



Convention to Combat Desertification

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Issues associated with the development and implementation of impact indicators related to the measurement of strategic objectives 1, 2 and 3 of The Strategy

Consideration of the status of work on methodologies and baselines for an effective use of the subset of impact indicators for strategic objectives 1, 2 and 3

Progress report on the status of work on methodologies and baselines for the effective use of the subset of impact indicators on strategic objectives 1, 2 and 3

Note by the secretariat

Summary

By its decision 17/COP.9, the Conference of the Parties (COP) decided provisionally to accept the set of impact indicators attached to that decision to assist measurement, at the national and global levels, of progress made under national action programmes in implementing strategic objectives 1, 2 and 3 of The Strategy. The following subset of impact indicators represents the minimum factors on which affected countries have been requested to report beginning in 2012:

- (a) Proportion of the population in affected areas living above the poverty line;
- (b) Land cover status.

This document presents a progress report on the work done to develop integrated approaches to data collection, analysis, monitoring and reporting for an effective use of the subset of impact indicators.

The Committee on Science and Technology is expected to review the present document with the aim of making recommendations on how to report against the agreed subset of impact indicators for consideration at the tenth session of the COP. Once adopted by the COP, the two impact indicators will guide Parties in measuring progress against strategic objectives 1, 2 and 3 of The Strategy.

Parties may also wish to refer to document ICCD/CST(S-2)/8 which contains a progress report on the refinement of the entire set of impact indicators.

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I. Background

1. In decision 3/COP.8, the Committee on Science and Technology (CST) was requested to advise the ninth session of the Conference of the Parties (COP 9), through the Committee for the Review of the Implementation of the Convention (CRIC), on how best to measure progress on the achievement of strategic objectives 1, 2 and 3 of The Strategy, based inter alia on the deliberations and outcomes of its ninth session.
2. During the biennium 2008–2009, the CST worked to carry out this assignment. As a first step, a framework document (ICCD/CST(S-1)/4/Add.3) was presented and discussed at the first special session of the Committee on Science and Technology (CST S-1). On that occasion the CST recommended concrete steps to be taken and activities to be carried out for selection of the indicators (ICCD/CST(S-1)/5/Add.1).
3. Thus, the CST Bureau developed and implemented a consultative process to select the impact indicators. The process comprised: (a) an in-depth review of the literature and a global consultation of affected Parties on currently utilized impact indicators, (b) consultation with all the actors in the five regional annexes on methodologies, baselines and capacity-building needs, and (c) a study on the availability of data at United Nations agencies and intergovernmental organizations. The findings of this process were synthesized in a comprehensive document which was presented at COP 9 (ICCD/COP(9)/CST/4); this document contained a recommended set of eleven impact indicators, a short discussion on their relevance to the United Nations Convention to Combat Desertification (UNCCD) and recommendations for their use.
4. In decision 17/COP.9, the COP decided provisionally to accept the recommended set of eleven impact indicators to assist measurement, at the national and global levels, of progress made under national action programmes in implementing strategic objectives 1, 2 and 3 of The Strategy.
5. The following subset of impact indicators was selected as the minimum requirement for reporting by affected countries, beginning in 2012:
 - (a) Proportion of the population in affected areas living above the poverty line;
 - (b) Land cover status.
6. The remaining impact indicators, while recommended, were considered optional for inclusion in reports by affected countries.
7. COP 9 requested the CST, with the support of the secretariat, to continue working on methodologies for collecting data and baselines and for an effective use of the agreed set of impact indicators, and to prepare a glossary in order to clarify the terminology and definitions used in the formulation of the set of impact indicators, for consideration at the tenth session of the Conference of the Parties (COP 10).
8. In order to enable affected countries to report against impact indicators in 2012, the secretariat started to work on methodologies and data needs for effective use of the subset of impact indicators, as well as on the development of a related glossary of terms and definitions. This document contains a progress report on the work done so far.
9. The report is based on the findings of a consultancy service, which aimed at: (a) reviewing the existing literature and to propose methodologies that could be used to measure one of the two mandatory indicators at both global and national level, (b) identifying and recommending standardized methodologies for collecting, processing, monitoring and reporting the relevant data needed for effective use of the subset of impact indicators, (c) identifying the available sources of data and information required to

implement the subset of impact indicators, (d) formulating harmonized scientific approaches to developing baselines and targets for the subset of impact indicators, and (e) preparing a glossary of terms and definitions which should accompany the subset of impact indicators in order to ensure that all end users understand the rationale and implement the impact indicators accordingly.

10. It also draws upon the report of the meeting on methodologies and data needs for the subset of the UNCCD impact indicators, land cover status and proportion of the population in affected areas living above the poverty line, which was organized by the UNCCD secretariat (Bonn, Germany, 11 June 2010) with relevant institutions and/or agencies which could provide information and data required in order to implement the subset of impact indicators.

11. Concurrently, an iterative process for the refinement of the set of impact indicators was launched. A progress report on this process is contained in document ICCD/CST(S-2)/8.

II. The subset of impact indicators within the context of The Strategy

12. The UNCCD set of impact indicators should be seen within the context of strategic objectives 1, 2 and 3 of The Strategy:

1. To improve the living conditions of affected populations;
2. To improve the condition of affected ecosystems;
3. To generate global benefits through effective implementation of the UNCCD.

13. The Strategy identifies five expected impact indicators and seven expected core indicators in relation to the three above-mentioned long-term objectives. The core indicators contained in The Strategy 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 global indicators further, capitalizing on existing sources of data.

14. In particular, the two indicators in the subset, that are, proportion of the population in affected areas living above the poverty line and land cover status, were established to provide information on progress made in achieving strategic objectives 1 and 2 respectively, at both the national and the global level. In addition, the indicator on the proportion of the population in affected areas living above the poverty line could provide indirect information on the generation of global benefits. The two impact indicators in the subset are presented in the table below, which links them to the strategic objectives, the expected impacts and the core indicators of The Strategy.

Table
The subset of impact indicators within The Strategy

The Strategy

Strategic objective	Expected impacts	Core indicators	Subset of impact indicators
S.O.1. To improve the living conditions of affected populations	1.1. People living in areas affected by desertification/land degradation and drought have an improved and more diversified livelihood base and benefit from income generated from sustainable land management	S.1. Decrease in numbers of people negatively impacted by the processes of desertification/land degradation and drought	Proportion of the population in affected areas living above the poverty line
	1.2. Affected populations' socio-economic and environmental vulnerability to climate change, climate variability and drought is reduced	S.2. Increase in the proportion of households living above the poverty line in affected areas. S.3. Reduction in the proportion of the population below the minimum level of dietary energy consumption in affected areas	
S.O.2. To improve the condition of affected ecosystems	2.1. Land productivity and other ecosystem goods and services in affected areas are enhanced in a sustainable manner, contributing to improved livelihoods	S.4 Reduction in the total area affected by desertification/land degradation and drought S.5 Increase in net primary productivity in affected areas	Land cover status
	2.2. The vulnerability of affected ecosystems to climate change, climate variability and drought is reduced		
S.O.3. To generate global benefits through effective implementation of the UNCCD	3.1 Sustainable land management and combating desertification/land degradation contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change	S.6 Increase in carbon stocks (soil and plant biomass) in affected areas S.7 Areas of forest, agricultural and aquaculture ecosystems under sustainable management	Proportion of the population in affected areas living above the poverty line

15. Desertification implies a long-term decline in ecosystem function and productivity which can be measured by changes in net primary productivity (NPP). To this end, tracking the trajectories of greenness, as a proxy indicator of land cover status, can be used to

identify degrading areas and areas where land degradation/desertification has been arrested or reversed. To interpret greenness in terms of land degradation/desertification or improvement, other factors that affect biomass, in particular climatic factors, must be taken into account.

16. Measures of poverty are highly significant in assessing the impact of actions against desertification due to the centrality of poverty as a root cause, and at the same time as a consequence, of land degradation and desertification. Income is strongly dependent on ecosystem services in the affected areas, and these in turn can affect the level of poverty. Furthermore, it is recognized that investment in land improvement, such as soil and water conservation structures and agroforestry, are strongly associated with higher income per capita. Thus measures of poverty can be used as good indicators of progress made in the strategic objectives of The Strategy.

III. Main findings

17. On the basis of the above, this section shows the main findings relevant to: (a) methodologies, (b) the level of harmonization that can be reached in the use of impact indicators by affected countries, (c) baseline and indicator tracking frequencies and targets, and (d) data and information acquisition.

A. Methodologies

1. Land cover status

18. Two main alternatives are identified: (a) those based on indicators derived from land cover/land use maps, and (b) those using biophysical indicators (also called ecosystemic indicators). Indicators derived from land cover/land use maps provide qualitative information, whereas biophysical indicators provide quantitative information.

19. Land cover is a robust indicator which provides the UNCCD and the affected countries with a method for assessing land cover status, and ultimately for obtaining land productivity measures.

20. The classifiers used in land cover classification can be unpacked to allow greater or lesser degrees of sophistication. At the first level, the raw data can be mapped to give the areal extent of two classifiers (vegetation cover and percentage of bare ground). This has considerable information content. Further unpacking can reveal land use, where changes are an important part of the land cover indicator.

21. Land cover information has to be compatible and comparable for multi-temporal analysis and map updates, within and among countries, within and between applications, disciplines and agencies, and across local to global scales (vertical and horizontal harmonization).

22. Monitoring of land cover change is necessary in order to understand the extent and severity of occurring anthropogenic and natural changes. The monitoring process requires the existence of reliable maps and datasets for the construction of a time series for land cover over a particular area. Categories and classifiers must be defined consistently in order to identify land cover changes over time. It is often essential to maintain the original data sources in support of land cover re-analysis according to evolving technologies or changing standards or user requirements.

23. Indicators derived from land cover/land use maps might have problems of accuracy, due to the heterogeneity of pixels, as well as some limitations relating to the discrimination of classes and the definition of legends.
24. The United Nations Land Cover Classification System (LCCS) classifiers¹ provide a comprehensive and flexible framework for thematic land cover characterization. LCCS classifiers enable compatibility to be achieved between existing datasets and for future global monitoring systems. The application of LCCS classifiers could help to overcome the problem of comparability of legends.
25. Considering these limitations in the indicators derived from land cover/land use maps, biophysical indicators are to be preferred. They are low cost, not very prone to error propagation and well-suited to implementation on remotely sensed time-series data covering large areas.
26. Several biophysical indicators could be used to assess land cover status including, among others, NPP, rain use efficiency (RUE), phenological trends and vegetation cover, which is the variable best correlated with water erosion. These indicators, used for instance by the Global Assessment of Land Degradation and Improvement (GLADA),² are considered promising in terms of their biophysical foundation, technical feasibility and high potential for harmonization. They describe land cover status (for both cultivated and non-cultivated land) by measuring NPP and RUE trends as obtained through long-term series of Normalized Difference Vegetation Index (NDVI) data, which can in many cases be substituted for available advanced time series data such as the fraction of absorbed photosynthetically active radiation (FAPAR).
27. The main advantages of this method are that it requires simple data (remote sensing and climatic data) and that the techniques for obtaining vegetation indicators, such as NDVI, NPP and RUE, are under close investigation and at this stage no alternative approaches are likely to replace them.
28. Annual sum NDVI, representing annually accumulated greenness, is a widely-accepted standard indicator of land degradation and improvement. RUE, RUE-adjusted NDVI and global residual trends of sum NDVI (RESTREND) are different ways of eliminating false alarms caused by rainfall variability. Each of the various measures is useful in its own right. Both NDVI (as an index of greenness) and RUE (production per unit of rainfall) are simple and well-known concepts. An advantage of RUE-adjusted NDVI is that, for areas considered as degrading or improving, the original NDVI values are retained. These can then be translated into NPP, which is open to economic analysis. Overall, RUE-adjusted NDVI provides a more restricted delineation of degradation.
29. Some concerns raised in relation to the GLADA product are to be seen, mainly in relation to its level of global generalization. A main limitation lies in the scale, which was based on Global Inventory Modeling and Mapping Studies (GIMMS) data, with 8 km spatial resolution, applied at the global scale with limited substratification. This limitation could be overcome by applying the indicator at the national level, using other available remote-sensing data sources with higher spatial resolution and better radiometric definition (for example, FAPAR product developed by the Joint Research Centre of the European Commission, Moderate Resolution Imaging Spectroradiometer (MODIS), Satellite Pour

¹ Di Gregorio, A., 2005. UN Land Cover Classification System (LCCS) – classification concepts and user manual for software version 2. Available at: <www.glcnlccs.org>.

² Bai, Z.G., Dent, D.L., Olsson, L. and M.E. Schaepman, 2008. Global assessment of land degradation and improvement. 1. Identification by remote sensing. Report 2008/01, ISRIC – World Soil Information, Wageningen.

l'Observation de la Terre (SPOT) VEGETATION, regional Advanced Very High Resolution Radiometer (AVHRR) 1 km archives), and in a more stratified way, as was done in other projects such as DeSurvey.³

30. Because not all countries have a high level of technical capacity and the deadline, compliance by 2012, is very tight, it was suggested that a stratified approach be adopted. This would allow a start to be made using readily-available land-cover data. As technical sophistication improves, countries at the "entry level" could progress to greater depth. Other countries could provide more detailed reports and mapping, reflecting the other classifiers such as land use system, vegetation cover and land practices. This approach might be facilitated by putting in place a web-based portal with a series of drop-down menus and three levels. First, at the most generalized level, "land cover" classes can be provided, from which users can choose the most appropriate category. At a second level, associated "land utilization types" can be offered in order to obtain better characterization – albeit still largely qualitative. At the third and most detailed level, users might input vegetation cover measurements along with production and biomass data, as appropriate to the type of cover. This basic data set will then be amenable to further exploration of how the impact indicator captures important ecosystem service outputs, such as an increase in the land's resilience and changes in economic production.

2. Proportion of the population in affected areas living above the poverty line

31. Many countries and international agencies already keep track of the evolution of poverty. There are, however, certain doubts regarding the appropriateness of this indicator for UNCCD purposes since data may not be readily available at the national level, or may be scattered in many international agency websites, or they should be applied in areas of the world where poverty might not be relevant.

32. There are also problems associated with the way in which poverty is measured. There is an international poverty line, determined by the World Bank, which does not allow comparisons across nations, while there are absolute or relative poverty lines determined by countries themselves and based on local conditions. Finally, the definition of affected areas can cause some degree of difficulty to the reporting Parties.

33. The lack of a common conceptual framework for defining poverty provides room for the existence of different methods of measuring it.

34. The reviewed literature suggests that consumption is an adequate way of measuring poverty in less-developed countries, while income would be a better method in developed ones. Also, some countries have adopted an absolute poverty line while others have chosen a relative poverty line. From the choices made by most countries and international agencies, the absolute poverty line is more commonly used.

35. The choice of a poverty line is ultimately arbitrary. In some countries it might make sense to use the minimum wage or the value of some existing benefit that is widely known and recognized as representing a minimum.

36. It was questionable whether it was relevant to report an indicator at the global level. Moreover there was an overall consensus that it should be up to the Parties to identify affected areas in their own territory.

37. Regarding the spatial resolution, many countries measure poverty through subnational surveys, targeted at a sample of households. This procedure needs to be refined

³ Barrio del, G. J., Puigdefabregas, J., Sanjuan, M. E. and A. Ruiz, 2005. The DeSurvey MP1_2dRUE tool for assessing and monitoring of land condition, Technical Report of CSIC-EEZA, Spain.

once a definition of “affected areas” is reached. It might be advisable for the UNCCD to implement some quality control procedures in order to ensure comparability across regions enjoying similar living standards.

38. The importance is recognized of dovetailing countries’ poverty measurements with the Global Environment Facility land degradation indicator on livelihoods.

B. Level of harmonization that could be reached in the use of impact indicators by affected countries

39. The main goal of reporting on impact indicators should be that actions and measures to combat desertification and mitigate the effects of drought are based on solid assessment and periodic monitoring of land degradation at national level.

40. The use of indicators compiled as part of national initiatives should be preferred to the use of internationally-compiled indicators, even to the detriment of harmonization and comparability. Many countries are already using impact indicators, and many of them are already actively participating in regional or subregional initiatives for harmonizing indicators (these include the South American countries and the Sahara and the Sahel Observatory).

41. Notwithstanding its importance, it has to be realised that harmonization of indicator methodology is a long-term effort, which could increase the burden on countries to deliver at short notice for the 2012 reporting deadline. The UNCCD reporting system should be flexible enough, therefore, to accommodate differences in methodologies, but Parties should be encouraged to engage in harmonization initiatives.

42. Nevertheless, the advantage of formulating and recommending common methods of measuring impact indicators would be twofold: it would serve as a reference for those countries which are not yet using the selected impact indicators, and it would facilitate the exchange and sharing of information, data and technology.

43. If it is understood that indicators should be compiled as far as possible from sources typically accessible to, and in use by, national actors, internationally-compiled indicators could constitute the basis for default monitoring in the case of data gaps at the national level for the first reporting process.

C. Baseline and indicator tracking frequency

1. Baseline

44. There is a need for the Parties to determine baselines against which to report changes observed in the value of the selected indicators.

45. The baselines should be selected pragmatically: first, not too far back in time, to ensure reliability and accuracy; and second, to be in tune with the 10-year lifespan of The Strategy. It is suggested that new baselines should be set within the period 2000–2009. The same approach was followed for the reporting on UNCCD performance indicators.

2. Indicator tracking frequency

46. The tracking frequency must be in conformity with the reporting guidelines currently being developed by the CRIC, and should take into account the response sensitivity of the components of the biological systems targeted for measurement such as regeneration of degraded land and forest cover.

47. Given that The Strategy has a 10-year lifespan, and that the first reporting cycle is scheduled for 2012, it is recommended that the tracking frequency for both indicators should be four years.

D. Data and information acquisition

1. Land cover status

48. There are no major problems of data availability at the regional and global scale. Multispectral and multi-temporal global, regional and national land cover data sets are currently produced by a range of space agencies, research institutes and national agencies at “coarse” resolutions (250 m–1 km) for determining land cover type, and “medium” resolutions (10–50 m) for determining type and detecting land cover change (Global Observation for Forest and Land Cover Dynamics - GOFD-GOLD, 2008).⁴ In addition, in situ data are acquired for the monitoring of land cover, vegetation migration and related phenomena, and are also used as a reference for the calibration and validation of land cover and land cover change measurements by satellites.

49. At the national scale, an alternative to the GIMMS dataset could be represented by MODIS and Medium Resolution Imaging Spectrometer (MERIS) datasets. LANDSAT datasets, which are in many cases freely available, are not best suited to deriving the above indicators because they lack the temporal resolution necessary for adequately resolving the vegetation growth cycle over a period of several years. Nevertheless they may be useful for verification purposes at subnational and local level.

50. Additional limitations could be, for example, a lack of accurate rainfall data in some countries as well as of satellite images in tropical areas with high cloud cover.

2. Proportion of the population in affected areas living above the poverty line

51. The proportion of the population in affected areas living above the poverty line is an indicator for which there are available data for most countries; compared to other indicators, the collection system is relatively straightforward, since there are monitoring systems in place. It is understood that the cost of data collection is affordable for countries which are already engaged in this process.

52. Regarding the availability of data, the UNCCD secretariat may facilitate the work of the focal points by keeping a repository of sources of data/information since there are many international agency websites containing high-quality downloadable data. It is advisable to use data from international agencies as default data in order provisionally to compensate for the lack of data in specific countries.

53. Efforts by the UNCCD should also be oriented to coordinating actions by other specialized United Nations bodies aiming at building capacity in those areas where poverty is not measured adequately.

54. If the effort of compiling data/information is aimed at allowing international comparisons in order to have a global indicator on poverty, then the UNCCD should define actions for facilitating access to data currently made available on the internet.

⁴ GOFD-GOLD 2008. Reducing greenhouse gas emissions from deforestation and degradation in developing countries: a source book of methods and procedures for monitoring, measuring and reporting. GOFD-GOLD report version COP13-2. Available at: <www.gofc-gold.uni-jena.de/redd>.

IV. Conclusions and recommendations

55. The CST has taken steps to make effective use of the subset of impact indicators by (a) reviewing and identifying existing methodologies for collecting, processing, monitoring, and reporting the relevant data needed to implement the subset of impact indicators, (b) identifying available data sources and information required for reporting the subset of impact indicators, (c) providing guidance on how to reach an operational level of harmonization, and (d) suggesting options for establishing a standardized baseline and tracking period.

56. The CST may wish to take note of the report and to provide guidance with respect to the development of further recommendations based on the main findings.

57. The CST may also wish to give clear guidance to its Bureau on the way forward with respect to the work to be accomplished during the period leading up to COP 10.

58. As the current document represents a progress report on the activities undertaken by the UNCCD under the guidance of the CST Bureau up to mid-July 2010, an update on the activities regarding the methodology and baselines for an effective use of the subset of impact indicators that have been undertaken since that time will be presented at the second special session of the CST.
