

Under this dimension, technical tools and policy responses focus on long-term system transformation – through adaptive management, climate-informed planning, sustainable resource use and institutional reform – to reduce drought vulnerability under evolving socioeconomic pressures and climatic conditions.

Adapt – technical and management tools

- **Adaptive management and learning systems:** Adaptive management architecture allows drought strategies to be adjusted over time based on monitoring, performance evaluation and lessons learned, enabling institutions to respond to changing risk profiles and avoid maladaptation under increasing climate variability.
- **Climate- and risk-informed planning tools:** Tools that integrate climate scenarios, drought risk assessments and vulnerability analysis support long-term adaptation by stress-testing water, agricultural and livelihood systems against plausible future drought conditions rather than historical norms.
- **Sector-specific adaptation tools:** Adaptation relies on technical tools for water efficiency, agricultural transformation, ecosystem restoration and livelihood diversification – such as water-saving technologies, resilient crop systems and sustainable land management practices – to reduce long-term drought impacts.
- **Monitoring, evaluation and feedback mechanisms:** Monitoring and evaluation tools help track adaptation effectiveness, identify emerging risks and refine strategies over time, ensuring that drought responses evolve with changing environmental and socioeconomic conditions.

Adapt – policy response options

- **Mainstreaming drought adaptation into development planning:** Integrate drought resilience into national and sectoral planning. *[Supports: SDG 13.2.1; GGA 10(b); UNCCD SO3]*
- **Policy alignment and coherence:** Align water, land, agriculture and finance policies to reduce conflicting incentives. *[Supports: SDG 17; GGA 10(b); UNCCD SO5]*
- **Structural and systemic transformation:** Transition to less water-intensive systems and diversify livelihoods. *[Supports: SDG 2.4; SDG 8; GGA 9(b); UNCCD SO1]*
- **Ecosystem-based and sustainable resource management:** Restore ecosystem function to reduce long-term drought risk. *[Supports: CBD Targets 2 and 8; Ramsar; UNCCD SO1 and SO2]*
- **Water security and integrated grey-green infrastructure:** Combine engineered and nature-based systems for resilience. *[Supports: SDG 6; GGA 9(a); Ramsar; UNCCD SO3]*
- **Risk sharing and financial adaptation mechanisms:** Use insurance and risk-transfer mechanisms. *[Supports: Sendai F; SDG 1.5; GGA 10(c)]*
- **Capacity building and institutional reform:** Strengthen governance and institutional capacity for long-term resilience. *[Supports: SDG 16; GGA 10(c, d); UNCCD SO5]*

See [box 4.4](#) for an example of how adaptation is being integrated into municipal planning and policy processes.



Gender lens: Long-term adaptation should also transform the structural inequalities that shape drought vulnerability (see [table 4.1](#)). This includes strengthening women's land and water rights, access to finance and extension services, leadership in natural resource governance, livelihood diversification opportunities, and the capacity of women's organizations and local institutions to implement and monitor drought resilience measures (see [box 4.3](#), UNCCD 2019b; Timu and Kramer 2023; Amoak and Najjar 2026).

Table 4.1: Main differences between gender-responsive and gender-transformative drought resilience actions

	Gender-Responsive	Gender-Transformative
Focus	Acknowledges and adapts to existing gender roles and needs.	Actively challenges unequal gender norms, roles and power dynamics.
Goal	Ensures women benefit from, and are not excluded by, drought interventions.	Aims to achieve systemic, long-term gender equality alongside building resilience.
Approach	Adapts programme delivery to suit women's existing constraints (e.g. providing water collection points closer to homes).	Transforms systemic barriers (e.g. reforming unequal land ownership rights).
Outcome	Improved immediate welfare, resource access and survival rates.	Structural changes, equal decision-making power, and empowered, lasting agency.

Box 4.3: Gender-responsive approaches to strengthening drought resilience

Women and girls are often **disproportionately affected by drought**, due to structural inequalities in access to land, water, finance and decision-making, as well as higher burdens of unpaid care work. At the same time, evidence shows that women are key actors in building drought resilience, including through local knowledge, resource management and community-based adaptation practices (UNCCD and FAO 2024).

Gender-transformative drought resilience policies therefore focus not only on addressing vulnerability, but on enabling and scaling women's contributions to resilience. These approaches show that gender-responsive action is not only a matter of equity, but also a practical strategy to strengthen the effectiveness and sustainability of drought resilience interventions.

Key areas and examples of gender-transformative action include:

1. **Access to resources and assets:** Strengthening women's access to land, water, finance and inputs – particularly secure land tenure and water rights – which are critical for enabling long-term investment and resilience-building.

Example: In El Salvador, the UNEP-led [CityAdapt](#) project worked to enhance urban climate resilience through gender-responsive Ecosystem-based Adaptation (EbA). Although coffee production is one of the main economic activities in El Salvador, women only represent a third of the production and have less access to land, resources and credit than men. The EbA measures focused on the Arenal Montserrat micro-watershed to address soil degradation caused by drought and deforestation. In particular, the measures aimed at reducing water runoff and soil erosion, and increase infiltration.

Consultations were carried out to assess how climate risks differently affect women and men, engaging both groups in identifying vulnerabilities and priorities. Based on these consultations, the project implemented gender-responsive activities that combined EbA measures with livelihood support, promoting the participation of women and strengthening their economic opportunities within climate adaptation interventions. The project included targeted capacity-building and training for both women and men to enhance awareness, technical skills and inclusive decision-making, ensuring that gender equality was integrated across implementation and outcomes (UNEP 2024a).

2. **Inclusive planning and decision-making:** Ensuring women's participation and leadership in drought planning, coordination mechanisms and resource allocation processes, including at local and national levels.

Example: In Chile, women's active engagement and leadership in planning and decision-making have been central to community-driven responses to drought and land degradation in vulnerable rural areas. In Nerquihue, women formed the Peumayen Unit, a community-based group that collaborates with institutions to design and implement nature-based solutions.

Through training, women have implemented innovative practices – such as rainwater harvesting, water recycling and agroecological farming – to sustain production and restore ecosystems. In this gender-transformative action, by leading local planning, decision-making and resource management, these women have become key implementers and leaders in building long-term community resilience (UNCCD and FAO 2024).

3. **Targeted support for livelihoods and resilience strategies:** Supporting women-led and community-based approaches, such as climate-smart agriculture, water conservation, sustainable land management and ecosystem restoration.

Example: Nigeria's National Action Plan on Gender and Climate Change aims to ensure that national climate change efforts mainstream gender considerations, with the goal of ensuring the access and engagement of women, men, youth and other vulnerable groups to climate change initiatives, programs, policies and funds. Specifically, the Action Plan sets a series of measures to engage women in climate adaptation actions, including on drought resilience. These measures include adapting agricultural and forestry practices to climate change, especially in drought-prone areas, and ensuring women's land rights (Nigeria, Ministry of Environment 2020).

4. **Access to early warning, information and services:** Ensuring that drought early warning systems, climate services and advisory systems are accessible, relevant and usable for women, including through appropriate communication channels.

Example: In Peru, women-led eco-hydrological early warning systems are helping to anticipate and adapt to drought by combining traditional pastoralist knowledge with modern scientific monitoring. Through collaboration between local communities, a local NGO and a university, women pastoralists are trained to monitor groundwater levels in high-Andean wetlands, generating critical data for drought forecasting. This information enables early action – such as timely irrigation – to protect ecosystems and sustain livestock, which are central to local livelihoods. By positioning women as key knowledge holders and implementers, the initiative strengthens community resilience and promotes sustainable water resource management (UNCCD and FAO 2024).

5. **Reduction of structural barriers and workload constraints:** Recognizing and addressing the additional burdens faced by women during drought (e.g. water collection, food and care responsibilities), which can constrain adaptation capacity.

Example: In Malawi, the Climate Information and Early Warning Systems (M-CLIMES) project, supported by the United Nations Development Programme (UNDP), addresses structural barriers by improving access to climate information, water resources and agricultural services for vulnerable communities, particularly women. By strengthening irrigation, water management practices and tailored climate advisories, the project reduces the time and effort women spend coping with climate stress (e.g. securing water and managing crops under drought conditions), thereby enabling greater participation in livelihood activities and decision-making (UNDP 2026).

6. **Direct support to women's organizations and networks:** Strengthening the role of women's groups as implementers and partners in drought resilience initiatives.

Example: In the Lake Urmia region in Iran, an academic-led initiative combines environmental restoration with women's empowerment. This initiative led by Dr Tayebe Mesbahzadeh trains and mobilizes women as key actors in sustainable land management, particularly through techniques such as the use of mycorrhizal fungi to restore degraded soils and vegetation. By involving women directly in training, decision-making and implementation, local capacity for drought mitigation is being strengthened. At the same time, economic opportunities are created – such as biofertilizer production – positioning women's groups as both implementers and drivers of community resilience and sustainable development (UNCCD and FAO 2024).



Box 4.4: Adapt: Long-term adaptation pathways for drought-resilient systems in Mexico

The city of Xalapa in Mexico, supported by the CityAdapt project, has strengthened drought resilience by integrating adaptation into municipal policies and planning frameworks. The city faces recurring climate hazards, including droughts, flooding and landslides, which have driven a more systemic approach to risk management.

Aligned with the Municipal Climate Action Plan, the project has generated scientific evidence and socio-environmental assessments – including climate scenarios and ecosystem service analyses – to inform decision-making at the water basin level. It has also supported capacity-building of local authorities, enabling public officials to better interpret and apply climate and technical data in planning processes.

Furthermore, the initiative has implemented pilot interventions, combining ecosystem-based approaches with water management solutions. These include riparian and wetland restoration, the promotion of sustainable silvo-pastoral systems, and the establishment of rainwater capture and district drainage systems, all contributing to enhanced drought resilience and reduced vulnerability to climate impacts (Balderas Torres *et al.* 2021).



5 The case for investment in drought resilience

5.1 From reactive response to proactive investment

As discussed in [section 2](#), drought is a systemic and generally increasing risk impacting many vital functions of societies. The impacts of drought are estimated to cost in the order of USD 307 billion annually, although the true costs are hard to estimate, and are often underestimated, as they tend to be indirect and long-term in nature (UNCCD 2023a; Thomas *et al.* 2024; World Bank 2024a). Despite this, most finance still flows to emergency response and recovery, not to proactive resilience (UNCCD 2021b; World Bank 2024a). There is growing recognition across the UN system, and by international finance institutions and national governments of the need to shift this balance – yet investment remains largely reactive.

In this regard, investing in Nature-based Solutions (NbS) are often critical (UNCCD 2021b; Thomas *et al.* 2024; World Bank 2024a).

Investments in drought resilience generate a ‘triple dividend’:

- **Avoided losses:** Reduced damage to, among others, agriculture, infrastructure, livelihoods and ecosystems
- **Enhanced productivity and stability:** Improved water security, energy production, agricultural performance and economic resilience across a number of productive sectors
- **Wider social and environmental benefits:** Improved health outcomes, reduced poverty, stronger ecosystems and climate co-benefits (FAO 2023; UNCCD 2023a)

This broader framing is critical for engaging economic decision makers, positioning drought resilience as a development and macroeconomic priority, rather than only as a risk management issue.

5.2 Sources of finance for drought resilience

Drought resilience is typically financed through a combination of national public expenditure, international climate and development finance, and private sector/innovative financial flows (UNCCD 2021b; World Bank 2024a). The mix of sources of finance for drought resilience must be better aligned to shift from reactive crisis response to proactive risk reduction.

Domestic public finance remains the primary source of funding, particularly across water, agriculture, ecosystems, infrastructure and social protection. However, resilience is often under-prioritized, with resources mobilized only after drought events. Embedding drought resilience into national development plans, sector strategies and budget processes is therefore essential to enable anticipatory investment (see [box 5.1](#)).

International finance:

- **International climate and development finance** – including multilateral funds such as the Green Climate Fund, Adaptation Fund, Global Environment Facility and multilateral development banks – plays a key role in supporting large-scale programmes and innovation. Ongoing efforts to harmonize approaches, such as common climate investment frameworks and shared reporting systems, are helping to improve access to, and coordination of, finance across sources (World Bank 2024b; Adaptation Fund 2025; GEF 2025).
- **Drought-specific international finance mechanisms** are emerging. One example is the **Riyadh Global Drought Resilience Partnership (RGDRP)**, which is a flagship initiative of the UNCCD and its Global Mechanism (GM), launched at COP16 under the leadership of the Saudi Presidency. The RGDRP is structured around three pillars: Readiness Facility to build national capacities; Investment Facility to finance drought resilience projects; and a Knowledge Platform to share innovations and best practices. Another example is the **Drought Resilience**

Investment Facility (DRIF), established in 2025 through the leadership of Luxembourg and in partnership with UNCCD. The DRIF offers structured impact investment pathways for the private sector to invest in drought resilience. With a target of USD 400 million, the DRIF aims to back sustainable farming, improve water access and promote nature-based solutions.

Private sector finance remains underutilized despite growing recognition of drought risks. Increasingly, initiatives focus on de-risking investments and mobilizing private capital through insurance, blended finance structures and investment funds. **Blended finance**, combining public, private and philanthropic capital, is particularly important to share risks and attract investors at scale (e.g. drought insurance, resilience bonds) (UNEP Finance Initiative 2025). Ministries of finance and planning have a central role in coordinating these funding streams, ensuring coherence, and aligning external and private finance with national priorities (UNCCD 2021b; UNEP Finance Initiative 2025).

Innovative and diversified financing instruments are required to scale investment effectively. This includes **market-based instruments** such as carbon and biodiversity credits, water markets and payments for ecosystem services (PES), which help monetize environmental outcomes. **Capital market instruments** – including green, nature and sustainability-linked bonds, as well as impact bonds – can mobilize large-scale institutional investment. **Blended finance** approaches, such as public–private–philanthropic partnerships, catalytic capital and concessional finance, are essential to de-risk projects and crowd in private capital. In addition, **corporate and value-chain finance mechanisms**, including certification systems, traceability and sustainable sourcing premiums, align business incentives with resilience outcomes. Finally, **risk and insurance instruments**, such as index-based drought insurance and microcredit for land users, support vulnerable stakeholders and enable investment at the local level (UNDRR, Standard Chartered Bank and KPMG International 2024; Greatrex *et al.* 2025).

Box 5.1: National leadership in drought resilience investment in Kenya and South Africa

Kenya has made significant progress in integrating drought resilience into national planning and budgeting. Through the National Drought Management Authority, Kenya has established a dedicated budget line for drought risk management, supported by a multi-year Drought Contingency Fund. The Ministry of Finance is directly involved in resource allocation, and drought risk is now reflected in the Medium-Term Expenditure Framework.

The key features of Kenya's approach are:

- **Multi-sectoral coordination:** The National Drought Management Authority works with finance, planning, agriculture, water and social protection ministries.
- **Blended finance:** Kenya leverages international finance (World Bank, African Development Bank, EU) alongside national resources.
- **Early warning and contingency planning:** Investments have enabled faster, more cost-effective responses, reducing losses and protecting livelihoods.
- **Private sector engagement:** Kenya is piloting drought insurance schemes and exploring public-private-partnerships for resilience.

Lessons: Kenya's experience shows that strong national leadership, anchored in finance and planning ministries, is essential for shifting from crisis response to proactive investment. This approach is increasingly recognized as a model for other countries facing systemic drought risk (World Bank 2020; World Bank 2022).

South Africa has strengthened drought resilience through a combination of disaster management funding and sectoral investments, particularly in water and agriculture. The government allocates resources through the National Disaster Management Centre and provincial disaster funds, enabling emergency response and recovery during severe drought events such as the 2015–2018 drought. In parallel, investments in water infrastructure, climate adaptation planning and agricultural support programmes aim to reduce vulnerability and improve long-term resilience (World Bank 2021b).

5.3 Prioritising investments and strengthening enabling conditions

The interconnected and cascading nature of drought impacts means that finance and planning ministries must be at the centre of resilience investment decisions. This requires:

Recognizing drought as a macroeconomic and development risk, not just as a sectoral or humanitarian issue and therefore:

- Mainstreaming drought resilience into national strategies and budget processes
- Coordinating across ministries and sectors to ensure coherence and avoid duplication (e.g. finance, planning, climate change, water, agriculture, environment)
- Integrating drought risk into national budgeting, public investment planning and fiscal risk management.

Understanding and developing different sources of finance, including:

- Leveraging international finance and aligning it with national priorities
- Engaging with the private sector to unlock additional resources and innovation.

Ensuring drought resilience investments are gender-responsive, including through gender-transformative budgeting, targeted support for women's access to land, water, finance and services, and monitoring of gender-differentiated benefits and risks.

Adopting blended finance approaches which require strong coordination to avoid fragmentation and ensure that resources are used efficiently. Addressing key constraints – such as fragmented financing systems, limited investment readiness and insufficient valuation of benefits – requires strengthening enabling conditions, including (UNCCD 2021b; World Bank 2024a):

- Improved monitoring and data systems to support prioritization (see [section 3.7](#) for a description of how the Drought Resilience Capacity Index can support prioritization of investment areas), and track impacts and outcomes
- Expanded use of innovative financial instruments (insurance, blended finance, climate funds).



6 Towards coherence: drought-relevant targets and indicators across multilateral environmental agreements

6.1 Functional roles of multilateral environmental agreements in relation to drought

Each of the six major multilateral environmental agreements (MEAs) considered in this report – UNCCD, the Global Goal on Adaptation (GGA), the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals (SDGs), the Convention on Biological Diversity (CBD) and the Ramsar Convention – contribute to drought monitoring and policy in distinct but complementary ways. Together, they cover the core components of drought risk and resilience, but do so from different entry points and mandates.

- **UNCCD** (2018–2030 Strategic Framework and UNCCD Land Degradation Neutrality framework) provides the most direct coverage of drought, including indicators on hazard (land under drought), exposure (population exposed), vulnerability and resilience outcomes (UNCCD 2017; UNCCD 2021a; UNCCD 2025a).
- **Global Goal on Adaptation** – The proposed Belém Adaptation Indicators focus on preparedness, adaptation processes and sectoral outcomes across water, food, ecosystems and livelihoods (noting the 59 indicator methodologies have not yet been finalized or operationalized). While the proposed Belém Adaptation Indicators cover multiple climate hazards, it is acknowledged that the indicators may be disaggregated as appropriate, including by climate-related hazard, such as drought (UNFCCC 2025).
- **Sendai Framework** captures drought primarily through its impacts and losses, including affected populations and economic damages, though it generally includes drought with other disasters rather than specifically (UNDRR 2015).
- **Sustainable Development Goals** provide indirect proxies through development outcomes, including water stress, food security, poverty and land degradation (UN Department of Economic and Social Affairs n.d).
- **Convention on Biological Diversity** and **Ramsar Convention** contribute through indicators on ecosystem condition, restoration and functioning, which underpin drought resilience but do not explicitly measure drought (CBD 2022; Convention on Wetlands 2026).

There are many other global arrangements relevant to drought, which include:

- The UN Environment Assembly (UNEA), which addresses drought primarily through resolutions on desertification, land degradation, ecosystem restoration and nature-based solutions, with UNEA-6 adopting the most recent explicit mandate to enhance drought resilience, demonstrating the importance of this topic to environment ministries around the world (UNEP 2024b)
- [UN Decade on Ecosystem Restoration](#) (2021–2030), which supports drought-relevant restoration indicators and investment, catalysing global efforts to restore degraded land and enhance ecosystem resilience
- UN-Water / [SDG 6 Global Acceleration Framework](#) and the [IWRM monitoring system](#), which promote integrated, risk-informed water resources management

- Early Warnings for All ([EW4All](#)) initiative, which represents an emerging operational extension of the Sendai Framework, aiming to ensure universal access to multi-hazard early warning systems, including for drought, by 2027.

Taken together, these systems span hazard, exposure, vulnerability, impacts, preparedness and adaptation. However, **no single system provides an integrated picture**, and the relationships between them are not systematically aligned.

6.2 A rich but fragmented landscape of drought-relevant indicators

Across the six major MEAs and their respective implementation mechanisms, a substantial body of drought-relevant indicators exists. However, substantial gaps remain, particularly for drought resilience. Analysis undertaken for this report suggests that approximately 30–50 indicators are directly relevant to drought, with a significantly larger number (60–100 or more) contributing indirectly through related domains such as water security, ecosystems, livelihoods, governance and resilience capacity (see [annex II](#)).

However, despite this abundance, these indicators are:

- Distributed across multiple reporting processes
- Designed for different policy objectives
- Rarely organized around drought as a coherent policy issue.

As a result, the challenge is a **lack of data, coherence, integration and usability**.

Existing indicator systems provide information on certain dimensions of drought risk or resilience, but do not collectively offer a clear or consistent basis for policy prioritization or investment decisions relating to drought.

To illustrate these patterns, [table 6.1](#) provides a simplified overview of how key drought-related topics are covered across MEAs (see [annex II](#) for full analysis).

[Table 6.1](#) highlights that:

- **Drought-related indicators remain institutionally fragmented**, although they are widely available across existing MEAs. While coverage exists across key domains – including hazards, impacts, governance and response – there is no single, fully integrated system that consistently and effectively brings together hazard, vulnerability, impacts and response specifically for drought.
- **Alignment is more visible in some areas than others.** Outcome-oriented domains such as impacts, ecosystems, governance and means of implementation tend to show stronger convergence across MEAs. In contrast, indicators related to hazards, vulnerability and broader socioeconomic systems are less consistently framed, reflecting differences in mandates, methodologies and reporting practices.
- **Differences in how drought is defined and captured remain an important challenge.** Drought is treated explicitly in some MEAs (notably under the UNCCD), while others address it through multi-hazard approaches or proxy indicators. This diversity can provide flexibility, but it also limits comparability and makes it more difficult to track drought risk and resilience in a consistent way across systems.

Furthermore, incorporating gender dimensions into drought indicators and monitoring remains a challenge, as outlined in [box 6.1](#).

Table 6.1: Coverage of drought-related topics across multilateral environmental agreements, and status of harmonization

Topic	UNCCD	GGA	Sendai	SDGs	CBD	Ramsar	Harmonization
1. Hazard	●	●	●	●	—	—	Medium. UNCCD is the lead for meteorological drought intensity (Standardized Precipitation Index – SPI); GGA and SDGs are aligned on water stress (SDG 6.4.2).
2. Socioeconomic exposure and impact	●	●	●	●	—	—	High. Strong harmonization between Sendai Framework, SDGs and GGA for mortality and economic loss. UNCCD provides unique drought population exposure.
3. Vulnerability	●	●	●	●	●	●	Medium. Most rely on socioeconomic proxies like poverty (SDG 1.1.1) and social protection (SDG 1.3.1).
4. Ecosystem and land cover	●	●	—	●	●	●	High. High convergence on land degradation (SDG 15.3.1), ecosystem extent (SDG 6.6.1) and extinction risk (Red List Index).
5. Technical capacity (early warning systems and decision support systems)	●	●	●	●	—	—	High. Strong alignment via the Sendai Framework on the establishment of multi-hazard early warning systems.
6. Governance (planning and institutions)	●	●	●	●	●	●	High. Strong policy convergence between national adaptation plans, disaster risk reduction strategies (Sendai Framework) and national drought plans (UNCCD).
7. Means of implementation	●	●	●	●	●	●	High. Strong harmonisation on tracking international finance (shared reliance on OECD Development Assistance reporting), and technology transfer across frameworks.
8. Broader adaptation (resilience) measures	●	●	●	●	●	●	Medium. Sectoral activities (sustainable agriculture, restoration, efficiency) are spread across MEAs; programmatic implementation is linked via GGA 10c01.

Key:

Coverage: ● Strong (Lead data collector or explicit target); ● Partial (Uses proxy data or qualitative info); — Limited/No explicit coverage.

Harmonization: ■ Strong (Shared data sets and methodologies); ■ Medium (Similar concepts but different metrics); ■ Low (Fragmented/No alignment).

Box 6.1: Gender considerations in drought-related indicators

Gender is widely recognized as a critical dimension of drought vulnerability and resilience. However, its integration into existing monitoring arrangements remains uneven, and is often limited to basic disaggregation (e.g. by sex). A key limitation is that many commonly used indicators – particularly those related to exposure (e.g. population in drought-affected areas) – show little difference between men and women, as they typically live in the same locations. As a result, simple sex-disaggregated exposure indicators often provide limited insight into gender-specific vulnerability or resilience.

Gender differences in drought impacts are primarily driven by structural factors, such as:

- Differences in access to land, water and financial resources
- Unequal decision-making power and participation
- Differentiated livelihood roles and dependence on natural resources
- Unequal workloads, including unpaid care responsibilities (UNDRR 2022; CBD n.d.).

Gender-responsive indicators therefore need to move beyond exposure. To be more informative, **gender-responsive indicators need to focus on access, control and capacity.**

Examples of more meaningful gender-responsive indicators include:

- **Land tenure and resource rights:** e.g. proportion of women with ownership or secure rights over agricultural land (SDG indicators 1.4.2 and 5.a.1; CBD Target 22) – these indicators capture structural inequalities that directly influence adaptive capacity (FAO n.d.)
- **Access to productive resources and services:** e.g. access to irrigation, finance, extension services or climate information, disaggregated by sex
- **Participation in decision-making at all levels:** e.g. women's representation in water user associations, local drought committees or national coordination mechanisms (e.g. SDG 6.5.1)
- **Livelihood resilience and adaptive capacity:** e.g. access to diversified livelihoods, social protection systems or adaptive support measures
- **Time use and workload indicators:** e.g. time spent collecting water or fuel, which often increases during drought and constrains other adaptation activities.

Under the proposed Belém Adaptation Indicators of the GGA, gender is treated primarily as a cross-cutting dimension, rather than through a large number of dedicated indicators. This is reflected in three main approaches:

- i. Explicit reference to **gender-responsive planning processes**, including indicators tracking whether national adaptation plans and policies incorporate gender considerations
- ii. Provision for **disaggregation of indicators by gender and other social characteristics**, recognizing that adaptation outcomes vary across groups
- iii. Broader emphasis on **equity, participation and inclusion** within adaptation systems.

In parallel, global monitoring arrangements – such as those under the CBD, SDGs and UNCCD – recognize the importance of gender-responsive data and indicators, including through the promotion of disaggregation and dedicated gender-related indicators.

6.3 Coordination efforts and remaining challenges

While drought-related indicators remain distributed across multiple MEAs, coordination efforts are increasing to improve alignment, consistency and usability.

At the level of disaster risk and development, one of the most advanced examples is the alignment between the Sendai Framework and the SDGs (e.g. SDG 1.5, 11.5 and 13.1), where several indicators on affected populations and economic losses are directly shared. This alignment is operationalized through the **Sendai Framework Monitor**, which enables countries to report against multiple MEAs through a common platform, representing a practical form of harmonized reporting.

Similarly, the **UNCCD PRAIS4 reporting system** provides an integrated platform linking drought-specific indicators with broader environmental and socioeconomic data. While primarily designed for UNCCD reporting, it increasingly supports alignment with SDG indicators (e.g. 15.3.1) and related processes, illustrating how centralized reporting systems can contribute to cross-MEA coherence.

In the climate adaptation space, the **Global Goal on Adaptation (GGA) indicators** have been designed explicitly to build on and align with existing indicators under the Sendai Framework, SDGs and UNCCD. Although still evolving, it plays an important bridging role between climate adaptation, disaster risk reduction and sustainable development monitoring systems.

Coordination is also advancing in the biodiversity domain. The **Global Biodiversity Framework (GBF)** of the Convention on Biological Diversity includes a structured set of headline indicators and is supported by an ad hoc technical expert group for ongoing development and operationalization. Complementing this, the **Biodiversity Indicators Partnership** promotes coordinated indicator development and use across biodiversity-related conventions and SDG reporting. In addition, **CBD–Ramsar collaboration**, including through joint work planning processes, aims to align objectives and implementation across the two conventions. Together, these mechanisms contribute to increasing consistency in ecosystem-related indicators, particularly for areas such as ecosystem extent, condition and water-related services, which are directly relevant to drought resilience.

More broadly, coordination is supported by a growing ecosystem of global platforms and initiatives, including data and monitoring systems, which bring together indicators and data sets from different sources and improve accessibility and interoperability, even where formal reporting systems remain separate. Examples include the **UNEP Data Reporting Tool**, which facilitates harmonized reporting and knowledge management across biodiversity-related MEAs and related global targets.

6.4 Implications for post-2030 processes and coordination

The current fragmentation of drought-relevant indicators reflects the historic evolution of MEAs, each with its own mandate, constituencies and measurement priorities. However, it also presents a clear opportunity.

Several of the MEAs considered in this report are entering, or will soon enter, review and design processes for post-2030 arrangements, including:

- Discussions on successor arrangements to the 2030 Agenda for Sustainable Development
- Ongoing development and refinement of the Global Goal on Adaptation
- Future updates to the Sendai Framework
- Evolving monitoring systems under UNCCD, CBD and Ramsar.

These processes provide a timely opportunity to improve coherence in drought-related monitoring and reporting.

Key considerations for such efforts include ensuring:

- **Drought is captured within multi-hazard indicators**, including where and how disaggregation should be applied
- **Core thematic areas across MEAs are aligned**, particularly with respect to water systems, ecosystems, vulnerability and preparedness
- **A streamlined set of policy-relevant signals**, rather than expanding the number of indicators

- **Consistency across reporting processes and cycles** to reduce burden on countries and improve comparability
- **A strong link between indicators and decision-making**, ensuring that measurement systems support practical policy and investment choices.

In this context, improving coherence is not only a technical exercise, but a strategic one.

Greater alignment across MEAs has the potential to reduce reporting burden, improve clarity, and strengthen the effectiveness of drought-related policy action, particularly as countries face increasing drought risk under changing climatic and socioeconomic conditions.



7 Next steps: piloting and developing the Drought Resilience Capacity Index approach

Next steps

Moving from analysis to implementation will require continued collaboration across countries and institutions. Based on feedback from regional consultations (see [annex IV](#)), the first step would be to explore pathways to pilot the DRCI in selected countries to test usability and applicability. This would require identification of partners and financing, and further elaboration of the piloting approach (see [section 3.9](#)). Potential other next steps may include:

- Exploring how the DRCI (proposed in this report) and the Drought Resilience Index (proposed by IDRO) can be further elaborated and aligned to provide a more comprehensive and nuanced picture of drought resilience at different levels
- Exploring alignment with ongoing MEA processes, including reporting under UNCCD, the Sendai Framework, and the Global Goal on Adaptation (see [section 6](#))
- Strengthening coordination across UN agencies and partners to improve coherence in drought-related indicators, particularly in the post-2030 context (see [section 6](#))
- Supporting national capacity to interpret, apply and link drought-related indicators to policy and investment decisions.

Final reflections

This report has shown that while a substantial set of drought-related indicators exists across multilateral environmental agreements (MEAs), there are significant data gaps, particularly on drought resilience. In response, the Drought Resilience Capacity Index (DRCI) is proposed as a practical entry point. It builds on existing reporting frameworks and organizes existing information around three core functions – Anticipate, Prepare and Adapt – to assess whether key resilience systems are in place and effective. The DRCI can be used to inform prioritization, guide implementation and support financing decisions at multiple levels.

Linking measurement, policy and investment around a shared understanding of resilience capacity provides an opportunity to move from fragmented reporting towards coherent and sustained drought resilience – benefiting ecosystems, economies and societies alike.

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The annexes provide supporting technical information underpinning the indicators and analysis presented in the main report. They are not intended to be exhaustive inventories.

Annex I: Alignment of Drought Resilience Capacity Index (DRCI) indicators with multilateral environmental agreements (MEAs)

This annex shows how each DRCI indicator is aligned with – and therefore relevant for – different MEAs and their targets and indicators. By addressing each of these indicators, countries are also progressing towards the respective targets under the MEAs. Furthermore, information in those MEAs can support reporting on the relevant DRCI indicators. Each indicator covers degree of development, implementation and effectiveness (see [section 3](#) of this report for further description).

DRCI indicator	Key aligned MEA indicators / targets	Interpretation of alignment
1a Risk knowledge	UNCCD: SO3-1 (Hazard), SO3-2 (Exposure), SO3-3 (Vulnerability) Sendai: Indicator G-5 (Disaster risk information and assessment) GGA: Indicator 10(a)-b (Level of conduct of assessments)	UNCCD SO3 provides the drought-specific baseline for hazard/vulnerability, while Sendai and GGA monitor the institutional maturity of risk assessment processes.
1b Early warning	Sendai: Indicators G-1 (MHEWS), G-2 (Monitoring/forecasting), G-3 (Dissemination) GGA: Indicator 10(a)-a (Level of establishment of multi-hazard early warning systems (MHEWS)), 10(a)-c (Level of establishment of multi-hazard monitoring and forecasting) SDG: 3.d.1 (Early warning capacity)	Sendai Target G is the primary source for technical early warning capacity; GGA adds a focus on 'impact-based' forecasting consistent with DRCI transformative levels.
1c Early response	Sendai: Indicator G-4 (Local plans to act on warnings), G-6 (Pre-emptive evacuation) GGA: Indicator 10(a)-e (Population protected through pre-emptive evacuation)	Focuses on the 'response' component of EWS; maturity is measured by the extent to which warnings lead to documented anticipatory actions like evacuation or resource triggers.
2a Planning	Sendai: Indicator E-1 (National DRR strategies), E-2 (Local DRR strategies) GGA: Indicator 10(b)-a (Status of national adaptation plans (NAPs) and policy instruments) SDG: 1.5.3 (National DRR strategies) UNCCD: Implementation Framework (National Drought Plans)	Maturity scoring draws from the shift in MEAs from binary 'existence' of plans to the quality and multi-sectoral integration of those plans.
2b Decision support systems	GGA: Indicator 10(a)-g (Usage of risk information to inform NAPs/strategies)	Aligns with the GGA indicator measuring the usage of information for decision-making rather than just the production of data.
2c Socioeconomic safeguards	GGA: Indicator 9(f)-b (Population access to social protection), 9(f)-c (Climate-responsive social protection) SDG: 1.3.1 (Social protection coverage) UNCCD: SO2-1 (Poverty), SO2-2 (Safe drinking water)	Aligns with GGA/SDG focus on social protection as a resilience pillar; DRCI measures how specifically these are triggered by drought risk.
3a Adaptive resilience programmes	GGA: Indicator 10(c)-a (Extent of NAP implementation) UNCCD: Implementation Framework (Actions on the Ground/SLM) Ramsar: Target 1.1 (Area of wetlands under restoration)	Maturity tracks the transition from isolated pilots (UNCCD Implementation Framework narratives) to institutionalized, large-scale implementation monitored under GGA Target 10(c).
3b Economic and financial adaptation mechanisms	GGA: Indicator 10(c)-d (Amount of adaptation finance) UNCCD: SO5 indicators (Public/Private resource trends) Sendai: Target F (International cooperation) SDG: 17.19.1 (Resources for statistical capacity)	Aligns with SO5 and Sendai Target F, focusing on both international support and the mainstreaming of adaptation finance into domestic budgets.
3c Monitoring, evaluation and learning (MEL)	GGA: Indicator 10(d)-a (Design of MEL), 10(d)-b (Operationalization), 10(d)-d (Integration of findings) UNCCD: Implementation Framework (Knowledge sharing)	Direct alignment with the new GGA Target 10(d) which specifically monitors the operationalization and integration of MEL into policy cycles

Annex II: Core drought-relevant indicator shortlist across multilateral environmental agreements

This annex provides a simple analysis of linkages of drought-related indicators across the six multilateral environmental agreements (MEAs) assessed in this report (see section 6.1), across eight categories: (1) Hazard; (2) Socioeconomic exposure and impact; (3) Vulnerability; (4) Ecosystem/land; (5) Technical capacity (monitoring, early warning systems – EWS, decision support systems – DSS); (6) Governance (plans, policies, institutions, coordination); (7) Means of implementation (finance, capacity development, international cooperation); (8) Broad adaptation (resilience) measures.

1. Hazard

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
UNCCD	None	SO3-1: Trends in proportion of land under drought. (SPI-12 intensity classes).	Global anchor for drought hazard. The only legally binding indicator specifically mapping drought intensity classes.	Global Multi-Index Drought (GMID) ; CHIRPS
SDG	GGA	SDG 6.4.2 / GGA 9(a)-a: Level of water stress (freshwater withdrawal vs. available resources, accounting for environmental flow requirements).	Full harmonization. GGA 9a01 is explicitly derived from the established SDG 6.4.2 methodology to reduce reporting burden.	National data reported through FAO Aquastat

2 Socioeconomic exposure and impact

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
UNCCD	None	SO3-2: Trends in proportion of population exposed to drought (proportion of total, female and male population living in areas classified as under drought).	Drought-specific exposure. Overlay of UNCCD hazard data (SO3-1 (SPI/SPEI)) with population grids.	See SO3-1 (Hazard); WorldPop
Sendai	SDG, GGA	Sendai A-1 / SDG 1.5.1/11.5.1/13.1.1 / GGA 10(c)-b: Deaths and missing persons attributed to disasters.	Total harmonization. Identical metrics. Countries report once via the Sendai Framework Monitor to satisfy all three MEAs.	Sendai Framework Monitor ; DesInventar
Sendai	SDG	Sendai B-1 / SDG 1.5.1/11.5.1/13.1.1: Number of directly affected people.	Shared methodology. Captures people injured, ill or displaced. Uses the joint Sendai-SDG reporting platform.	National disaster loss databases
Sendai	UNCCD	Sendai B-5: Number of people whose livelihoods were disrupted or destroyed. e.g. $B_{5a} = \text{ha. of crops affected} * (\text{ave. workers} / \text{ha.})$; $B_{5b} = \text{livestock lost} * (\text{ave. workers} / \text{livestock})$; $B_{5c} = \text{sum of productive assets and infrastructure facilities} * (\text{average workers} / \text{facility})$.	Thematic linkage. Provides the raw socioeconomic impact data used by UNCCD SO2 to interpret 'resilience outcomes' for populations.	Sendai Framework Monitor (proxy from agriculture/ assets)

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
Sendai	SDG, GGA	Sendai C-1 / SDG 1.5.2/11.5.2 / GGA 10(c)-c: Direct economic loss in relation to GDP.	Total harmonization. Sendai C-1 and SDG 1.5.2/11.5.2 are identical. GGA 10(c)-c uses these results to calculate 'net savings' from avoided losses.	Summation of sectoral losses (C2-C6) vs. national GDP
Sendai	UNCCD	Sendai C-2: Direct agricultural loss (crops, livestock, forestry, fisheries).	Drought-sensitive impact. Sendai C-2 provides critical data for UNCCD SO3, as agriculture is often the first sector impacted by drought.	Physical damage (ha/heads) multiplied by replacement costs
Sendai	None	Sendai D-8: Number of disruptions to other basic services attributed to disasters. e.g. hydropower losses due to water scarcity (drought), though this is not listed as an example in the methodology.	–	National data sets

3 Vulnerability

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
UNCCD	GGA	UNCCD SO3-3: Trends in the degree of drought vulnerability (Drought Vulnerability Index (DVI)).	Measures vulnerability factors across three dimensions: social, economic, infrastructure. For Tier 1, minimum of: literacy rate (social); proportion of population below the international poverty line (economic); proportion of population using safely managed drinking water services (infrastructure). More parameters result in more robust vulnerability assessments (higher Tiers). [N.B. Social and economic vulnerability factors are not specific to drought, but more general socioeconomic vulnerability factors. Infrastructure factors are more closely related to drought (e.g. cultivated area equipped for irrigation; total renewable water resources per capita)]. Aligns with GGA 10(a)-b tracking the conduct of assessments.	Literacy & poverty: World Bank Open Data; Drinking water: Joint Monitoring Programme (JMP)
SDG	UNCCD, GGA	SDG 1.1.1 / UNCCD SO2-1 / GGA 9(f)-a: Population living below the international poverty line (or income inequality) in affected areas.	Primary data set alignment. GGA and UNCCD adopt the established SDG poverty data set to measure underlying socioeconomic vulnerability. [N.B. 'in affected areas' does not mean drought-affected areas calculated through other indicators. Instead, it is generally just measured at national level.]	World Bank Open Data ; National household surveys

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
SDG	GGA	SDG 1.3.1 / GGA 9(f)-b: Proportion of population covered by social protection systems.	Synergy in safeguards. Direct alignment on 'adaptive social protection' as a pillar of socioeconomic resilience. Linked to GGA 9(f)-c (Climate-responsive social protection).	ILO Social Protection Database
UNCCD	None	SO2-3: Trends in the proportion of population exposed to land degradation, disaggregated by sex.	Gender-responsive vulnerability. Specifically identifies cohorts where land-based livelihoods are at risk.	Overlay of SDG 15.3.1 with WorldPop sex-disaggregated grids
SDG	UNCCD, GGA	SDG 6.1.1 / UNCCD SO2-2 / GGA 9(a)-e: Proportion of population using safely managed drinking water services.	Structural water security. [N.B. in SO2-2 'in affected areas' does not mean drought-affected areas calculated through other indicators. Instead, it is generally measured at national level.] UNCCD uses SDG 6.1.1 as an infrastructure pillar for the DVI (SO3-3).	WHO/UNICEF Joint Monitoring Programme (JMP)
UNCCD	SDG	SO2-3: Trends in the proportion of population exposed to land degradation disaggregated by sex	SO1-4 (Land degradation (i.e. SDG 15.3.1), disaggregated by sex.	

4 Ecosystems and land cover

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
UNCCD	SDG, GBF	SO1-4 / SDG 15.3.1: Proportion of land that is degraded over total land area.	Full Harmonization. Integrates trends in land cover (SO1-1), productivity (SO1-2), and carbon stocks (SO1-3).	Trends.Earth ; ESA CCI-LC
SDG	Ramsar, GBF, GGA	SDG 6.6.1 / Ramsar Goal 1 / GBF A.2 / GGA 9(d)-c: Change in the extent of water-related ecosystems (wetlands, rivers, etc.).	Similarity, but not full alignment. Freshwater ecosystem extent as a measure of natural buffering capacity. Ramsar tracks wetland extent as a hydrological buffer; it contributes directly to GBF Target 2 on ecosystem restoration. GGA 9(d)-c uses this to measure the resilience of ecosystems.	GEO-Wetlands ; Global Wetland Watch
SDG	GBF, UNCCD	SDG 15.5.1 / GBF A.3 / UNCCD SO4-2: Red List Index (RLI) (extinction risk).	Total harmonization. Measures aggregate extinction risk. UNCCD uses it to track global environmental benefits from restoration.	IUCN Red List
GBF	Ramsar	GBF A.1 / Ramsar 1.2: Red List of Ecosystems (risk of ecosystem collapse).	Methodological alignment. Provides a risk-based framing of ecosystem integrity and resilience to slow-onset hazards like drought.	IUCN Red List of Ecosystems

5 Technical capacity (monitoring, early warning systems and decision support systems)

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
Sendai	GGA, SDG	Sendai G-1 / GGA 10(a)-a / SDG 13.3.1: Level of establishment of multi-hazard early warning systems (MHEWS).	Full harmonization. GGA 10(a)-a and SDG 13.3.1 use the Sendai Target G reporting framework to measure institutional readiness.	Sendai Framework Monitor
Sendai	GGA	Sendai G-2 / GGA 10(a)-c: Multi-hazard monitoring and impact-based forecasting systems.	Technical alignment. Tracks the transition to 'impact-based' forecasting, a 'Transformative' level in the DRCI maturity levels.	National Meteorological and Hydrological Services (NMHS)
GGA	Sendai	GGA 10(a)-g / Sendai G-5: Usage of climate risk information to inform national planning/strategies.	Decision support alignment. Focuses on the usage of data for decision-making rather than just the production of risk assessments.	National Adaptation Plan (NAP) Central ; Sendai Target G reports

6 Governance (planning, policies, institutions and coordination mechanisms)

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
Sendai	SDG, GGA	Sendai E-1 / SDG 1.5.3 / GGA 10(b)-a: Number of countries with national DRR strategies / NAPs.	Policy convergence. Tracks the existence and quality of national disaster and adaptation strategies across frameworks.	Sendai Framework Monitor
UNCCD	None	UNCCD Implementation Framework: Status of National Drought Plans.	Drought-specific planning. Qualitative reporting on the development and implementation of dedicated drought policy instruments.	UNCCD PRAIS4 Portal
GGA	None	GGA 10(d)-a to e: Status of monitoring, evaluation and learning (MEL) systems.	Learning cycle anchor. Direct alignment with DRCI dimension 3c (MEL). Tracks design, operationalization and integration of findings.	Biennial Transparency Reports (BTRs)
GBF	SDG	GBF Target 1 / SDG 15.9.1: Percentage of land covered by biodiversity-inclusive spatial plans.	Policy alignment. Measures the integration of ecosystem values into national planning, a key component of DRCI dimension 2a.	CBD National Reports

7 Means of implementation (financing, capacity development, international cooperation)

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
Sendai	GGA, UNCCD	Sendai Target F / GGA 10(c)-d / UNCCD SO5: Amount of international and domestic finance for adaptation.	Financial tracking harmony. GGA 10c04 and Sendai Target F track the 'Means of Implementation' (Mol) for resilience.	OECD DAC Creditor Reporting System (CRS)
SDG	GGA, UNCCD	SDG 17.7.1 / GGA 10(c)-e / UNCCD SO5-4: Technology development and transfer for climate adaptation.	Mol alignment. Tracks the exchange of science and technology. Aligns with UNCCD reporting on technology transfer.	UNSD SDG Global Database
SDG	GGA	SDG 17.9.1 / GGA 10(c)-f: Dollar value of financial and technical assistance for capacity building.	Capacity alignment. Measures official support for building domestic technical and institutional capacity.	OECD DAC CRS
SDG	Sendai	SDG 17.18.1 / Sendai F-8: Support to strengthen disaster-related statistical capacity.	Data capacity alignment. Tracks investment in the underlying data systems required for all resilience monitoring.	PARIS21 Partner Report on Support to Statistics

8 Broader adaptation (resilience) measures

Primary MEA	Aligned MEAs	Indicator and description	Harmonization and nature of linkage	Data sources
GBF	Ramsar, GGA	GBF Target 2 (2.1) / Ramsar 1.1 / GGA 9(d)-b: Area of degraded ecosystems (wetlands, forests, etc.) under effective restoration.	Active restoration activity. Direct measure of proactive resilience efforts to restore nature-based buffers.	CBD National Reports ; National Wetland Inventories
SDG	GGA	SDG 6.4.1 / GGA 9(a)-b: Change in water-use efficiency over time.	Full harmonization. Measures ratio of value added to water volume. Tracks economic adaptation to water scarcity.	FAO Aquastat
SDG	GBF, GGA	SDG 2.4.1 / GBF 10.1 / GGA 9(b)-a: Proportion of agricultural area under productive and sustainable agriculture.	Resilient production. Tracks adoption of sustainable practices. Aligns with UNCCD Implementation Framework reporting.	FAO SDG Data Portal
SDG	GGA	SDG 6.5.1 / GGA 9(a)-d: Degree of Integrated Water Resources Management (IWRM) implementation.	GGA 9(a)-d: Proportion of total area of basins (river, lake or aquifer) and cryosphere (glacier, snow and ice) for which a climate adaptation plan is developed and implemented as part of an IWRM approach. Could be disaggregated to drought. Builds on SDG 6.5.1 and SDG 6.5.2 (transboundary cooperation data).	6.5.1 national reporting through IWRM Data Portal. GGA to be determined
GGA	Sendai	GGA 10(c)-a: Extent of implementation of national adaptation plans (NAPs) and strategies.	Programmatic implementation. Tracks progress of adaptation actions relative to planned objectives. Relevant to DRCI dimension 3a.	Biennial Transparency Reports (BTRs)

Annex III: Global and regional platforms and initiatives

This annex provides an overview of key global and regional platforms and initiatives relevant to drought monitoring, analysis and resilience-building. While this annex is not exhaustive, it shows a wide range of data platforms and initiatives to support both drought-related monitoring and implementation of resilience measures on the ground.

Global

Name	Lead institutions	Type	Summary relevance to drought resilience
International Drought Resilience Alliance (IDRA)	UNCCD and partners	Initiative	High-level global coalition to mobilize political commitment and coordination for proactive drought management.
International Drought Resilience Observatory (IDRO)	IDRA-UNCCD, Yale and partners	Platform	Emerging global data hub designed to integrate drought indicators and support a robust Drought Resilience Index (DRI).
Integrated Drought Management Programme (IDMP)	WMO and Global Water Partnership	Initiative	Provides the standard policy and technical guidance for the 'three pillars' of drought management (EWS, vulnerability, mitigation).
Early Warnings for All (EW4All)	UN system partners	Initiative	Global push to ensure every person on Earth is protected by multi-hazard early warning systems by 2027.
UNCCD Drought Initiative and Toolbox	UNCCD and partners	Initiative / platform	Promotes proactive drought management, provides management tools, indicators, guidance on all areas of drought resilience.
UNCCD Flood and Drought Portal	UNCCD and UNEP-DHI	Platform	Global drought indices, data, applications.
Trends.Earth	Conservation International, UNCCD	Platform	The primary analytical tool for processing Earth Observation data for UNCCD SO1 and SO3, facilitating standardized national reporting.
World Overview of Conservation Approaches and Technologies (WOCAT)	University of Bern and partners	Platform	The UNCCD-accredited global database for sharing and upscaling sustainable land management (SLM) best practices.
Copernicus Global Drought Observatory	European Commission Joint Research Centre	Platform	Provides combined indicators on hazard, exposure, and impacts to offer global drought situation awareness.
UN SPIDER knowledge portal	United Nations Office for Outer Space Affairs (UNOOSA)	Platform	Supports capacity building and access to EO-based drought data and tools.
FAO Agricultural Stress Index System	FAO	Platform	Uses remote sensing to monitor agricultural drought and provide early warning for food security.
FAO Drought Portal	FAO	Platform	Knowledge platform and resources.

Name	Lead institutions	Type	Summary relevance to drought resilience
Global Multi-Index Drought Platform	Centre for Ecology and Hydrology and partners	Platform	Standardized drought indices across timescales.
Global Drought Monitoring and Prediction System	University of California Center for Hydrometeorology and Remote Sensing (CHRS)	Platform	Monitoring and forecasting drought conditions.
Global Hydrological Status and Outlook System (HydroSOS)	WMO	Platform	Monitoring hydrological and drought conditions globally, integrating national, basin, regional and global products. Links climate data to water system status.
World Bank climate data platforms	World Bank	Platform	Climate and risk data sets for decision-making, supporting planning and investment analysis.
Global Drought Information System (GDIS)	National Oceanic and Atmospheric Administration (NOAA), WMO and partners	Platform	Aggregates monitoring and outlooks from regional centres to provide a coherent global drought picture.

Regional (selection only)

Region	Platform / Initiative	Lead institutions	Summary relevance
All regions	Regional Drought Monitors Map	WMO	Overview of regional drought monitors around the world, including links to relevant resources. Includes drought monitors which cover more than one country / territory either fully or partially.
All countries	Status of National Drought Monitors	WMO	Presence and operational status of national drought monitors worldwide.
Africa	Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC) Drought Watch	IGAD-ICPAC	Leading regional early warning and forecasting system for the Horn of Africa.
Africa	IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI)	IGAD	A coordination framework for regional resilience.
Africa	Great Green Wall Initiative	African Union	A massive landscape restoration programme that serves as a strategic buffer against desertification and drought.

Region	Platform / Initiative	Lead institutions	Summary relevance
Asia-Pacific	South Asia Drought Monitoring System (SADMS)	International Water Management Institute (IWMI) and partners	Provides high-resolution drought monitoring and seasonal outlooks for the South Asia region.
Asia-Pacific	ASEAN Climate Resilience Network	ASEAN	Focuses on cross-border coordination for drought-resilient agriculture and policy planning.
Asia-Pacific	Asia Pacific Adaptation Network (APAN)	UNEP	Regional knowledge and adaptation support.
Europe	European Drought Observatory (EDO)	EC Joint Research Centre	Regional hub for drought monitoring, analysis and sector-specific impact assessment in Europe.
Latin America	SISSA (Sistema de Información sobre Sequías para el Sur de América) Drought System	Centro Regional del Clima para el Sur de América del Sur (CRC SAS)	Integrated drought information system for southern South America, providing critical monitoring data for national authorities.
Latin America	Drought Monitoring in Western South America	CIIFEN (Regional Climate Center for Western South America)	Integration of six national drought monitors into a regional overview which provides a monthly drought bulletin.
West Asia / Middle East and North Africa	Middle East and North Africa Drought Initiative	IWMI, NASA, US National Drought Mitigation Centre	Supports regional risk management and policy reform for drought-vulnerable countries in the Middle East and North Africa region.
West Asia / Middle East and North Africa	International Center for Agricultural Research in the Dry Areas (ICARDA) dryland programmes	CGIAR, International Center for Agricultural Research in the Dry Areas	Focused on technical research and implementation of resilient agricultural systems in dryland environments.

Annex IV: Consultation process

The Drought Resilience Capacity Index proposed in this report was developed drawing on feedback and inputs received from thematic experts and from regional consultations. An expert review group was formed at the outset from more than 15 organizations globally with expertise in drought resilience (see [Acknowledgements](#) section at the beginning of this report). Exchanges with the expert review group helped us develop the first draft of the report.

The initial draft was subsequently presented and discussed in a series of technical stakeholder consultations. All UNCCD national focal points, in their expert capacity, and some other government and technical experts, were invited to in-person or online consultations across four workshops, considering time zone and language: (1) Africa, West Asia, Europe (English, French, Arabic); (2) Asia-Pacific (English); (3) Latin America (Spanish, Portuguese); (4) Caribbean and North America (English, French, Spanish). Representatives from more than 65 countries participated in the workshops⁴.

A succinct summary of the primary feedback received from the country consultations, and how this has been addressed in this report, is provided in the table below.

Feedback received from regional consultations	How feedback was addressed and discussion on next steps
Ensure it is clear that the proposed methodology in its current state is not part of any political negotiation process under UNCCD, and that the proposed index does not represent a finalized methodology or endorsed method from such a process.	Messaging included in Executive Summary , Section 1 and Section 3.2 . Disclaimer provided below.
The index, built on the indicator matrix, is deemed to cover aspects of drought resilience in a holistic manner, without being overly complicated. Other aspects that may be considered for inclusion: capacity development programmes; cross-sector coordination mechanisms.	Capacity development included in indicator 3a (thresholds and best practice). Cross-sector coordination was previously a standalone indicator, but based on other feedback, is now included as an element in the threshold descriptions for most indicators (table 3.2).
Other considerations for indicator design and scoring: vertical integration (national to sub-national to local); differences within a country (e.g. federated states).	The report makes clear that the methodology needs ground-truthing and piloting in various national settings before it can be finalized for global adoption.
Participants cautioned against creating a new monitoring mechanism, welcomed alignment with UNCCD definitions and processes, and suggested that UNCCD monitoring (e.g. through PRAIS) <i>could</i> be a logical process in which to integrate the DRCI (if it is further developed). Keeping reporting burden to a minimum is a key priority for countries.	This has been noted (section 3.8). If the DRCI is piloted and further developed at a technical level, ongoing political processes may determine if it is relevant to incorporate into existing monitoring mechanisms (<i>potentially</i> through UNCCD monitoring).
Reflecting on potential national-level application, the index was seen as a useful diagnostic tool, which could support cross-sector coordination and form a basis to inform policy prioritization and investment planning (though further analysis would be required).	The suggested ground-truthing and piloting in various national settings can provide valuable lessons on the usefulness of the DRCI as a tool for such purposes.
More than 20 countries informally expressed interest in being involved in piloting activities, after the report is launched.	The strong interest to take part in further developing the DRCI and in-country piloting was warmly welcomed. Following the launch of the report, UNEP intends to explore how such piloting could be funded and initiated.

⁴ More elaborate workshop summaries and the draft report were shared with all invitees and are available on request.

Disclaimer

Participation in regional workshops was undertaken on a strictly informal and non-prejudicial basis.

Attendance, interventions and exchanges of views by participants shall not be construed as constituting endorsement, acceptance or support for any concept, proposal, recommendation, conclusion or outcome that may have emerged from the discussions.

The workshops were intended solely as a platform for the exchange of information, scientific knowledge and perspectives. They do not constitute a negotiation process, nor do they create any legal, political or policy obligations for participants or the entities they represent.

Furthermore, neither participation in the workshops nor any of its outputs may be invoked, cited or otherwise used to prejudge, undermine, alter or prejudice the positions, rights or negotiating mandates of States or other participants in any ongoing or future bilateral, regional or multilateral negotiations or processes.

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