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**Conference of the Parties  
Committee on Science and Technology  
Tenth session**

Changwon, Republic of Korea, 11–13 October 2011

Item 4 (a) of the provisional agenda

**Advice on how best to measure progress on strategic objectives 1, 2, and 3 of The Strategy**

**The development and implementation of impact indicators relating to the measurement of strategic objectives 1, 2 and 3 of The Strategy**

**Report on the refinement of the set of impact indicators on  
strategic objectives 1, 2 and 3**

**Note by the secretariat**

*Summary*

This document is a summary of the results of the scientific peer review process recommended in decision 17/COP.9, which requested the Committee on Science and Technology (CST) to develop proposals, for consideration at the eleventh session of the Conference of the Parties (COP 11), for the refinement of the set of provisionally accepted impact indicators attached to decision 17/COP.9 being developed to measure progress on strategic objectives 1, 2 and 3 of the 10-year strategic plan and framework to enhance the implementation of the Convention (2008–2018) (The Strategy). It is a synthesis of a participatory, formative and iterative scientific peer review process involving input from 104 technical experts between September 2010 and May 2011. At its tenth session, the CST may wish to review and recommend that the COP adopt the conclusions and recommendations herein, which are drawn from the proposals made by the technical experts in the white paper resulting from the participatory peer review process. The original conclusions and recommendations were presented at the second special session of the CST in document ICCD/CST(S-2)/INF.1 and summarized for consideration by the COP in document ICCD/CST(S-2)/9; they are updated in this document with contributions drawn from public comment in document ICCD/COP(10)/CST/INF.1.

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## List of abbreviations

AGTE	Ad hoc advisory group of technical experts
BIP	Biodiversity Indicators Partnership
CAS	complex adaptive systems
CBD	Convention on Biological Diversity
COP	Conference of the Parties
CST	Committee on Science and Technology
DMAP	Desertification monitoring and assessment partnership
DLDD	desertification/land degradation and drought
DPSIR	Driving Force-Pressure-State-Impact-Response
FAO	Food and Agriculture Organization of the United Nations
GDOS	Global Drylands Observation System
GEF	Global Environment Facility
GLADIS	Global Land Degradation Information System
GTOS	Global Terrestrial Observing System
HDI	Human Development Index
IPBES	Intergovernmental Science-policy Platform on Biodiversity and Ecosystem Services
LADA	Land Degradation Assessment in Drylands
MA	Millennium Ecosystem Assessment
NAP	national action programme (UNCCD)
SEEA	System of integrated Environmental and Economic Accounting
SLM	sustainable land management
SPI	Standardized Precipitation Index
The Strategy	10-year strategic plan and framework to enhance the implementation of the Convention (2008–2018)
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNU-INWEH	United Nations University Institute for Water, Environment & Health
WOCAT	World Overview of Conservation Approaches and Technologies
WMO	World Meteorological Organization

## I. Introduction

### A. Background

1. By decision 3/COP.8, the Conference of the Parties (COP) adopted the 10-year strategic plan and framework to enhance the implementation of the Convention (2008–2018) (The Strategy).
2. By the same decision, the COP requested the Committee on Science and Technology (CST) to provide advice to the COP at its ninth session on how best to measure progress on strategic objectives 1, 2, and 3 of The Strategy:
  - Strategic objective 1: To improve the living conditions of affected populations;
  - Strategic objective 2: To improve the condition of affected ecosystems;
  - Strategic objective 3: To generate global benefits through effective implementation of the Convention.
3. Strategic objectives 1, 2 and 3 contain seven core indicators which are indicative of the types of indicators to be established to provide information on trends in affected areas. The CST was requested to refine these core indicators further, capitalizing on existing sources of data.
4. Based on guidance from several official documents (ICCD/CST(S-1)/4/Add.3, ICCD/COP(9)/CST/INF.3, ICCD/CST(S-1)/5/Add.1 and ICCD/COP(9)/CST/INF.2) and a series of studies carried out in the biennium 2008–2009,<sup>1,2,3</sup> the COP decided, by decision 17/COP.9, to provisionally accept the proposed minimum, but not exclusive, set of 11 impact indicators. The indicators were organized in a matrix in annex I to decision 17/COP.9.
5. In decision 17/COP.9, a sub-set of two impact indicators (that is, indicator III: Proportion of the population in affected areas living above the poverty line; and indicator IX: Land cover status) was identified as the minimum required for reporting by affected countries beginning in 2012. The remaining nine impact indicators, while recommended, were considered optional for inclusion in reports by affected countries.

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<sup>1</sup> Berry, L., E Abraham and W Essahli. 2009. The UNCCD recommended minimum set of impact indicators. Draft Report. Consultancy report (1) for the CST of the UNCCD. 99 pp. <<http://www.unccd.int/regional/rcm/docs/UNCCD%20Min%20Set%20of%20Impact%20Indicators%20Final%20Report%20June%2004.pdf>>.

<sup>2</sup> Randriamiarana, D. 2010. Synthetic report: Regional consultations on methodologies related to the minimum set of impact indicators to measure progress in the implementation of strategic Objectives 1, 2 and 3 of the UNCCD 10-Year Strategic Plan. Consultancy report (2) for the CST of the UNCCD. 24 pp. <[http://www.unccd.int/science/docs/Regional%20consultation%20on%20methodologies-for%20the%20web\\_2010.pdf](http://www.unccd.int/science/docs/Regional%20consultation%20on%20methodologies-for%20the%20web_2010.pdf)>.

<sup>3</sup> Johnstad, M. 2009. Data and information available at UN agencies and IGOs related to impact indicators for Strategic Objective 1, 2 and 3 of the UNCCD Strategy. Consultancy report (3) for the CST of the UNCCD. 28 pp. <[http://www.unccd.int/science/docs/Study%20on%20data%20availability%20at%20UN\\_IGOs%20for%20the%20web\\_2010.pdf](http://www.unccd.int/science/docs/Study%20on%20data%20availability%20at%20UN_IGOs%20for%20the%20web_2010.pdf)>.

6. Also in decision 17/COP.9, the COP requested the secretariat, under the guidance of the CST Bureau and using an iterative process, to develop proposals to refine the set of impact indicators and associated methodologies, taking account of:

- (a) Application and review of the impact indicators by affected countries;
- (b) Scientific peer review of the relevance, accuracy and cost-effectiveness of the impact indicators;
- (c) Possible synergy with relevant programmes, projects and institutions, including those associated with the other Rio conventions;
- (d) Relevant contributions from UNCCD scientific conferences.

7. This document was prepared in response to the request by the COP, in the same decision, for the CST to review the status of this iterative process during its sessions and to recommend a minimum set of impact indicators for consideration at COP 11.

## **B. Participatory, formative and iterative evaluation**

8. Before, during and after COP 9, the scientific community expressed a strong interest in contributing to the process for refining the UNCCD impact indicators. To maximize this diverse technical knowledge and expertise, the refinement approach was designed to be participatory and formative. It is participatory in that scientists from around the world and across disciplines were invited to contribute. It is formative in that multiple avenues of communication and engagement with technical experts were followed, and at four junctures what was learned in previous stages became the basis of the next discussion.

9. Formative research attempts to contextualize and incorporate what a population thinks, does and says about some domain of experience, in this case indicator development in support of monitoring desertification/land degradation and drought (DLDD) and the impact of The Strategy. After each stage/iteration in the process, feedback from participants is used to adapt the findings to reflect what has been learned. The feedback can influence not only the objective (in this case, refinement of the impact indicators), but also the overall approach, so that the outcome addresses not only the needs expressed at the outset, but also how those needs are perceived following interaction among the participating scientists.

10. A participatory and formative evaluation can be logistically challenging in that it requires hands-on engagement with the target population. But it has an added benefit that is essential for the process for refining the UNCCD impact indicators. Through individual and social learning, knowledge is co-produced instead of being the result of a unilateral flow of information. Self-reflection is made possible through open and responsive discourse and interaction among diverse participants in order to develop a common framework of understanding and basis for joint action. Although total consensus on any scientific issue is unlikely, this approach encourages engagement, sharing, learning, a sense of ownership, consensus and, ideally, better information.

11. In order to provide a scientific foundation for furthering the indicator refinement process the following work has been undertaken (the timing of each stage is indicated in parentheses at the end of each subparagraph):

- (a) Development of a “zero draft” of a white paper based on the results of a thorough review of technical documents and the scientific literature. The foundation for the zero draft was the considerable body of work conducted over the past three decades on developing desertification indicators, including steps taken to identify and define suitable indicators for monitoring and assessment of the implementation of the Convention, the impact of national action programmes (NAPs), and the processes and impacts of

desertification. This zero draft also makes use of the relevant work of several parallel synergistic initiatives and was generated with input from both the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD). The zero draft comprised the following chapters: (i) background and objectives; (ii) a candidate conceptual scientific framework; (iii) a summary of recent scientific evaluations of the 11 provisional impact indicators; (iv) a detailed description of the proposed refinement metrics/proxies for each of the 11 provisional indicators (obtained from two major parallel indicator development activities conducted by scientists working with the Land Degradation Assessment in Drylands (LADA)/World Overview of Conservation Approaches and Technologies (WOCAT) and the United Nations University, Institute for Water, Environment and Health (UNU-INWEH)/Global Environment Facility (GEF) KM: Land Initiative (KM:Land), and one each contributed by the World Meteorological Organization (WMO) and the CBD); (v) indicator evaluation criteria; and (vi) an approach to evaluation of the alternative metrics/proxies based on an evaluation matrix incorporating the criteria (August–October 2010);

(b) Identification, using chain referral (asking those identified early on for other candidate scientists), of a broad set of candidate technical experts from each region and across disciplines who would be invited to review the zero draft of the white paper (October–November 2010);

(c) Presentation of the zero draft to the CST Bureau and agreement to move to the next iteration (November 2010);

(d) Initial expert review. This involved the engagement (via email) of 70 scientists for the initial review of the zero draft and the evaluation of the 22 metrics/proxies proposed as candidates for refinement of the 11 provisional indicators. This resulted in 37 written reviews, which were compiled, analysed, and shared back (November–December 2010);

(e) A technical workshop on refining impact indicators, hosted at the UNCCD headquarters in Bonn, Germany.<sup>4</sup> Participants included 41 scientists, including representatives of the other synergistic initiatives. Among those attending were 14 experts who had provided reviews of the zero draft and the indicators. Presentations were made on the zero draft and indicator evaluation results to date, the role and potential contributions of synergistic initiatives, and several key discussion topics (for example, conceptual framework, and indicator testing). Four working groups discussed and evaluated the current links between the UNCCD strategic objectives, the core indicators and the provisional indicators. They also assessed the 22 metrics/proxies. Outcomes included a draft of proposals for consideration by the CST at its second special session (18–19 December 2010);

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<sup>4</sup> <<http://www.unccd.int/science/announce/ImpactIndicators.php>>.

(f) Integration of the results of the technical workshop. The workshop results and feedback, together with information from the previous stages in the formative evaluation, were used to produce (i) a refined conceptual framework; (ii) a refinement of the indicator set hierarchy; (iii) proposals (with varying levels of agreement among the scientists) on which of the metrics/proxies reviewed could be considered for testing or further development; (iv) a final version of associated workshop conclusions, framed as proposals for consideration by the CST; and (v) a “first draft” of the white paper (ICCD/CST(S-2)/INF.1)<sup>5</sup> (January 2011);

(g) Presentation of the process and results at the second special session of the CST (CST S-2),<sup>6</sup> held in Bonn, Germany. This resulted in a summary compilation of ideas, suggestions and proposals offered by various delegations during CST S-2, identifying potential action that could be undertaken at the national, subregional, regional and international levels, after consideration and appropriate decisions by the COP (ICCD/CST(S-2)/9) (16–18 February 2011);

(h) Public comment. The first draft of the white paper was subjected to a global public consultation through an e-forum facilitated by the UNCCD secretariat.<sup>7</sup> This provided an additional opportunity for scientists and other stakeholders to provide feedback and suggestions for further fine-tuning of the white paper. A total of 43 technical experts provided feedback through the e-forum and/or direct communication during the public comment period (February–May 2011);

(i) Synthesis. These steps and the contributions of 104 technical experts led to the summary findings of the participatory scientific review process presented here, and to a final draft of the white paper, which is contained in document ICCD/COP(10)/CST/INF.1 (August 2011);

(j) A pilot impact tracking exercise. A multinational pilot exercise will inform the process of refining the impact indicators and provide experience with their use in preparation for the next UNCCD reporting and review process.<sup>8</sup> Working with at least one nominated country per Annex, the pilot aims to produce evidence, examples and recommendations on the national production and reporting of the impact indicators, covering both the technical and scientific aspects of this work and the organizational or capacity aspects of producing the indicators. A progress report of the multinational piloting exercise is contained in document ICCD/COP(10)/CST/INF.2; the findings and recommendations of the exercise will be presented at a side event at COP 10 (June–October 2011).

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<sup>5</sup> The full first draft of the white paper, with annexes, is contained in: Orr, BJ. 2011. Scientific review of the UNCCD provisionally accepted set of impact indicators to measure the implementation of strategic objectives 1, 2 and 3. White Paper - Version 1, 4 February 2011. Consultancy report for the CST of the UNCCD. 145 pp. <[http://www.unccd.int/science/docs/Microsoft%20Word%20-%20White%20paper\\_Scientific%20review%20set%20of%20indicators\\_Ver1\\_31011%E2%80%A6.pdf](http://www.unccd.int/science/docs/Microsoft%20Word%20-%20White%20paper_Scientific%20review%20set%20of%20indicators_Ver1_31011%E2%80%A6.pdf)>.

<sup>6</sup> <<http://www.unccd.int/cop/cric9/menu.php>>.

<sup>7</sup> <<http://eforum.unccd>>.

<sup>8</sup> <<http://www.unccd.int/prais/>>.

## II. Findings of the scientific peer review

### A. Conceptual framework

12. The general purpose of monitoring and assessment is to provide the capacity for a formal synthesis and quantitative analysis of information relating to specified goals. Indicators should reflect what a project/programme/policy was intended to achieve, and how it was to be achieved. Indicators must therefore be explained in the context of an understanding of the processes involved, and of how interventions will affect those processes.

13. Indicators have the capacity to provide the necessary information only if, when taken in combination, they consider the full complexity of the system (attributes and stressors), remain simple enough to be regularly and systematically monitored, reflect clear long-term management and policy goals, and can be linked to the decision process. This is possible if the set of indicators can capture the causality in the system among driving forces, state of the environment, and impacts of changes, and thereby help decision makers to connect the underlying processes with impacts, make links to related assessment areas, and ultimately support decision-making more directly. This approach suggests the need for a causality-based conceptual framework as a foundation for monitoring and assessment and the development, organization and communication of associated indicators. Among several causality-based frameworks, the driving force–pressure–state–impact–response (DPSIR) framework is of particular note because it includes feedback responses, and has been adopted or adapted by most of the groups working to develop indicators of desertification, and its mitigation through sustainable land management (SLM).<sup>9</sup>

14. In addition to causality, it is important that the framework provides a mechanism for integrating human and environmental systems and interactions. The Millennium Ecosystem Assessment (MA), where desertification is described as being “...a result of a long-term failure to balance demand for and supply of ecosystem services in drylands” provides a balance sheet approach to accomplish this.<sup>10</sup> This approach helps link environmental change and human well-being.

15. The conceptual framework proposed for consideration by the UNCCD employs a combination of DPSIR and ecosystem services approaches to conceptualizing the indicator set, and includes an MA-like visualization of the different spatial temporal scales of concern (see figure below).

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<sup>9</sup> Smeets, E and R Weterings. 1999. Environmental indicators: Typology and overview. European Environment Agency. Report No. 25. European Environment Agency, Copenhagen. 19 pp. <<http://www.eea.europa.eu/publications/TEC25>>.

<sup>10</sup> Millennium Ecosystem Assessment. 2005. Ecosystems and human well-being: Desertification synthesis. A report of the Millennium Ecosystem Assessment. World Resources Institute. Washington, D.C.: Island Press. <<http://www.maweb.org/documents/document.355.aspx.pdf>>.



16. The proposed framework is similar in approach to that taken by two important synergistic initiatives supporting the mission and objectives of the UNCCD – KM:Land and LADA. In the case of KM:Land, UNU-INWEH, together with the GEF Land Degradation Task Force, developed what they call the “SLM framework,” where DPSIR operates at different scale levels with the impact assessment focused on benefits to society and to biodiversity.<sup>11,12</sup> LADA integrates different parts of its land degradation assessment approach through DPSIR and ecosystem services frameworks, as well as a sustainable livelihoods framework. Together, these focus on the benefits people obtain from the environment in support of their livelihoods.<sup>13</sup>

17. The amended DPSIR framework integrated with ecosystem services provisions can guide and facilitate the organization, use and communication of the indicator set. It has the potential to support the strategic objectives of The Strategy and provides the opportunity to account for causality, interactions and trade-offs that are always present in land management, and which have to be taken into account if proper and feasible responses are to be identified in support of decision-making. This provides a first approximation of how well the causal chain associated with DLDD will be captured by the selected indicator set, helping to highlight gaps and cross-indicator interactions.

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<sup>11</sup> GEF KM:Land. 2010. Project indicator profiles for the GEF Land Degradation Focal Area. Final report by the GEF MSP: Ensuring impacts from SLM – Development of a Global Indicator System (KM:Land Initiative). Hamilton Ontario: UNU-INWEH. 67 pp.

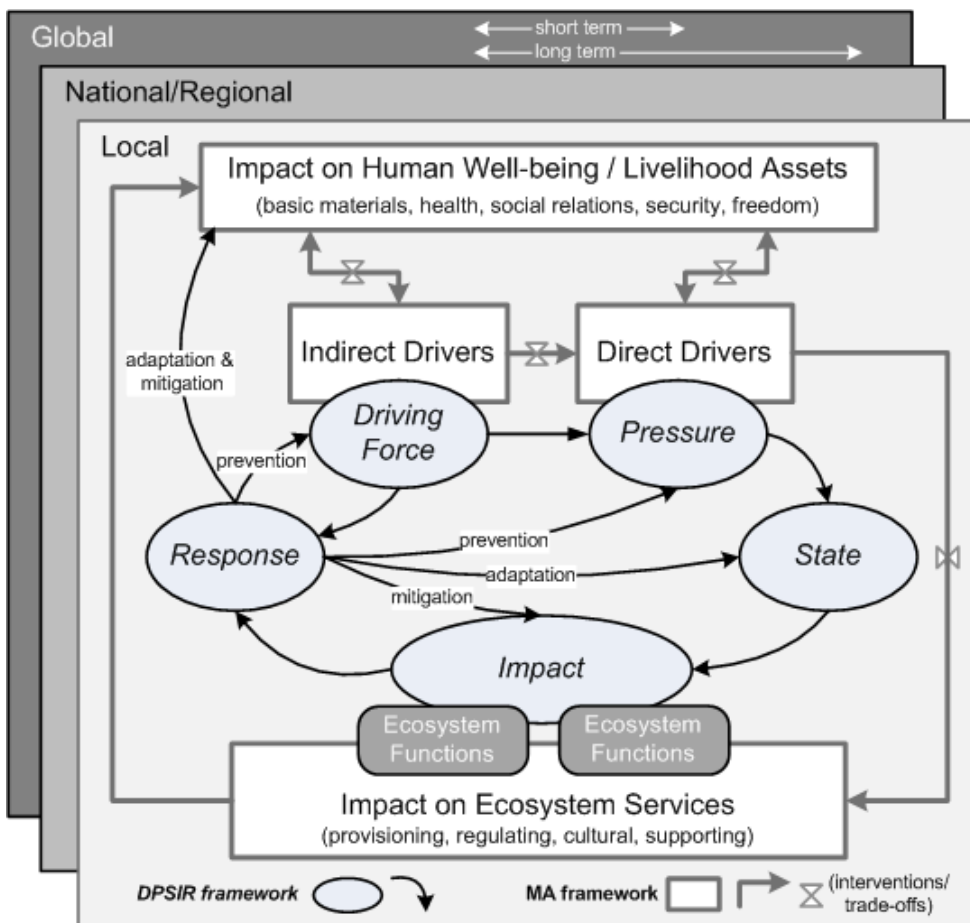
<[http://www.inweh.unu.edu/drylands/docs/KM-Land/KM-Land\\_Indicator\\_Profiles\\_Final.pdf](http://www.inweh.unu.edu/drylands/docs/KM-Land/KM-Land_Indicator_Profiles_Final.pdf)>.

<sup>12</sup> FAO-LADA. 2009. Field manual for local level Land Degradation Assessment in Drylands. LADA-L Part 1: Methodological Approach, Planning and Analysis. Rome: FAO. 76 pp.

<[http://www.fao.org/nr/lada/index.php?option=com\\_docman&task=doc\\_download&gid=231&lang=en](http://www.fao.org/nr/lada/index.php?option=com_docman&task=doc_download&gid=231&lang=en)>.

<sup>13</sup> See footnote 12.

**Amended driving force–pressure–state–impact–response framework integrated with ecosystem services provisions**



Source: Adapted from: Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: Desertification synthesis. A report of the Millennium Ecosystem Assessment.* World Resources Institute. Washington, D.C.: Island Press. <<http://www.maweb.org/documents/document.355.aspx.pdf>>; GEF KM:Land. 2010. *Project indicator profiles for the GEF Land Degradation Focal Area. Final report by the GEF MSP: Ensuring impacts from SLM – Development of a Global Indicator System (KM:Land Initiative).* Hamilton Ontario: UNU-INWEH. 67 pp. <[http://www.inweh.unu.edu/drylands/docs/KM-Land/KM-Land\\_Indicator\\_Profiles\\_Final.pdf](http://www.inweh.unu.edu/drylands/docs/KM-Land/KM-Land_Indicator_Profiles_Final.pdf)>; FAO-LADA. 2009. *Field manual for local level Land Degradation Assessment in Drylands. LADA-L Part 1: Methodological Approach, Planning and Analysis.* Rome: FAO. 76 pp.

18. The proposed framework provides specific emphasis on a number of monitoring and assessment priorities which the UNCCD is working to support in its approach to indicator refinement: emphasis on impact on human well-being; accommodation of an ecosystem services approach to integrated assessment; consideration of spatial and temporal scalar issues; and emphasis on “response” indicators to help monitor policy and management influences. It distinguishes responses in terms of prevention, mitigation and adaptation and how these reflect feedback on driving forces, pressure, state and impacts.

19. This approach has some weaknesses. Changes in ecosystem services due to strategies or interventions (as measured by response indicators) may impact human well-

being, but over a longer time frame than typical observation periods of one to five years. This can be in part mitigated through assessment of changes in state indicators.<sup>14</sup> The approach highlights the issues of scale, but it does not resolve them (for example, in many cases local-scale indicator data cannot be aggregated to national levels without risking exaggerated results). The approach also offers the opportunity to incorporate locally derived indicators into the global monitoring effort, but it does not, as yet, define the mechanism that would make this operationally feasible.

20. Another challenge lies in how the framework is used to support reporting. Environmental assessments that are conducted using causal chain frameworks frequently do not capitalize on the entire set of indicators (interactions), but rather report on an indicator-by-indicator basis, with some comparisons across indicators. This practice of compartmentalization of indicator data essentially defeats the purpose of having an indicator set working in concert.

21. These weaknesses can in part be addressed by making the framework itself part of the indicator development process so that it evolves with the decisions to embrace or adapt indicators and measurement methodologies into the future to better reflect the complex and often non-linear relationships among DLDD system elements and their mode of change. This might lead to a framework based on a different scientific paradigm, such as complex adaptive systems (CAS)<sup>15</sup> and/or a more in-depth assessment of the interrelationships among the indicators in the set through casual network analysis.<sup>16</sup>

## **B. Results of the refinement of the indicator set and a new hierarchy**

22. Candidate metrics/proxies were proposed for each of the provisional indicator categories by a number of synergistic initiatives. In particular, taken together, the GEF KM:Land Initiative, LADA-WOCAT, WMO and CBD contributed 22 metrics/proxies for indicators under development that corresponded to the provisional indicator list (ICCD/CST(S-2)/INF.1 and ICCD/COP(10)/CST/INF.1).<sup>17</sup> Their development efforts over the past few years have involved considerable input and documentation from the scientific community.

23. Consistent technical descriptions, including relationships to UNCCD strategic objectives, purpose, description, source, spatial and temporal refinement, and noted strengths and weaknesses, were developed for each proposed metric/proxy (ICCD/CST(S-2)/INF.1 and ICCD/COP(10)/CST/INF.1).<sup>18</sup>

24. One of the critical needs identified through the scientific peer review was how the underlying logic (and in some cases, language) of the indicator set hierarchy needed to be fine-tuned in order to maximize the potential for the indicator set to meet the strategic objectives of the UNCCD.<sup>19</sup> This included:

<sup>14</sup> See footnote 11.

<sup>15</sup> Briassoulis H. 2005. Policy integration for complex environmental problems: the example of Mediterranean desertification. Hants (UK): Ashgate.

<sup>16</sup> Niemeijer, D and RS de Groot. 2008. "Framing environmental indicators: moving from causal chains to causal networks" *Environment, Development and Sustainability* 10:89–106 doi:10.1007/s10668-006-9040-9.

<sup>17</sup> See also footnote 5.

<sup>18</sup> See also footnote 5.

<sup>19</sup> See footnote 5.

(a) Refining the *structure* of the indicator set hierarchy to make 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;

(b) Enhancing the links between the strategic objectives and core indicators;

(c) Clarifying the role of indicators supporting the assessment of impact in the overall set, such as drivers;

(d) Eliminating the term “in affected areas” — such areas are not fixed in place or time — from the definition of the core and general indicators in conjunction with the proposal that the context of application of the indicators should be defined and clarified as a separate but parallel task (an operational approach to this with respect to reporting templates is proposed in document ICCD/COP(10)/CST/3);

(e) Changing the wording of “VIII Aridity index” (a contextual metric) to “VIII Drought index” and adding an impact metric “Trends in standardized precipitation index (SPI)”;

(f) Not endorsing “V Human development index (HDI)” because it is redundant with other livelihood indicators and the least sensitive to DLDD;

(g) Adding “V Capacity of soils to sustain agro-pastoral use” as a contextual indicator and the Global Land Degradation Information System (GLADIS) metric/proxy “soil health status” in order to reduce the subjectivity of expert assessments in assessing “VI Degree of land degradation” and “XI Land under sustainable land management (SLM)”;

(h) Adopting a “readiness scheme” (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.

25. The combined results of the hierarchy refinement steps and the culmination of the peer review of the provisional indicators are depicted in the table below. It is important to note that the suggested refinements are intended not to change the purpose and target of the indicators, but to simplify them in order to ease selection of the specific and operational indicators needed to allow for clear and effective reporting.

26. The indicators and associated metrics/proxies in the table below are being tested in the pilot indicator tracking exercise requested in decision 17/COP.9 (see document ICCD/COP(10)/CST/INF.2).

27. For information on the source for each metric/proxy, and associated detailed technical descriptions, see document ICCD/CST(S-2)/INF.1, table 12 and annex II. For information on the steps taken to refine the hierarchy of the indicator set, see document ICCD/CST(S-2)/INF.1, paragraphs 48–73.

**Proposed refinements to the provisionally accepted set of impact indicators contained in annex I to decision 17/COP.9, including metrics/proxies to be considered for testing and/or further assessment/development**

<i>Core indicators (with proposed revisions)</i>	<i>General indicators (revisions of 11 provisional indicators)</i>	<i>Metrics/proxies (operational approaches proposed for testing, where ready, and further assessment/development where not)</i>	<i>Degree of expert agreement</i>	<i>Readiness for testing*</i>
<b>Strategic objective 1: To improve the living conditions of affected populations</b>				
<b>Core indicator S-(1/2/3):</b> Improvement in the livelihoods of people potentially impacted by the process of DLDD	<b>III Proportion of the population living above the relative poverty line</b>	Rural poverty rate**	High	Green
	I Water availability per capita	Percentage of population with access to (safe) drinking water	Medium	Yellow
		Water availability and use	Low***	Yellow
	IV Food consumption per capita	Proportion of chronically undernourished children under the age of 5 in rural areas**	High	Yellow
<b>Strategic objective 2: To improve the condition of ecosystems</b>				
<b>Core indicator S-4:</b> Reduction in the total area affected by DLDD	VI Degree of land degradation	A less complex version of Level of land degradation + Trends in seasonal precipitation	High	Yellow
	VIII Drought index	Trends in WMO Standardized Precipitation Index (SPI) (a meteorological drought index)	(New)	Green
	V Capacity of soils to sustain agro-pastoral use	GLADIS “soil health status”	(New)	Green
	II Change in land use	Land use (in support of deriving (a) VI Land degradation and (b) XI Land under SLM, and also in interpreting (c) IX Land cover status)	Low***	Yellow
<b>Core indicator S-5:</b> Maintenance of or increases in ecosystem function, including net primary productivity	<b>IX Land cover status</b>	Land cover**	High	Green
		Land productivity	Medium	Green
	VII Plant and animal biodiversity*****	Crop and livestock diversity (agro-biodiversity)	High	Yellow
		Trends in abundance and distribution of selected species	High	Yellow
		Soil biodiversity	(New)	Red

<i>Core indicators (with proposed revisions)</i>	<i>General indicators (revisions of 11 provisional indicators)</i>	<i>Metrics/proxies (operational approaches proposed for testing, where ready, and further assessment/development where not)</i>	<i>Degree of expert agreement</i>	<i>Readiness for testing*</i>
<b>Strategic objective 3: To generate global benefits through effective implementation of the UNCCD</b>				
<b>Core indicator S-6:</b> Increases in carbon stocks (soil and plant biomass)	X Carbon stocks above and below ground	Above ground organic carbon stocks	High	Yellow
		Below ground organic carbon stocks	High	Red
<b>Core indicator S-7:</b> Areas of forest, agricultural and aquaculture ecosystems under sustainable management	XI Land under SLM	Land under SLM + general indicator VII Plant and animal biodiversity (secondary role) + II Change in land use	High	Yellow
	V Capacity of soils to sustain agro-pastoral use	GLADIS “soil health status”	(New)	Yellow

\* Readiness scheme: Green = ready for testing, Yellow = requires fine tuning, Red = requires further development.

\*\* Although named slightly differently, the operational definition of this indicator is very similar to that given by Berry, L., E. Abraham, and W. Essahli. 2009. The UNCCD Recommended Minimum Set of Impact Indicators. Draft Report. Consultancy report (1) for the CST of the UNCCD. 99 pp.

<<http://www.unccd.int/regional/rcm/docs/UNCCD%20Min%20Set%20of%20Impact%20Indicators%20Final%20Report%20June%2004.pdf>>

\*\*\* As a stand-alone metric/proxy, there was limited or divided support for this metric/proxy. However, if used in support of another indicator, the agreement was much higher.

\*\*\*\* Also a secondary indicator under core indicator S-7.

## C. Capacity

28. It is important that the realities of indicator development, monitoring and reporting be fully acknowledged, including the variability among the country Parties in current capacity and resources. Indicator development is an evolutionary process at the global, national and local levels that requires guidance on alternative approaches that may be adopted and mechanisms to encourage horizontal and inter-agency collaboration and data sharing.

29. National needs of this kind can be addressed in part through capacity-building efforts, as well as by ensuring that the processes and products desired realistically reflect the challenges faced. The scientific peer review process produced a number of proposals that, if taken together, make the monitoring and assessment of the impacts of the Convention more feasible across the varying levels of capacity among the country Parties.

30. Pursuing harmonization of monitoring and reporting can help address variability in capacity. Harmonization means to make comparable (harmonize) the same variable measured in different ways. Standardization means to agree on and use only one single common methodology for the same variable or indicator. The causes and consequences of dryland degradation have multiple characteristics and vary in space and time. Hence, indicator and methodology selection, monitoring, and reporting all need to accommodate these particularities while following coherent principles and criteria, including their scientific support in peer reviewed journals.

31. It is quite challenging, and in some cases impossible, to define the contribution of DLDD to some indicators (such as gross national product); in other cases, however, the degree of sensitivity to DLDD may improve as the capacity to define and delineate affected areas improves and the spatial resolution of corresponding indicator data sets is enhanced. This must be considered to ensure a place for essential indicators which, given improvements in knowledge and methodologies, may in future be measured with adequate sensitivity to DLDD.

32. By implementing a readiness scheme, a place can be ensured for indicators that currently cannot easily be measured with adequate sensitivity to DLDD, a particular concern for socio-economic factors and the impacts on human well-being.

33. The pilot testing exercise can provide insight on capacity challenges, resulting in practical recommendations for monitoring and reporting (ICCD/COP(10)/CST/3).

## D. National relevance and interests

34. Desertification is a global problem that is manifest locally. Mitigation efforts, even those associated with global or national initiatives, ultimately involve local decisions and actions designed to improve conditions. Moreover, the causes and consequences of desertification vary considerably between and within countries. For global monitoring to be effective and useful within country Parties, the national and even subnational relevance of the information provided from the indicator set is paramount.

35. The Convention has a major emphasis on participation,<sup>20</sup> and as a result, many of the documents focused on monitoring and assessment call for local, regional and national contributions to the process of selecting appropriate indicators for impact monitoring.<sup>21</sup> More than 40 per cent of the comments and questions received from delegates during CST S-2 in response to the presentation on the refinement of the impact indicators focused on how the approach would capture “the voice of the farmer”.

36. This suggests that efforts to monitor the impacts of the Convention across the country Parties in a unified way must include both a minimum set of indicators and metrics and a mechanism for the global system to account for local/subnational/national realities that may involve indicators not listed in the minimum set.

37. On a regional and national basis, there has been past success in linking local participatory processes to the combat of desertification in ways that ensure local relevance to national and regional assessments.<sup>22</sup> In addition, several initiatives have created frameworks for linking local participatory assessments to national and global efforts in support of the mission of the Convention.<sup>23</sup>

### III. Way forward

#### A. Ad hoc advisory group of technical experts

38. Based on discussions of the findings of the scientific peer review process (ICCD/CST(S-2)/INF.1 and ICCD/COP(10)/CST/INF.1)<sup>24</sup> during the CST S-2 (ICCD/CST(S-2)/9), it was recommended that the secretariat develop a proposal for the establishment of an ad hoc advisory group of technical experts (AGTE) for consideration at COP 10.

39. Such a group would be tasked with continuing the iterative, participatory contribution from the scientific community to the indicator selection, development and refinement process, subsequent monitoring and evaluation, and efforts to analyse, manage and use the data. Examples of topics this group (or appointed ad hoc technical sub-working groups) would address include:

- (a) Evolution of the conceptual framework;
- (b) Indicator effectiveness, reproducibility and understandability by users;
- (c) Operational measurement methodology;

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<sup>20</sup> Poulsen L and M Lo, 2006. Promoting good governance through the implementation of the UNCCD. Chapter 8. In: Johnson, PM, K Mayrand and M Paquin (Eds.). *Governing global desertification. Linking environmental degradation, poverty and participation*. Aldershot, UK: Ashgate.

<sup>21</sup> Stringer LC, MS Reed, A Dougill, M Seely, and M Rokitzki. 2007. Implementing the UNCCD: participatory challenges. *Natural Resources Forum* 31: 198–211.

<sup>22</sup> Abraham E, E Montaña and I Torres. 2006. Procedimiento y marco metodológico para la obtención de indicadores de desertificación en forma participativa. In: Abraham E and G. Beekman (Eds.) *Indicadores de la Desertificación para América del Sur*, Mendoza, BID-IICA: 37–64.

<sup>23</sup> Oba, G, E Sjaastad and HG Roba. 2008. Framework for participatory assessments and implementation of global environmental conventions at the community level. *Land Degradation & Development* 19:65–76; Whitfield S, S Bautista, BJ Orr, HJ Geist and VR Vallejo. In Press. *Prevention and restoration actions to combat desertification (PRACTICE): An integrated assessment. EcoHealth*.

<sup>24</sup> See also footnote 5.



- (d) Data quality, availability and cost;
- (e) Testing;
- (f) Harmonization and standardization;
- (g) Developing a mechanism for the framework and indicator approach to accommodate regionally or locally specific inputs;
- (h) Developing an operational definition of, and an approach to identifying, affected areas;
- (i) Addressing cross-boundary data harmonization to address potential map edge faults;
- (j) Improving “readiness” of selected indicators, including their sensitivity to DLDD;
- (k) Addressing gender disaggregation;
- (l) Developing a communication strategy and associated information products for the outputs of the indicator set, etc.

40. This AGTE would comprise 15 members, be regionally and functionally representative, and include participation by representatives of major synergistic initiatives, and relevant conventions and organizations.

41. The AGTE members would be appointed to serve for a term of two years, and report to the CST at its sessions.

42. Setting up the AGTE would imply a shift away from a primarily consultant-based process to an expert-meeting based process. Financial implications of the AGTE are set out in annex I.

## **B. Desertification monitoring and assessment partnership**

43. The scientific peer review concluded that each of the proposed impact indicators and/or the underlying data sets is at a different stage of development and implementation, and none is owned or managed by any one organization, with, as yet, no mechanism for coordination and collaboration (ICCD/CST(S-2)/INF.1 and ICCD/COP(10)/CST/INF.1).<sup>25</sup>

44. It was therefore recommended that the secretariat develop a proposal for the establishment, at COP 10, of an appropriate institutional partners’ taskforce, for example, the “desertification monitoring and assessment partnership” or DMAP (see annex II for the financial implications).

45. Although mandated by the UNCCD, DMAP would be a collaborative, global initiative to promote and coordinate the development and delivery of DLDD indicators in support of the Convention, the other Rio conventions, national and regional Governments and other synergistic initiatives. The envisioned partnership would bring together the wide range of organizations working internationally on indicator development and impact monitoring and assessment, to provide the most comprehensive information possible on DLDD trends.

46. DMAP would catalyse new international collaborations by facilitating coordination and pursuing interoperability among other intergovernmental efforts to share data and

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<sup>25</sup> See also footnote 5.

leverage existing observation networks, such as the Global Terrestrial Observing System (GTOS), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the United Nations System of Integrated Environmental and Economic Accounts (SEEA), and any future Global Drylands Observation System (GDOS) – working with them to agree standards and protocols, to integrate existing systems, and to provide a platform for the evolution of future systems.

47. DMAP would encourage research coordination networks, including national academies of science, to contribute to the development and refinement of indicators and establish a scientifically sound baseline for monitoring and assessment at national, regional and global scales against which future impact assessments could be compared.

48. DMAP would support UNCCD efforts to establish DLDD outcome-oriented goals and targets.

49. DMAP would also work to encourage the identification, mobilization and leveraging of resources to support DLDD monitoring and assessment.

## IV. Conclusions and recommendations

50. The conclusions and recommendations listed in this report are a summary compilation of ideas, suggestions and proposals first introduced, debated and refined through the scientific peer review process, then further reviewed during CST S-2 and the public comment period (ICCD/CST(S-2)/INF.1, ICCD/CST(S-2)/9 and ICCD/COP(10)/CST/INF.1).<sup>26</sup>

### A. Core principles

51. Decision 17/COP.9 calls for an iterative process intended to lead to proposals to refine the set of impact indicators and associated methodologies, for consideration by future sessions of the COP commencing with its eleventh session. To meet this mandate, it is recommended that core principles identified in the participatory scientific peer review process thus far be fully integrated at COP 10, setting the stage for the proposals envisioned for COP 11.

52. The core principles determined to be necessary to refine the impact indicator set and enhance its potential effectiveness are:

(a) *Conceptual framework.* It is recommended that the amended DPSIR framework integrated with ecosystem services provisions (see figure in section II.A) be adopted as the initial conceptual scientific framework to support the organization, use and communication of the indicator set;

(b) *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 may improve;

(c) *Indicator set hierarchy and logic.* It is recommended that the amended indicator set hierarchy and logic be adopted (see paragraphs 23–25 and table in section II.B);

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<sup>26</sup> See also footnote 5.

(d) *Impact indicator set.* It is confirmed that the intention is for the overall set of indicators, taken together, to provide insight into impact (so that the set will include some other types of indicators, such as drivers);

(e) *Affected areas.* It is recommended that all the proposed indicators be measured in affected country Parties and that the operational use of the term in “affected areas” be refined through input from the scientific community and used to interpret the impact indicator measurements. In this approach the related but different challenges of defining, measuring and monitoring the indicators and defining and delineating affected areas would be distinct and therefore more operationally viable;

(f) *Harmonization.* The pursuit of harmonization is recommended, with the potential for standardization when 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;

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

(h) *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 are viewed as essential to monitoring impact (see table in section II.B);

(i) *Gender disaggregation.* It is recommended that indicator data sets 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 on DLDD;

(j) *Mechanism for national relevance.* In order to ensure that country Party reporting reflects not only global, but also national and local, realities it is recommended to initiate the development of a mechanism whereby the minimum set of globally harmonized impact indicators could be systematically complemented by regionally, nationally, and/or locally relevant and developed indicators. Existing frameworks for linking local participatory assessments to national and global efforts in support of the mission of the Convention should be assessed in the development of this mechanism;

(k) *Continued peer review.* Indicator and methodology selection, monitoring, and reporting all need to accommodate these core principles with continued input from scientific community.

## B. Recommendations

53. The CST may wish to review this document in conjunction with the report on the scientific peer review for the refinement of the set of impact indicators (ICCD/COP(10)/CST/INF.1), the recommendations from the CST S-2 (ICCD/CST(S-2)/9), and the progress report of the pilot impact tracking exercise (ICCD/COP(10)/CST/INF.2), taking into consideration that:

(a) The participatory scientific peer-review involved four iterations and direct contributions from 104 technical experts from all DLDD disciplines and regions, including representatives of synergistic initiatives, and other Rio conventions;

(b) The resulting refined conceptual framework, indicator set logic, hierarchy, and associated core principles are being tested together with the refined indicator set and associated metrics/proxies in the pilot impact tracking exercise.

54. The CST may wish to recommend that the COP:

- (a) Endorse the core principles contained in this document;
- (b) Establish an ad hoc advisory group of technical experts (AGTE) to be tasked with continuing the iterative, participatory contribution from the scientific community on indicator refinement and the monitoring and assessment of impact;
- (c) Request the CST Bureau to select, as soon as possible after the tenth session of the COP, the members of the AGTE, in consultation with regional groups and based on applications submitted in response to a public call for experts;
- (d) Task the AGTE, with input from the scientific community, to address the following three fundamental issues for consideration by the COP at its eleventh session:
  - (i) Identify the best scientific approach to delineating affected areas, including an evaluation of how this delineation was operationally undertaken during the pilot tracking exercise;
  - (ii) Develop a mechanism or framework that encourages country Parties to identify nationally and locally relevant impact indicators and integrate these in their contribution to the global impact assessment effort;
  - (iii) Further refine the set of impact indicators, based on the findings of the scientific review and on lessons learned through application by affected country Parties in the pilot tracking exercise and in the reporting process in 2012;
- (e) Establish an institutional partners task force, namely the desertification monitoring and assessment partnership (DMAP), made up of organizations which would contribute to the generation, management and harmonization of the data sets underlying the indicators of DLDD and the success of remedies to address it;
- (f) Call on Parties and partners to contribute to the funding required for the establishment of the AGTE and the DMAP, as presented in annexes I and II.

## Annex I

### Financial implications of establishing the ad hoc advisory group of technical experts

#### A. Human resources

1. The ad hoc advisory group of technical experts (AGTE) will comprise 15 members (3 from each regional group, ideally including at least one bio-physicist and one social scientist). AGTE members will be compensated for the work undertaken, in quality and on time, with a honorarium of EUR 3,000 per biennium. An additional lump sum of EUR 15,000 will be paid to one member who will be in charge of preparing the background documentation based on the inputs provided by all the experts.

<i>Category</i>	<i>Number</i>	<i>Duration (month per biennium)</i>	<i>Unit cost</i>	<i>Total (EUR)</i>
AGTE member	15	-	3 000	45 000
AGTE member in charge of the preparation of background documentation	1	3	5 000	15 000
Contractor for logistic assistance	1	6	2 600	15 600

#### B. Travel

2. The AGTE will meet once per year. Travel costs and daily subsistence allowance will be paid to AGTE members attending a meeting of the AGTE, in accordance with United Nations rules and regulations. In order to maintain the independent nature of the AGTE, the participation costs of all the members should be covered, regardless of whether the members come from a developed or a developing country.

<i>Category</i>	<i>Purpose of travel</i>	<i>Number of persons</i>	<i>Number of days per meeting</i>	<i>Number of meetings</i>	<i>Air tickets (EUR 2 800 per person per mission)</i>	<i>Daily subsistence allowances (EUR 200 per day per person)</i>	<i>Total (EUR)</i>
AGTE member	Attendance at AGTE meetings	15	3	2	84 000	18 000	102 000
Chair of the AGTE	Attendance at meetings of the CST and the CST Bureau	1	3	5	14 000	3 000	17 000
Secretariat staff	Attendance to AGTE meetings	2	3	2	8 000 <sup>a</sup>	2 400	10 400

<sup>a</sup> Air ticket EUR 2,000 per person.

### C. Other costs

<i>Category</i>	<i>Unit cost</i>	<i>Number of meetings</i>	<i>Total (EUR)</i>
Translation and reproduction of documents	7 500	2	15 000

### D. Time of secretariat staff

<i>Number of secretariat staff</i>	<i>Dedicated time allocated by secretariat staff (%)</i>	<i>Source of funds</i>	<i>Total amount</i>
1 P-5	5	Core budget	Per memoire
1 P-4	15	Core budget	Per memoire
1 P-3	20	Extra budget	Per memoire

### E. Total budget

3. The total budget needed in the biennium 2012–2013 for the establishment and activities of the ad hoc advisory group of technical experts (excluding the time of secretariat staff) is EUR 220,000.

## Annex II

### Financial implications of establishing the desertification monitoring and assessment partnership

1. It is anticipated that the desertification monitoring and assessment partnership would require a development phase prior to launch, to establish a working partnership of those organizations involved in collecting indicator data on monitoring and assessing desertification/land degradation and drought, and to determine the actions necessary to ensure the continuity of the process. The role, structure and basis for participation would be further developed during this phase.
2. This phase would involve a team of consultants assigned:
  - (a) To draft a modus operandi;
  - (b) To identify and recruit key potential partners;
  - (c) To establish and maintain effective management and coordination;
  - (d) To prepare, conduct and follow up on three development meetings;
  - (e) To establish a an inter-agency working group to review the process and enhance inter-agency cooperation;
  - (f) To convene a meeting of all stakeholder (unpaid attendance);
  - (g) To launch the partnership.
3. Ideally, the activities of the partnership would start in 2013 after the Parties have reported against impact indicators for first time.

#### A. Human resources

<i>Category</i>	<i>Number</i>	<i>Duration (month per biennium)</i>	<i>Unit cost</i>	<i>Total (EUR)</i>
Consultant	2	4.5	5 000	45 000
Contractor for logistic assistance	1	4.5	2 500	11 250

## B. Travel

<i>Category</i>	<i>Purpose of travel</i>	<i>Number of persons</i>	<i>Number of days per meeting</i>	<i>Number of meetings</i>	<i>Air tickets (EUR 2 800 per person per mission)</i>	<i>Daily subsistence allowances (EUR 200 per day per person)</i>	<i>Total (EUR)</i>
Member of the inter-agency working group	Attendance at inter-agency working group meetings	8	3	2	44 800	9 600	54 400
Consultant	Attendance at meetings of inter-agency group and of CST Bureau	1	3	4	11 200	2 400	13 600
Secretariat staff	Attendance at inter-agency working group meetings	2	3	1	4 000 <sup>a</sup>	1 200	5 200

<sup>a</sup> Air tickets EUR 2,000 per person.

## C. Other costs

<i>Category</i>	<i>Unit cost</i>	<i>Number of meetings</i>	<i>Total (EUR)</i>
Reproduction of documents and communication material	3 000	3	9 000
Set up and management of a website	10 000	0	10 000

## D. Time of secretariat staff

<i>Number of secretariat staff</i>	<i>Dedicated time allocated by secretariat staff (%)</i>	<i>Source of funds</i>	<i>Total amount</i>
1 P-4	15	Core budget	Per memoire
1 P-3	20	Extra budget	Per memoire

## E. Total budget

4. The total budget needed in the biennium 2012–2013 for the development of the desertification monitoring and assessment partnership (excluding the time of secretariat staff) is EUR 148,450.