



United Nations

ICCD/COP(14)/CST/7-ICCD/CRIC(18)/4



Convention to Combat Desertification

Distr.: General
28 June 2019

Original: English

Conference of the Parties Committee on Science and Technology

Fourteenth session

New Delhi, India, 3–6 September 2019

Item 3 (c) of the provisional agenda

**Interfacing science and policy, and sharing knowledge
Monitoring framework for the strategic objective on
drought**

Committee for the Review of the Implementation of the Convention

Eighteenth session

New Delhi, India, 3–12 September 2019

Item 3 of the provisional agenda

**Improving the procedures for communication of
information as well as the quality and formats of reports
to be submitted to the Conference of the Parties
Outcomes of the work of the Committee on Science and
Technology on a monitoring framework for the strategic
objective on drought**

Outcomes of the work of the Committee on Science and Technology on a monitoring framework for the strategic objective on drought

Note by the secretariat*

Summary

By its decision 15/COP.13, paragraph 8, the Conference of the Parties (COP) is considering the need for a specific indicator for the strategic objective on drought, which is contained in the United Nations Convention to Combat Desertification (UNCCD) 2018–2030 Strategic Framework adopted by Parties at the thirteenth session of the Conference of the Parties (COP 13).

Taking into consideration that the Committee on Science and Technology (CST) assisted in defining and identifying monitoring frameworks for the other strategic objectives, including indicators, the COP requested the CST to assist in the work relating to the establishment of such a monitoring framework.

The Bureau of the CST, in collaboration with other members of the Science-Policy Interface (SPI), formed a working group to review the options and possible indicators, which are outlined in this document.

The working group took into consideration relevant work within UNCCD processes and from other associated intergovernmental processes related to the monitoring of drought and the resilience of vulnerable populations and ecosystems to drought, including indicators currently in use at the national level, as reported by Parties to the Committee for the Review

* This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.

GE.19-10576(E)



* 1 9 1 0 5 7 6 *

Please recycle



of the Implementation of the Convention (CRIC), and various reports from other relevant international organizations.

The working group on drought also took into consideration past decisions of the COP, providing a framework for monitoring and evaluation of UNCCD impact/progress indicators, which allows the COP to set indicators for monitoring, while allowing for refinement, and enhance its potential effectiveness, based on national capacities and circumstances.

The working group concluded that there are a wide range of approaches to defining and then monitoring drought. This was synthesized and translated into the wide variety of indicators currently in use at the national level. All of these approaches and indicators are useful under specific circumstances; however, no individual approach or indicator covers all needs identified by Parties. To account for this, the SPI developed a tiered approach for the establishment of an indicator and monitoring framework for strategic objective 3, which is outlined under the conclusions in this document.

Since this issue touches on UNCCD reporting and scientific considerations, it is of importance to both the CRIC and the CST. Therefore, the document will be discussed in both the CST and CRIC plenary.

Contents

	<i>Paragraphs</i>	<i>Page</i>
List of abbreviations.....		4
I. Background	1–6	5
A. Mandate for monitoring drought.....	1–5	5
B. Basis for the framework.....	6	8
II. Conclusions and recommendations	7–16	9
A. A tiered drought indicator and monitoring framework	7–9	9
B. Specific indicator for each level of the framework	10–16	12

List of abbreviations

AGTE	Ad hoc advisory group of technical experts
COP	Conference of the Parties
CRIC	Committee for the Review of the Implementation of the Convention
CST	Committee on Science and Technology
DLDD	desertification/land degradation and drought
FAO	Food and Agriculture Organization of the United Nations
GDI	Global Drought Indicator
GEF	Global Environment Facility
GM	Global Mechanism
GMAS	Global Multi-Hazard Alert System
GWP	Global Water Partnership
IDMP	Integrated Drought Management Programme
LDN	land degradation neutrality
MHEWS	multi-hazard early warning system
NAP	national action programmes
NMHS	National Meteorological and Hydrological Service
PRAIS	performance review and assessment of implementation system
SLM	sustainable land management
UNCCD	United Nations Convention to Combat Desertification
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

I. Background

A. Mandate for monitoring drought

1. In the prologue of the United Nations Convention to Combat Desertification (UNCCD), Parties to the Convention affirm that human beings in affected or threatened areas are at the centre of concerns to combat desertification and mitigate the effects of drought. Parties also reflect the urgent concern of the international community, including states and international organizations, around the adverse impacts of desertification and drought.

2. By its decision 7/COP.13, the Conference of the Parties (COP) decided to adopt the UNCCD 2018–2030 Strategic Framework, including strategic objective 3 and two associated expected impacts:

(a) Strategic objective 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems;

(b) Expected impact 3.1: Ecosystems' vulnerability to drought is reduced, including through sustainable land and water management practices; and

(c) Expected impact 3.2: Communities' resilience to drought is increased.

3. By its decision 15/COP.13, the COP considered the need for a specific indicator for the strategic objective on drought and requested the Committee on Science and Technology (CST) to assist in the work relating to the establishment of such a monitoring framework.

4. By its decision 21/COP.13, the COP requested the Science-Policy Interface (SPI), in objective 2 of its work programme for the biennium 2018–2019, to report on the potential of appropriate land-based interventions to mitigate the effects of drought by increasing the resilience of ecosystems and the socioeconomic well-being of populations. The Bureau of the CST, whose five members also serve on the SPI, engaged the members and observers of the SPI participating in the working group focused on this SPI objective to also consider the need for a specific indicator and monitoring framework for the strategic objective on drought. This working group was comprised of seven experts on drought, three of which also serve on the Integrated Drought Management Programme (IDMP), a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership (GWP), on scientific issues related to drought risk management.

5. The SPI working group on drought took into consideration relevant work within UNCCD processes and from other related intergovernmental processes related to the monitoring of drought and the resilience of vulnerable populations and ecosystems to drought, including:

(a) Decision 16/COP.13, in which the COP decided to include in the programme of work for the seventeenth session of the Committee for the Review of the Implementation of the Convention (CRIC 17) an agenda item enabling Parties to review and discuss implementation using the progress indicators contained in the UNCCD 2018–2030 Strategic Framework. Since strategic objective 3 was newly introduced into the UNCCD 2018–2030 Strategic Framework, there was no agreed-upon indicator to report on progress towards this objective. Therefore, for this reporting cycle, Parties were encouraged to report which indicators are currently in use at the national level to estimate progress towards strategic objective 3, provide a qualitative assessment of trends in those indicators and report on any related targets that may have been set. A preliminary analysis of a compilation of drought-related indicators in use at the national level by Parties and an analysis of associated national voluntary targets is provided in document ICCD/CRIC(17)/5 and recommendations from some Parties stemming from discussions on this analysis are provided in paragraph 23 of the report of CRIC 17 in document ICCD/CRIC(17)/9. Country Parties reported a wide range of approaches to monitoring drought:

(i) For the purposes of reporting, strategic objective 3 indicators were defined as variables or parameters used to describe drought conditions, particularly those being used in support of national drought management plans or policies. Parties were given access to a global reference resource for drought monitoring to aid in the UNCCD

national reporting against this objective, the WMO/GWP IDMP Handbook of Drought Indicators and Indices;¹ and

(ii) In total, 102 country Parties, representing 57.9 per cent of global land area, reported 408 drought indicators currently in use at the national level (see table 1);

Table 1
Thematic categorization of national-level drought indicators reported as currently in use, as reported by country Parties in 2018 (ICCD/CRIC(17)/5)

<i>Theme</i>	<i>Frequency</i>	<i>Per cent</i>
Meteorological/rainfall	128	31.4
Agricultural/vegetation	94	23.0
Socioeconomic/living conditions	63	15.4
Hydrological/water scarcity	51	12.5
Ecological/biodiversity	32	7.8
Climate hazard	23	5.6
Risk management	10	2.5
Research	7	1.7
Total	408	100.0

(b) Decision 29/COP.13, in which the COP welcomed the inclusion of a new strategic objective on drought in the UNCCD 2018–2030 Strategic Framework, to be implemented through national action programmes and other means, welcomed and invited the Parties to develop a comprehensive system on drought preparedness, and for the secretariat and appropriate UNCCD institutions and bodies, including the SPI, to implement the Drought Initiative for the biennium 2018–2019 within their respective mandates;

(c) The drought resilience, adaptation and management policy framework² and efforts to enable its use, as documented in ICCD/COP(13)/19;

(d) The findings and emerging recommendations of a study on drought impact and vulnerability assessment commissioned by the secretariat with the WMO, the Food and Agriculture Organization of the United Nations (FAO) and the GWP;³

(e) The United Nations Office for Disaster Risk Reduction (UNDRR)⁴ Sendai Framework Monitor,⁵ an initiative launched in 2015 by United Nations Member States to support the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 to quantify the impact of disasters, mainly from extreme weather.⁶ This includes slow-onset disasters, such as drought and desertification;

(f) The 2017 Report of the Open-ended Intergovernmental Expert Working Group on Indicators and Terminology Related to Disaster Risk Reduction (A/71/644),⁷ and the recommendations for indicators and terminology relating to disaster risk reduction contained therein, which were endorsed in United Nations General Assembly resolution A/RES/71/276. In this report, Member States requested the UNDRR to undertake technical work and provide

¹ <<http://www.droughtmanagement.info/find/guidelines-tools/handbook-drought-indicators-and-indices/>>.

² <https://www.unccd.int/sites/default/files/relevant-links/2018-08/DRAMP_Policy_Framework.pdf>.

³ <<https://www.unccd.int/issues/land-and-drought>>.

⁴ Formerly known as the United Nations International Strategy for Disaster Reduction (UNISDR).

⁵ <<https://sendaimonitor.unisdr.org/>>.

⁶ <<https://www.unisdr.org/we/inform/publications/43291>>.

⁷ <https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf>.

technical guidance to develop, inter alia, minimum standards and metadata for disaster-related data, and methodologies for the measurement of indicators;⁸

(g) The fifth edition of the United Nations Global Assessment Report on Disaster Risk Reduction published by the UNDRR, particularly chapter 3 (Risk, which includes sub-sections on Hazards, Exposure, Vulnerability) and chapter 6.1 (Drought indicators);⁹

(h) United Nations Framework Convention on Climate Change decision 5/CP.23, paragraph 19, which requests the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts to consider, when updating its five-year rolling workplan,¹⁰ cross-cutting issues and current, urgent and emerging needs related to extreme weather events and slow onset events, including, but not limited to, drought and floods in developing countries that are particularly vulnerable to the adverse effects of climate change, and to vulnerable populations and the ecosystems on which these populations depend.

(i) Reports by the Intergovernmental Panel on Climate Change, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and other bodies relevant to desertification/land degradation and drought (DLDD), sustainable land management and land degradation neutrality;

(j) Resolution 9 (Cg-17),¹¹ which was approved in 2015 by the 17th session of the World Meteorological Congress, the supreme body of the 193 Member States and Territories of the WMO.¹² This resolution initiated a process of standardizing weather, water, climate, space weather and other related environmental hazards and risk information, and prioritized the development of identifiers for cataloguing extreme weather, water and climate events. Based on this need, the IDMP, co-sponsored by WMO and GWP, published the Handbook on Drought Indicators and Indices in 2016;¹³

(k) Resolution 5.1/1(Cg-18), which was approved at the 18th World Meteorological Congress, held in June 2019, and includes the adoption of the cataloguing methodology referred to as “WMO Cataloguing of Hazardous Events”. The methodology is presented in the Annex of this resolution;

(l) Resolution 5.1/2 (Cg-18), also approved at the 18th World Meteorological Congress, recommended the development of a Global Multi-Hazard Alert System (GMAS) framework and approved a revised GMAS Concept Note¹⁴ which will further guide the development of an implementation plan. Some of the key objectives of the GMAS Concept Note include establishing a framework that includes a repository of warnings and defined information flows, building on and leveraging existing WMO standards and infrastructure that allow for sharing authoritative warning information produced by WMO Members and to improve and promote the availability, affordability and accessibility of Members’ Multi-Hazard Early Warning System (MHEWS) as envisioned in the Sendai Framework, ensuring that they have authoritative warning information (sources) available to anticipate, mitigate, prepare for and respond to weather, water, ocean and climate events. Another GMAS objective is to foster cooperation in disaster risk management and MHEWS on national, regional and global levels, including cross-border and interregional collaboration, such as creating a community to share warning information and promote harmonization to the extent possible/appropriate. These authoritative warnings come from the National Meteorological and Hydrological Service (NMHS) of each country, providing the foundation on which early action to take precautions against hazards by the responsible authorities and public can be realized. As envisioned by this resolution, WMO members would contribute to the GMAS Framework by incorporating national drought alerts and warnings as well as alerts and warnings on dust storms, frosts, coldwaves, heatwaves and floods impacting agriculture into

⁸ <https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf>.

⁹ <https://gar.unisdr.org/sites/default/files/reports/2019-05/full_gar_report_0.pdf>.

¹⁰ FCCC/SB/2017/1/Add.1.

¹¹ WMO-No. 1137.

¹² <http://www.wmo.int/aemp/sites/default/files/wmo_1157_en.pdf#page=266>.

¹³ Ibid. 1, 5.

¹⁴ See annex 1 of resolution 5.1/2 (Cg-18).

regional MHEWS and global alert systems. The WMO GMAS framework thus provides the basis for harmonization of national drought reporting towards more consistent drought mapping and monitoring across countries through coordination and collaboration with NMHSs and MHEWSs; and

(m) Resolution 5.1/6 (Cg-18), also approved at the 18th World Meteorological Congress, requests the development of a Global Drought Indicator (GDI) as input into WMO activities such as the GMAS Framework, Common Alerting Protocol, Global Hydrological Status and Outlook System, and cataloguing of high-impact events and information on the outcomes of these efforts to be provided to the UNCCD in support of relevant UNCCD decisions. The resolution requests the relevant WMO technical commission(s) and other bodies to develop a framework and standards for a GDI addressing the duration, intensity, and spatial extent of droughts based on the cataloguing of high-impact events carried out by the WMO Expert Team on Drought. It also invites WMO Members to incorporate the GDI into the GMAS framework and cataloguing of hazardous events. It requests the WMO Secretary-General to liaise with the IDMP on integrating the GDI framework and standards into its work on the three pillars in support of WMO Members and to work with the UNCCD secretariat and other United Nations and humanitarian organizations on the uptake of drought policies and drought early warning systems incorporating WMO activities and practices, and to support WMO Members in further developing national and regional drought-monitoring systems.

B. Basis for the framework

6. The SPI working group on drought also took past decisions of the COP into consideration, providing a framework for monitoring and evaluating UNCCD impact/progress indicators:

(a) Decision 19/COP.10, in which the COP decided that the core principles identified in the participatory scientific peer review process and contained in document ICCD/COP(10)/CST/2 set the stage for the development of proposals to refine the set of impact indicators and associated methodologies based on national capacities and circumstances. Six of these core principles deemed necessary to refine the impact indicator set and enhance its potential effectiveness were particularly relevant:

(i) *Indicator set hierarchy and logic.* Following the UNCCD indicator set hierarchy, which makes it possible to distinguish what to measure (general indicators) and how it should be measured (metrics/proxies):

I. Strategic objectives

a. Core indicators

i. General indicators

1. Metrics/proxies;

(ii) *Harmonization.* The pursuit of harmonization is recommended, with the potential for standardization where appropriate and feasible to account for variability in the causes and consequences in dryland degradation among the country Parties, and in their capacity to measure and monitor impact;

(iii) *Sensitivity.* With input from the scientific community, the sensitivity of indicators should be carefully considered, particularly that of essential socioeconomic measures of impact, where the contributive influence of DLDD and its remedies are, at least at present, difficult to distinguish;

(iv) *Readiness*. It is recommended that a scheme for categorizing indicators be adopted, based on their “readiness” for operational use. Such a scheme would ensure a place for indicators that are currently challenging to measure but viewed as essential to monitoring impact;¹⁵

(v) *Gender disaggregation*. It is recommended that indicator data sets be collected, analysed and reported on with respect to gender in order to ensure assessment of the contributive differences in the distribution of achievements between women and men on DLDD; and

(vi) *Adaptability*. It is recommended that both the conceptual framework and the indicator set be regularly re-evaluated for appropriateness as monitoring and evaluation efforts mature, for their usefulness in decision-making, and because needs may change and scientific tools improve;

(b) Decision 22/COP.11, in which the COP established a monitoring and evaluation approach consisting of: (i) indicators; (ii) a conceptual framework that allows the integration of indicators; and (iii) indicators sourcing and management mechanisms at the national/local level, taking into account the implementation guidelines contained in document ICCD/COP(11)/CST/2 and Corr.1. The intention of this guidance, as requested by the COP in decision 19/COP.10, was for the overall set of impact indicators, when taken together, to have the potential to generate relevant information at the national level that can be harmonized and used to produce regional and global baseline assessments;

(c) Decision 15/COP.12, in which the COP defined an approach designed to support Parties in reporting on UNCCD progress indicators which may be applicable in future reporting on strategic objective 3. This approach included a request applicable to the 2017–2018 UNCCD reporting process, to the secretariat, in cooperation with relevant specialized institutions to:

(i) Compile and make available to affected country Parties national estimates of the metrics/proxies associated with these indicators from the global datasets, as default data for validation in accordance with the procedure established in decision 22/COP.11, as amended by any related UNCCD national reporting decisions adopted at future sessions of the COP;

(ii) Prepare methodological guidelines and provide technical assistance to affected country Parties on the compilation and use of such default data, including for the preparation of national voluntary targets using the progress indicators; and

(iii) Undertake measures aimed at strengthening the capacities of affected Parties to validate, replace or reject the default data.

II. Conclusions and recommendations

A. A tiered drought indicator and monitoring framework

7. Based on this background, the SPI working group on drought took into account the following criteria, which have been updated to take account of refinements made in decisions 19/COP.10 and 22/COP.11, for establishing a specific indicator for the strategic objective on drought and the establishment of a monitoring framework:

(a) *Indicator set hierarchy and logic*. Following the UNCCD indicator set hierarchy, which makes it possible to distinguish what to measure (progress indicators) and how it should be measured (candidate metrics/proxies):

I. Strategic objectives

¹⁵ The ‘readiness scheme’ is defined in paragraph 24 (h) of ICCD/COP(10)/CST/2 as: “(green = ready for testing, yellow = requires fine tuning, red = requires further development) to ensure a place for indicators that are currently challenging to measure, but are viewed as essential to monitoring impact.”

a. Progress indicators

i. Metrics/proxies;

(b) *Sensitivity* of the indicator to the strategic objective, which in this case is focused on how drought effects the resilience of vulnerable populations and ecosystems to future drought;

(c) *Comparability* of nationally reported data on candidate metrics/proxies for the indicator, with consideration of issues concerning the development and practical implementation of international standards in underlying data, methodologies and guidance;

(d) *Readiness* of candidate metrics/proxies for the indicator for operational use, taking into consideration the appropriateness of the indicator and challenges that may need to be overcome for its effective use, including:

(i) *Global coverage* of candidate metrics/proxies for the indicator to ensure that it is possible to develop national estimates and make them available to affected country Parties from global datasets, as default data; and

(ii) *Capacity to create ownership at the national level*, whereby countries can follow standardized guidance to develop indicator data, empowering them to validate, replace or reject the default data;

(e) *Gender disaggregation* potential or the ability for indicator data to be collected, analysed and reported upon with respect to gender in order to ensure assessment of the contributive differences in the distribution of achievements between women and men; and

(f) *Adaptability*. It is recommended that both the drought monitoring framework and the indicator set be regularly re-evaluated for appropriateness as monitoring and evaluation efforts mature, for their usefulness in decision-making and because needs may change and scientific tools may improve.

8. As documented in the WMO/GWP IDMP Handbook of Drought Indicators and Indices,¹⁶ there are a wide range of approaches to defining and then monitoring drought. This was synthesized and translated into the wide variety of indicators currently in use at the national level (see table 1). All of these approaches and indicators are useful under specific circumstances; however, no individual approach or indicator covers all needs identified by Parties, nor comprehensively meets all the aforementioned criteria simultaneously.

9. To account for this, the SPI developed a tiered approach for the establishment of an indicator and monitoring framework for strategic objective 3. This approach identifies three complementary levels which can be pursued individually or in combination, according to national circumstances and capacities, ensuring that an indicator and monitoring framework can be established in the short term and evolve as foreseen challenges (scientific, technical, logistical, capacity-based) are addressed. The three levels and their different anticipated strengths and weaknesses relative to the criteria listed in paragraph 7 are described in Table 2.

¹⁶ Ibid. 1, 5.

Table 2
Tiered approach for the establishment of an indicator and monitoring framework for United Nations Convention to Combat Desertification strategic objective 3 on drought*

<i>Level</i>	<i>Description</i>
Level 1 – Simple drought hazard indicator	<p>This would be a commonly calculated and easy-to-use global drought indicator for which data are being regularly produced in most countries, which could be aggregated under a common framework consistent with international standards and be supported in terms of data collection, analysis and reporting by an existing multilateral process. Ideally the development of candidate metrics/proxies for this indicator would leverage ongoing collaboration among NMHSs to ensure that steps towards standardization are taken multilaterally with full consideration of national circumstances.</p> <p>Such an indicator would score high in terms of ‘Readiness’ and ‘Comparability’, however it would be much less responsive to the ‘Sensitivity’ and ‘Gender disaggregation’ criteria.</p>
Level 2 – Simple drought exposure indicator	<p>This indicator would link the Level 1 simple drought hazard indicator with a commonly calculated and easy-to-use proxy for drought exposure, such as the population exposed to drought. The development of the underlying candidate metrics/proxies could be conducted within the multilateral process identified for Level 1.</p> <p>This would lead to an improvement on the “Sensitivity” score but with limited or no improvement for the ‘Readiness’, ‘Comparability’ and ‘Gender disaggregation’ criteria.</p>
Level 3 – Comprehensive drought vulnerability indicator	<p>This indicator would build on Level 1 and Level 2 to more directly and more comprehensively address the strategic objective, which is to mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems. Vulnerability in this context refers to the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards, such as drought.¹⁷ The assessment of drought vulnerability is essential for the identification of the underlying causes of drought impacts, which is essential to developing appropriate policy responses. However, there is no single metric or proxy that can adequately represent the complexity of drought vulnerability, which means that this indicator would need to be a composite of the physical, social, economic, and environmental factors contributing to community and ecosystem vulnerability to drought, ideally collected at both the national and subnational levels. Exploration of this level could be pursued in collaboration with the multilateral process identified in Levels 1 and 2.</p> <p>This Level 3 indicator would score highest on ‘Sensitivity’ and would have the greatest capacity for ‘Gender disaggregation’. However, noting the complexity of this approach and the likely demands in terms of data and methods, it would currently score lower in the national ownership aspect of ‘Readiness’. In addition, the likely variability in the availability of required data sets would influence ‘Comparability’ among countries. A harmonization/standardization process focused on candidate</p>

¹⁷ Ibid 7, 6.

<i>Level</i>	<i>Description</i>
	metrics/proxies and methodologies could help address these concerns if conducted multilaterally.

*It is anticipated that countries would pursue the level or combination of levels in this framework most appropriate to national circumstances and capacities.

B. Specific indicator for each level of the framework

10. Having established a tiered approach for the establishment of an indicator and monitoring framework for strategic objective 3, the SPI working group on drought developed a proposal for each of the three levels, which is summarized in Table 3.

Table 3
 Summary of the indicators and the basis for the metrics/proxies which would apply to each of the three levels of the proposed drought indicator and monitoring framework

<i>Level</i>	<i>Progress Indicator</i>	<i>Basis for candidate metrics/proxies*</i>
Level 1 – Simple drought hazard indicator	Trends in the proportion of land that is under drought over the total land area	World Meteorological Organization Global Drought Indicator (standardized into classes) monitored and mapped monthly, and aggregated for the United Nations Convention to Combat Desertification reporting period.
Level 2 – Simple drought exposure indicator	Trends in the proportion of the population exposed to drought of the total population	Percentage of population exposed to each drought class defined in Level 1.
Level 3 – Comprehensive drought vulnerability indicator	Trends in the degree of drought vulnerability	Composite index of relevant economic, social, physical and environmental factors which contribute to drought vulnerability.

* The description provided for the candidate metrics/proxies should be considered preliminary, as these would evolve through a multilateral process such as the WMO GMAS framework to help ensure progress towards the collaborative development of standards in methods and data supported by good practice guidance as well as national ownership of the reporting process.

11. The simple drought hazard indicator proposed for Level 1 has been embraced by the WMO for the development of a Global Drought Indicator in the GMAS framework in coordination and collaboration with NMHSs and MHEWSs. Therefore, this indicator would leverage a relevant, ongoing multilateral process focused on the development of a global drought indicator, be consistent with WMO standards and have multiple uses. The candidate metric for this indicator could be aggregated in a cumulative way so that the duration and intensity of drought would provide a measure of drought magnitude and a proxy for drought effect/impact.

12. Because countries use different approaches for calculating drought, in the Level 1 approach, each country would determine which drought index to use as appropriate to national circumstances. The Global Drought Indicator, within the WMO GMAS framework, is a methodology of aligning and standardizing these national drought calculations into a coherent and easy-to-understand global system of reporting. It is recommended that the Standardized Precipitation Index be used as an initial test since it is easy to use and has a lower requirement for data (only monthly precipitation as an input).¹⁸ Resolution 21 (Cg-XVI) was adopted by the 16th Meteorological Congress which requested WMO Members to ensure that all NMHSs around the world use the Standardized Precipitation Index to characterize meteorological droughts in addition to other drought indices that are already in use in their service, making it a good starting point for most countries. Irrespective of which index is used, all countries would embrace a harmonized approach to mapping in terms of the statistical definition of drought severity classes. The experience from the North American Drought Monitor provides the basis for such a harmonized approach where the class of Abnormally Dry (D0) is removed (see table 4). In keeping with UNCCD indicator development principles outlined in paragraph 7, the candidate metrics/proxies of this indicator can and will be further elaborated upon based the final development of the WMO GDI.

Table 4
Level 1 drought hazard indicator: Example of drought classes for severity mapping and monitoring defined in a statistically harmonized way

<i>Drought class</i>	<i>Number of events in 100 yrs</i>	<i>Severity of event</i>
No Drought		
D1 (Moderate Drought)	33	1 in 3 years
D2 (Severe Drought)	10	1 in 10 years
D3 (Extreme Drought)	5	1 in 20 years
D4 (Exceptional Drought)	2.5	1 in 50 years

13. In the Level 1 approach, each month, all countries would generate a national drought severity map based on the WMO GDI which would be reported to the GMAS framework and used by countries to calculate the percentage of their total land area affected by each class and then be made available to the UNCCD national reporting platform.

14. The simple drought exposure indicator proposed for Level 2 would build off the Level 1 drought classification and monitoring approach. Based on the drought classes defined in Table 4, all countries would calculate the percentage of their population exposed to each drought class each month. Freely available finer scale gridded population data sets based on disaggregated census data such as WorldPop¹⁹ can ensure that national census data that have been mapped in a consistent way for each country can be used in the overlay of population and drought necessary to calculate this indicator. Other factors of drought exposure such as livestock densities, crop cover and water stress could be considered in the development of the underlying candidate metrics/proxies for this indicator.

15. The proposed Level 3 indicator would address drought vulnerability, and thus more directly respond to strategic objective 3. Although considerable advances have

¹⁸ Hayes, M., M. Svoboda, N. Wall, and M. Widhalm. 2011. The Lincoln Declaration on Drought Indices: Universal meteorological drought index recommended. *Bull. Amer. Meteor. Soc.*, 92:485–488: <<https://doi.org/10.1175/2010BAMS3103.1>>.

¹⁹ <<https://www.worldpop.org/>>.

been made in the development of comprehensive drought vulnerability indicators, a global indicator that is comparable between countries but also viewed as nationally relevant and owned within each country remains a challenge. In 2016, the Joint Research Council of the European Commission developed an empirical framework based on subnational estimates of hazard, exposure and vulnerability that has been applied to map global patterns of drought risk.²⁰ This approach integrates 15 economic, social and infrastructural aspects of drought vulnerability, all derived from global data sources. To more comprehensively address the strategic objective, environmental factors which influence ecosystem vulnerability to drought would need to be added, something which has been attempted on a regional basis.²¹ While these composite index approaches employ extensive validation and model performance assessment techniques, it will be necessary to ensure that the results can be produced (and reproduced independently) in individual countries to satisfy the national ownership criterium.

16. Parties at CST 14 and CRIC 18, with a view to preparing a draft decision on future reporting for the COP, may wish to consider these conclusions and:

(a) Adopt the criteria and tiered approach for the establishment of an indicator and monitoring framework for UNCCD strategic objective 3, outlined in paragraphs 7 and 10;

(b) Decide that reporting is required individually or in combination for the Level 1 indicator “trends in proportion of land that is under drought over total land area”, the Level 2 indicator “trends in proportion of population exposed to drought over total population”, and/or the Level 3 indicator “trends in degree of drought vulnerability”, as deemed appropriate according to national conditions and circumstances;

(c) Request the secretariat, in cooperation with WMO and the GMAS framework, and in consultation with IDMP and other relevant specialized institutions, to:

(i) Compile and make available to affected country Parties national estimates of candidate metrics/proxies associated with these indicators from the identified global datasets as default data for validation, in accordance with the procedure established in decision 22/COP.11 and as amended by any related UNCCD national reporting decision adopted at future sessions of the COP 14; and

(ii) Prepare methodological good practice guidance and provide technical assistance to affected country Parties on the compilation and use of such default data, including for the preparation of national voluntary targets;

(d) Decide that affected country Parties shall provide timely feedback on the default data and the proposed methodology to formulate national voluntary targets;

(e) Invite relevant specialized institutions to provide access to data and methodologies and assist the secretariat in the compilation and provision of data/national estimates as well as their review, as mentioned in sub-items (b) and (c) above; and

(f) Request the secretariat and invite the WMO and other relevant specialized institutions to ensure that the establishment of an indicator for the UNCCD strategic objective for drought is aligned with the vision and road map for a GMAS framework endorsed by the 18th World Meteorological Congress in resolution 5.1/2 and on the Global Drought Indicator in resolution 5.1/6 (Cg-18) as well as the 2017 Report of the Open-ended Intergovernmental Expert Working Group on Indicators and Terminology Related to Disaster Risk Reduction (A/71/644), and the

²⁰ Carrão, H., Naumann, G. and Barbosa, P. 2016. Mapping global patterns of drought risk: An empirical framework based on sub-national estimates of hazard, exposure and vulnerability. *Global Environmental Change* 39:108-124: <<https://doi.org/10.1016/j.gloenvcha.2016.04.012>>.

²¹ Blauhut, V., Stahl, K., Stagge, J. H., Tallaksen, L. M., De Stefano, L., and Vogt, J. Estimating drought risk across Europe from reported drought impacts, drought indices, and vulnerability factors. *Hydrology and Earth System Sciences* 20:2779-2800: <<https://doi.org/10.5194/hess-20-2779-2016>>.

recommendations for indicators and terminology relating to disaster risk reduction contained therein, which were endorsed in United Nations General Assembly resolution A/RES/71/276.
