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Report on progress of the Land Degradation Assessment in Drylands project

**Report on progress of the Land Degradation Assessment in Drylands project**

**Note by the secretariat\***

*Summary*

The Conference of the Parties (COP) at its seventh session, having considered the initiatives undertaken on the Land Degradation Assessment in Drylands (LADA) project by various international organizations and institutions with the collaboration of the secretariat, requested a report on the progress of the LADA project, to be submitted to the Committee on Science and Technology (CST) at its eighth session.

The Committee may recall that the request for an assessment of the extent of land degradation in drylands came from the COP, out of which the LADA project was conceived. LADA is a global initiative supported by the Global Environment Facility, the United Nations Environment Programme, the secretariat and the Global Mechanism, and the Food and Agriculture Organization of the United Nations (FAO) as the executing agency.

The LADA project has developed and tested effective assessment methodologies for land degradation in drylands through pilot projects in Argentina, China and Senegal, and also through case studies in Argentina, Kenya, Malaysia and Mexico.

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\* The submission of this document was delayed due to the short time available between the fifth session of the Committee for the Review of the Implementation of the Convention and the eighth session Conference of the Parties.

The objective of the LADA project is to develop and implement strategies, methods and tools for assessing, quantifying and analysing the nature, extent, severity and impacts of land degradation on ecosystems, watersheds and river basins, and carbon storage in drylands, at a range of spatial and temporal scales.

Moreover, the LADA project aims to build national, regional and global assessment capacities to enable the design, planning and implementation of interventions to mitigate land degradation and establish sustainable land-use and management practices.

The FAO has prepared a progress report on the LADA project: this is submitted to the CST for consideration. The Committee may wish to provide through the COP any recommendations on this subject that it deems appropriate.

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## I. Background

1. Many attempts have been made in recent decades to understand, assess and monitor land degradation in general, and desertification in particular. Until recently there was no mechanism in place to collect and disseminate comparable information within countries, across regions and at international level. To respond to the needs for up-to-date and comparable land degradation information, the Global Environment Facility (GEF) has funded the Land Degradation Assessment in Drylands (LADA) project to be implemented by the United Nations Environment Programme (UNEP) and executed by the Food and Agriculture Organization of the United Nations (FAO). This project has benefited from the support of the United Nations Convention to Combat Desertification (UNCCD), the International Soil Reference and Information Centre (ISRIC), the United Nations University (UNU), the Global Land Cover Network (GLCN) and other regional and national partners. The project started in May 2006. The present project has been prepared through a PDF-A phase (2000–2001) and a PDF-B phase (2002–2004).

2. Six countries are participating in the project as pilot countries: Argentina, China, Cuba, Senegal, South Africa and Tunisia. They contribute to the project in kind and/or in cash.

## II. Main objectives of the project

3. The LADA project has two principal objectives:

(a) To develop and implement strategies, methods and tools for assessing, quantifying and analysing the nature, extent, severity and impacts of land degradation on ecosystems, watersheds and river basins, and carbon storage in drylands, at a range of spatial and temporal scales;

(b) To build national, regional and global assessment capacities to enable the design, planning and implementation of interventions to mitigate land degradation and establish sustainable land-use and management practices.

4. As a result of the land degradation assessment it will be possible to identify:

(a) The status or baseline and trends of land degradation in drylands;

(b) The hot spots. In the LADA context, hot spots are areas where swift rehabilitation action is required as land degradation is particularly severe or fast, with actual or expected harmful or extensive impacts on-site or off-site. A hot spot may also be an area where the land is vulnerable and threatened by degradation;

(c) The bright spots. In the context of LADA, these are areas without significant land degradation that are stable, naturally or under the present conditions of sustainable management. A bright spot can also be a formerly degraded or vulnerable area where land protection or rehabilitation has been successful or is in progress.

(d) The major driving forces and pressures leading to land degradation in hot spots and to improvements in bright spots.

(e) The status of land degradation at the national and subnational scale and the driving forces and pressures leading to resources degradation for the pilot countries.

(f) Quick and participatory local assessment tools, for which guidelines will be prepared and distributed to the pilot countries.

5. In the final part of the project, an analysis of the findings will be carried out, aimed at identifying cause–effect relations between the different indicators of land degradation within the “Driving Force–Pressure–State–Impact–Response (DPSIR)” conceptual framework.

6. Finally, a global action plan will be prepared and proposed to the partner countries and the wider international community, containing all the findings of the project and conclusions and recommendations for further action.

7. The project was approved by the GEF in November 2004. It started its activities in May 2006. Its duration is four years, until April 2010.

### **III. Structure of the project**

8. The project operates at different levels of scale. It has a global-level component, which is based mostly on remote sensing information, complemented by ground-truthing work. The country level has two components: a national component that will combine remotely-sensed datasets with information collected at national level and expert knowledge, and a local-level component which will be based on field work and local expertise.

#### **A. Global level**

9. The global component consists basically of three lines of work.

(a) A study of the trends in net primary productivity (NPP) and rainfall use efficiency (RUE) through the analysis of normalized difference vegetation index (NDVI) data. This method takes into account a 21-year time series of NDVI data, which are then converted into NPP and RUE. Those areas where both the RUE and the NPP have constantly decreased over the years will be considered as hot spots for this specific indicator, whereas the areas where they have increased will be noted as bright spots. This method has been developed by ISRIC, and has been tested in China and in Kenya within the framework of LADA.

(b) A study of the land cover change to agriculture and urbanization through the analysis of Landsat data. This method has been developed by the GLCN. It uses a comparison between the current land cover as it appears from the most recent Landsat images and the situation as it appears in two other series of images taken in the 1970s and the 1980s. Those areas where there has been a change from forest or rangeland to agriculture or urbanization will be considered to be hot spots for this indicator.

(c) Land-use systems mapping at global level. Global land-use systems will be created following a methodology proposed by Dixon et al.<sup>1</sup> and developed at FAO to be adapted to the needs of a land degradation assessment. It is based on the analysis of three sets of biophysical data (climate, soil and terrain and land cover) using a combination of expert knowledge and simple spatial modelling, to form a spatial information base on land use which can be flexibly queried by end users to support a wide range of land interventions. The resulting map could be used in planning local assessments of land degradation as well as in formulating interventions for reducing land degradation. The map units are then characterized using other sets of biophysical and socio-economic data to be used as DPSIR indicators. These mapping units will become the cartographic basis for the subsequent national assessment.

## **B. Country level**

10. Based on the result of the preparatory studies, a seven-step approach has been formulated, which is considered as the modular part of the LADA methodological framework at national and local level. The seven steps of the LADA approach are:

- (a) Identification of land degradation problems and users' needs assessment;
- (b) Establishment of a LADA task force;
- (c) Stocktaking and preliminary analysis;
- (d) Stratification and sampling strategy;
- (e) Field surveys and participatory assessment;
- (f) Information integration;
- (g) Monitoring strategies and tools.

### 1. National component

11. The national component of LADA will be carried out mostly by national institutions in the partner countries, supported by the project. It will consist basically of a collection and analysis of locally available data and information, their processing in order to make them compatible with international standards, and their comparison with the results of the global studies. In doing so, the countries will be able to refine and detail the maps obtained under the global study and to have a national cartographic base for land degradation assessment.

12. National expert knowledge will be applied to characterize the base map with land degradation and land management characteristics at subnational level. A specific mapping tool, in the form of a questionnaire, has been prepared by the project in collaboration with the World Overview of Conservation Approaches and Technologies (WOCAT). The utilization of this tool

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<sup>1</sup> Dixon J., Gulliver A., Gibbon D. and Hall M., Farming systems and poverty, FAO and World Bank, Rome and Washington D.C., 2001.

will allow the application of the national knowledge in a more consistent and comparable way among the different countries. The results of this exercise will be compared with the hot and bright spots identified at global level, and will serve as a basis to guide the local assessment survey described below.

## 2. Local component

13. Local assessments will be carried out in areas selected by each country following the national land degradation assessment. Each participating country will initiate detailed assessments for at least two sites, supported by national-level policy forums to create the linkage processes to local by-laws, national planning and development practice. The steps towards achievement of the planned result will commence with the training of relevant professionals in land degradation assessment, impact analysis and related developmental factors. These assessments will be made by means of low-cost speedy procedures, and will follow a participatory approach in order to achieve stronger involvement of the local stakeholders.

14. The local component will aim to identify not only the actual status and circumstances of land degradation, but also its historical development and its perception by the people. This will allow a better understanding of the phenomenon, and will provide pertinent information for the definition of response measures. The local assessments will also analyse indicators in the DPSIR framework, taking into account both biophysical and socio-economic indicators. The detailed assessment methodology will be defined in guidelines to be prepared in collaboration with the University of East Anglia, the Visual Soil Assessment group and WOCAT, and in consultation with ISRIC. The local assessment activity will also give an opportunity for ground-truthing of the remote-sensed information utilized for the global assessment.

### **C. Integration of the different levels**

15. LADA aims at integrating the findings of the local, national and global assessments, both horizontally and vertically. Horizontally, the harmonization of the assessment methodology among the countries is conceived in order to make the results comparable, and to allow easier communication and experience exchange among the pilot countries and other countries willing to adopt the LADA approach. Vertically, the utilization of a harmonized methodology for the creation of the base map will give the possibility of establishing a link between the findings of the global and the country level components that will be used to compare the results at different levels of scale.

## **IV. The Land Degradation Assessment in Drylands project approach**

16. LADA has four main project components:

(a) Development of the LADA approach: land degradation assessment guidelines, network and information system;

(b) Carrying out global and regional land degradation assessments;

(c) Carrying out local assessments in hot spots and bright spots in pilot countries;

- (d) Carrying out a major analysis and preparation of a strategy for global action.

17. A corresponding outcome is attached to each component as follows:

- (a) An improved tested and disseminated needs-based and process-driven approach to drylands degradation assessment;

- (b) A map with information retrieved from the global land degradation assessment, which will constitute a baseline of the status of land degradation, with a special emphasis on areas at greatest risk;

- (c) Detailed local assessments and analysis of land degradation and its impact in the pilot countries;

- (d) A proposed global action plan, incorporating main findings from the project, conclusions, and recommendations for further action.

18. This LADA approach integrates biophysical and socio-economic components of land degradation at different scales, recognizing that socio-economic issues are also driving forces of pressures that impact on land conditions. The LADA approach further recognizes that land degradation assessments should:

- (a) Capitalize on existing initiatives;

- (b) Focus on the goods and services of the drylands;

- (c) Work with local stakeholders;

- (d) Develop a standardized methodology that will monitor land degradation in time.

19. It also recognizes that humans are an integral component of most ecosystems and emphasizes an understanding of the immediate and underlying causes of threats to biodiversity, leading to policy and management interventions at appropriate levels. The LADA approach applies the integrated approach to ecosystem management at local, agroecological zone, and national levels.

20. The LADA methodological framework comprises the LADA approach and a set of tools for the different scales of land degradation assessment, from the global to the subnational level. It incorporates participatory rural appraisals – expert assessments – field measurements, remote sensing, geographic information system (GIS) modelling and other modern means of data generation and dissemination for analysing and sharing information. The key elements of this strategic approach are:

- (a) Participation and inclusion of different perceptions of land degradation;

- (b) Combination of expert assessment and local knowledge;



- (c) Use of adapted assessment tools for specific environments.

21. To understand the process of land degradation at subnational, national and global level, the LADA approach relies on the DPSIR framework, which states that driving forces exert pressures on the environment and that these pressures can induce changes in its state or condition. The subsequent impacts on socio-economic and biophysical attributes cause society to respond by developing or modifying environmental and economic policies and programmes aimed at preventing, minimizing or mitigating pressures and driving forces.

22. The adoption of this conceptual framework also implies recognition of the dynamic nature of the land degradation phenomenon. Land degradation is in this way defined by comparison with a previous situation, when driving forces exerted a certain pressure on the land. This pressure created the present state of the land, which is having an impact that will drive a response in the future. The time factor is in this way introduced into the system, and will have to be considered in the formulation of the assessment methodology at all levels.

#### **A. Indicator toolbox and visual soil assessment tool**

23. During the PDF-B phase, the LADA project started developing an indicator toolbox containing a minimum set of indicators that can be measured at local and global scales and which allow for extrapolation at these different scales. Development of the toolbox will continue during the full-scale LADA project. The LADA indicators are relatively easy to measure or obtain and are therefore low-cost. The LADA indicators are related to several conditions of the land in such a way that they can describe the system cost-effectively.

24. The LADA project has also developed a local assessment tool, a set of simple and inexpensive assessment techniques which can be gradually learned by farmers and which are related to their need to improve land conditions. These visual soil assessment (VSA) indicators are morphological and measured soil characteristics that allow for the transfer of information between sites, soil types, land uses, etc., while providing a cross-check and physical reality to structure descriptors.

#### **B. Capacity-building**

25. As already noted, capacity-building is one of the main objectives of the project. At all stages of intervention, substantial attention will be given to training and institutional and technical capacity-building. Institutions will be created and integrated into policy and decision-making. Particular emphases will be on multi-stakeholder involvement and participation, especially of land users, farmers and the rural poor at the local level and of policymakers at national and global levels. Local professionals and extension agents will be trained in field assessment of land degradation through adopting a farmer perspective and using a sustainable rural livelihoods approach. Best practices will also identify the synergies between different global benefits (biodiversity, climate change, international fresh water basins/river systems) and between global and local benefits (food security, livelihood support and poverty alleviation). A further feature of LADA will be to adapt scientific knowledge at global, regional and national levels in order to integrate with local knowledge where local people have successfully controlled land degradation.

26. It is worth noting that the capacity-building activity will have a special focus at the regional level, through the establishment in the pilot countries of six regional training centres on land degradation issues. The regional centres will be created with the collaboration of the national partners, their trainers will be prepared and the curricula will be defined.

## **V. Relevance of the Land Degradation Assessment in Drylands Project for policymaking**

27. The new capacities and knowledge base that will be produced by the project will constitute a basis for more aware policymaking at national and global levels. All the information will be made available to interested parties through a set of means such as workshops, publications, web-based information systems and the increased expertise of the national and international organizations involved.

28. LADA will communicate and exchange land degradation information in order to complete the linkage to policy processes and decision-making. It will do this through policy guidance (in, for example, UNCCD regional, subregional and national action programmes), GEF and implementation agency interventions in land degradation control, and the identification of priority actions, such as policy and institutional reforms and development investment at all levels. Communication and exchange will be furthered by the implementation of best practices to identify land degradation issues and to employ lessons to check and reverse problem issues, and the development of monitoring of the changing severity of land degradation and the effectiveness of remedial control measures.

29. LADA is already actively engaged in similar projects in Central Asia (Central Asian Countries Initiative on Land Management (CACILM)) and the Caribbean; it has various complementary actions within the TerrAfrica programme and cooperates with the Convention on Biological Diversity (CBD).

## **VI. Status of the activities**

30. During its first year of work, the LADA project has performed the following activities:

### **A. Component 1: Development of the Land Degradation Assessment in Drylands approach: land degradation assessment guidelines, network and information system**

31. A management team has been set up within FAO, including the establishment of an internal task force and the recruitment of a project technical adviser. A toolbox of pressure and state indicators has been prepared by a senior expert, and revised with the national partners. A new LADA brochure has been prepared and published. The project website, or LADA Virtual Centre, has been restructured on the basis of an extensive user need assessment carried out in collaboration with the *Istituto Agronomico Mediterraneo* (IAM) of Bari, Italy (<<http://lada.virtualcentre.org/pagedisplay/display.asp>>).

32. A technical workshop and a Steering Committee meeting were held at FAO headquarters in November 2006. The meeting comprised technical sessions in which presentations were made

in the areas of global and regional land degradation assessment and remote sensing, country reports, and local assessment of land degradation and capacity-building, followed by discussion periods. The technical sessions were followed by the meetings of the Steering Committee and the Scientific Committee. Some of the main recommendations were the need for inclusion of socio-economic data, ground-truthing of the results, and collaboration with other agencies which were involved in work relating to the LADA project; the participatory approach was also strongly supported. In the Steering Committee meeting, decisions were made on the composition of the Steering Committee and its terms of reference. The Scientific Committee called for discussion on a coordinating mechanism and agreement on issues such as nomenclature, the method of stratification, sample design and local assessments. A minimum data set should also be used for socio-economic data.

33. A methodology for global stratification has been defined. The methodology takes into account the natural resources base, and the land-use and socio-economic features of the land. It has been revised by the LADA teams in the pilot countries, which are now using it as a basis for the preparation of their own national stratification.

34. A questionnaire/guidelines for an expert assessment of land degradation, based on the land-use systems map created with the methodology mentioned above at national level, has been prepared in collaboration with WOCAT, and discussed with the national teams in the pilot countries.

#### **B. Component 2: Carrying out global and regional land degradation assessments**

35. A collation of information available at international level of all databases, satellite images, reports and documents relevant for the global land degradation assessment has been carried out. Pilot studies for remote sensing-based assessment of land degradation based on the analysis of long-term series of NDVI data have been finalized in China and Kenya in collaboration with ISRIC.

36. Land degradation hot spots and bright spots based on the NDVI methodology have been identified for each pilot country and will be submitted to the national LADA teams for ground verification.

#### **C. Component 3: Carrying out local assessments in hot spots and bright spots in pilot countries**

37. A local assessment methodology has been prepared in collaboration with WOCAT and the University of East Anglia, which included a consultation with LADA partners in the pilot countries. A training stage for national specialists on the application of the methodology will be carried out in early autumn 2007.

38. Stakeholder workshops have been held in each pilot country in order to establish the national team, define the workplan and establish general criteria for the identification of the areas that will be covered by the local assessment. During the workshops, a review of the existing datasets available in each country was carried out.

### 1. Argentina

39. The national stakeholder workshop for Argentina took place in Buenos Aires from 28 to 30 March 2007: it was attended by 18 participants from relevant national and regional institutions. The meeting confirmed the partner institutions that will collaborate with the project and nominated their respective representatives. Argentinean partners are keen to start project activities at the subnational level and have expressed their interest in playing a lead role for LADA in the South and Central American region.

40. Participants were informed by FAO about the objectives and approaches of the LADA project and received additional information on the components of project implementation at global, national and local level. The meeting was briefed on the present efforts to assess land degradation and its causes in the different regions of the country. Argentina has proposed the inclusion of seven pilot sites from six different regions for local assessment under the LADA project.

41. The national counterpart(s) received clarification on operational matters and the available budget for implementation of activities in Argentina and agreed in principle to the project workplan presented by the LADA team from FAO.

### 2. China

42. About 50 representatives of various ministries, institutes and other major projects dealing with land degradation and land-use planning attended the national inception meeting. The meeting was convened in Beijing from 23 to 25 January 2007, hosted by the National Bureau to Combat Desertification.

43. The LADA approach, the global project, links between global and national activities and the preparation of a document on sustainable land management practices were presented by FAO at the meeting. Several national institutions presented their own work relating to land degradation. The participants had the opportunity to learn what different actors are doing in China. The meeting also provided a platform for open and interesting discussions on the LADA approach and the need for appropriate working mechanisms in the country, to avoid duplication and to make the best use possible of resources.

44. The meeting was also an opportunity to highlight institutions that have already done important work on land degradation assessment methodologies and results in China. A stronger collaboration with the GEF-China-ADB project on land degradation assessment indicators and training will be pursued.

### 3. Cuba

45. Two workshops have been held in Cuba. They were both attended by about 50 participants. During these events, the national LADA team was established and the LADA methodology and approach were introduced to the national counterparts. In particular, the connections between the global and the national LADA were considered, and the capability of Cuba to become a regional focal point of Central America and the Caribbean was discussed.

46. The present state of land degradation assessment and control in the country was presented, and a workplan for the implementation of the project at national and local level was defined.

47. A particular topic that was discussed referred to the connections and possible synergies between LADA and the GEF Operational Programme 15 (OP 15) project in support of the National Programme to Combat Desertification and Drought of Cuba, implemented by UNEP, the United Nations Development Programme and FAO.

#### 4. Senegal

48. In Senegal, following a meeting held in September 2006, the activity of LADA has started with the preparation of the national stratification of natural resources and agroeconomic information in order to create the national map of land-use systems. The work done in Senegal has been used to refine the global methodology, and will be used as a basis for national assessment in the other pilot countries.

#### 5. South Africa

49. A workshop and meetings with the national LADA team has set the stage for a good implementation of the project in South Africa. The workshop gathered more than 30 experts of various ministries and national projects relating to LADA implementation.

50. During the workshop, the various levels of study were explained and the full global database for South Africa (resource base and land-use systems) was transferred to the counterparts, together with various LADA documents relating to the methodology.

51. The South African LADA team expressed interest in evaluating the global data for the whole Southern African Development Community region. The team members also showed considerable interest in contributing to the further development of the Mapping Questionnaire for the national level; great interest was also shown in contributing to the development of the local assessment methodology.

52. Overall the workshop succeeded in making the LADA project approach more transparent and understandable and led to fruitful discussions between national agencies, particularly on the matter of data quality and data sharing within the country. It was clear that there is considerable expertise in the country to deal with remote sensing data (land cover and global land degradation assessment (GLADA) outputs), and an excellent infrastructure exists for information systems.

#### 6. Tunisia

53. About 40 participants attended the workshop in Tunisia, representing many organizations involved in LADA. The context of the project in Tunisia was defined, through the presentation of the global LADA, the institutional framework for land degradation assessment and the monitoring system of the programmes for desertification control. Several aspects of degradation and its control were presented: land-cover change, irrigation-linked degradation problems, pasture management, and water and wind erosion assessment.

54. Two working groups have developed concrete proposals in order to ensure the implementation of a participatory and multisectoral approach to land degradation assessment, both at national and subnational level. During the workshop, the importance of evaluating the functioning of the ecosystems alongside the natural resources base was underlined. In particular, the links between land degradation and biodiversity, carbon sequestration and climate change should be taken into account.

#### **D. Component 4: Carrying out a major analysis and preparation of a strategy for global action**

55. Best practices studies are on going in the pilot countries, in order to have a baseline for the response strategies adopted. These studies will serve as a contribution to the DPSIR framework study planned for the latest stage of the project.

### **VII. Conclusions and recommendations**

56. The LADA project has made good progress throughout its first year; it is on track and benefits from the active participation of all LADA countries.

57. The COP at its eighth session may wish to:

(a) Invite Parties, notably in the context of revised guidelines for reporting, to make available data on land degradation and drylands, including the results of surveys, desertification maps, land degradation perceptions, statistics and hot spots and bright spots identified by previous assessments or through other methodologies, as well as other biophysical and socio-economic data relating to land degradation and drylands;

(b) Encourage Parties embarking on more detailed national land degradation assessments to consider adopting the LADA methodological framework and to share their findings for refining the global LADA assessment;

(c) Welcome Parties interested in refining the findings from the global LADA assessment in their own country to request LADA assistance in developing project proposals and in identifying potential funds. Parties that are in a position to assist financially in this endeavour are invited to do so.

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