

LAND DEGRADATION ASSESSMENT IN DRYLANDS (LADA)

PROJECT FINDINGS AND RECOMMENDATIONS



GLOBAL ENVIRONMENT FACILITY
UNITED NATIONS ENVIRONMENT PROGRAMME

FOOD AND AGRICULTURE ORGANIZATION
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**LAND DEGRADATION ASSESSMENT IN DRYLANDS
(LADA)**

**GLOBAL
&
ARGENTINA, CHINA, CUBA, SENEGAL,
SOUTH AFRICA, TUNISIA**

PROJECT FINDINGS AND RECOMMENDATIONS

Report prepared for
the participating Governments
by
the Food and Agriculture Organization of the United Nations
acting as executing agency for
the United Nations Environment Programme

UNITED NATIONS ENVIRONMENT PROGRAMME
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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LIST OF ACRONYMS AND ABBREVIATIONS

COP	Conference of Parties (to the Global Conventions such as UNCCD)
CST	Committee for Science and Technology (of the UNCCD)
DPSIR	Driving Forces-Pressures-States-Impacts-Responses (<i>LADA</i> Conceptual Framework)
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GIS	Geographical Information System
GLASOD	Global Assessment of Human-induced Soil Degradation
GLCN	Global Land Cover Network
ILEIA	Centre for Information on Low External Input and Sustainable Agriculture
ISRIC	International Soil Reference and Information Centre
LADA	Land Degradation Assessment in Drylands
OECD	Organization for Economic Cooperation and Development
PDF	Project development funding phase, viz PDF-A, PDF-B (for GEF projects)
RS	Remote Sensing
SLM-IM	Sustainable Land Management – Integrated Model
SOTER	Soil and Terrain Database
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
USLE	Universal Soil Loss Equation
WOCAT	World Overview of Conservation Approaches and Technologies

IMPLEMENTING ORGANIZATION: UNEP

PROJECT NO: GFL/2328-2770-4909 (FAO symbol EP/GLO/502/GEF)

PROJECT TITLE: Land Degradation Assessment in Drylands (LADA)

1. PROJECT NEEDS AND RESULTS

The overall objective of the project was to secure global environmental benefits through the conservation and sustainable use of the essential and globally-important ecosystems and land resources in the world's drylands, consisting of all arid, semi-arid and sub-humid areas. This objective emphasizes the catalytic effect of adoption of comprehensive ecosystem management interventions, through the better application of land degradation information. It also aims at the mitigation of the causes and negative impacts of land degradation on the structure and functional integrity of ecosystems. The mutually supportive global environmental objectives of the project are an essential feature, on the grounds that dryland ecosystems cannot be protected without attention to ecosystem function and land degradation control.

The first project objective is to develop and implement strategies, methods and tools to assess, quantify and analyze 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. The second objective is 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.

As a global impact, the project has developed a harmonized set of methodologies for the assessment of land degradation at global, sub-national, national and local levels.

Besides developing the global Land Use System (LUS) classification and mapping and supporting a global NDVI study (GLADA) led by the International Soil Reference and Information Centre (ISRIC), a new set of pressures and threats indicators has been mapped at global level, in order to complement and complete the global output of the project. The information is accessible at country, LUS and pixel (5 arc-minute resolution) levels through a Global Land Degradation Information System (GLADIS),

A comprehensive web-based indicators information system has been developed in cooperation with the University of Sassari. The database has been completed and it is on-line.

All national level assessments have been completed. A remote sensing based study of Land Cover Change at high resolution has been completed for Kenya (test case), Senegal, South Africa, Tunisia and Cuba.

Local level assessments have been completed in all LADA countries in representative sites in order to test, further develop and validate the methodology in varied agro-ecological and socio-economic contexts. Reports on these have been received from all the pilot countries.

An analysis of the relations between the biophysical and socio-economic aspects of land degradation has been carried out in Senegal which is providing further guidance to ensure a rigorous and triangulated data collection and analysis process using field observations and measurements, land users/household interviews and secondary information. Work has been carried out on the aggregation of indicators and the identification of indexes and/or proxies that allow a more synthetic presentation of the results, particularly at global and national level in direct support of the UNCCD impact indicator mapping.

The visibility of the project is high, both within the pilot countries and at international level. The strong LADA participation to the CST-COP9 of UNCCD in September 2009 has been instrumental to inform the scientific community and country Parties of LADA outputs and to ascertain needs and interests in the use of products for land degradation and land management assessment and monitoring. This outreach has also been strengthened by the Regional workshops organized by LADA countries that presented LADA methods and results reaching more than 40 additional countries. Overall, LADA tools have been or are presently applied in 27 countries, as per October 2011. LADA is also a constant partner of the UNCCD in the pilot tracking exercise for the refinement of the impact indicators of the Convention.

2. PROJECT ACTIVITIES

The information and project delivery is presented in the form of progress on the 14 activities adopted by the steering committee meeting of 28 November – 1 December 2006 as reflected in the log-frame of the project. Activities correspond to major outputs for example Activity 1-4 served for the development, testing and publication of an improved and needs-based and process-driven approach to drylands degradation assessment.

2.1 *Activity 1: Reviewing data sources, methods and frameworks for land degradation assessment for drylands at multiple scales.*

Reviewing data sources methods and frameworks started under the PDF-B phase and final results in the form of guidelines at local, national and global level assessment for land degradation were produced within the timeframe foreseen in the logframe of the project. These methods all underwent a series of refinements throughout the project's lifetime as a logical consequence of field testing in the LADA countries and feedback received during peer reviews and technical workshops. LADA countries operate in five languages: Argentina and Cuba in Spanish, South Africa in English, Senegal in French, Tunisia in Arabic and French, China in Chinese and English. This has been a challenge but has also added value in harmonizing and making available methods and tools.

The activity is completed.

2.2 *Activity 2: Developing and testing integrated land degradation information systems at central and national level.*

The web-based central information system was investigated through two user surveys (results were published in Technical Reports #4 – Appendix 2). The look and feel of the LADA information centre developed during the PDF-B phase were enhanced in and the content significantly expanded (A new logo was developed, a discussion forum set up, an expanded number of publications and search functions were introduced, newflashes and country outputs were highlighted). GLADA and GLADIS maps and data are available the latter through a visual, interactive system; for the 6 LADA countries, national maps of land degradation and sustainable land management status and trends and local level assessment reports are also available; the DIS4LADA indicators systems is also accessible. The entire

website is available in English, French and Spanish. Since August 2008, the average number of pages viewed per month is 19.000 and the average number of hits per month is 170.000.

At national level all countries have developed, with the assistance of the project, similar national web sites containing land degradation assessment and LADA information.

The activity is completed.

2.3 *Activity 3: Preparing the stratification, carrying out national hot spot analysis and populating the network and information system*

This activity concerned mainly the development of a global land use system including attributes that linked to drivers of land degradation worldwide and nationally. The activity was undertaken in three steps. First detailed regional land use prototypes were developed that made use of various layers of land use, land resource and socio economic information. These maps and legends were sent to the individual LADA countries and tested and further refined against national information and approaches. Finally a global land use system was developed based on the feedback received and the lessons learned. The final map and document was published on-line and the corresponding database is part of the Global Land Degradation Information System (GLADIS). The document includes guidelines for national institutes to prepare a national land use system characterization and delineations of units.

National hot spot analysis was transferred from this activity to the one dealing actually with hot spot analysis (GLADA – Activity 6) and national assessment (Activity 4).

The activity was completed but partly implemented under other activities.

2.4 *Activity 4: Developing and disseminating guidelines for an improved needs-based and process-driven approach to dryland degradation assessment.*

Guidelines were produced for all level of assessment.

At **global** level three complementary guidelines were produced concerning (1) the mapping of global land use systems (2) the analysis of greenness trends with NDVI –GLADA- and (3) the assessment of global ecosystem services degradation (GLADIS). These are documented in Technical Report #8, #12 and the GLADIS working paper respectively. (Annex 2)

At **national** level guidelines were produced for the assessment of land degradation and sustainable land management (Technical Report #9). The approach to a detailed national analysis of land cover change over the period 1980 – 2005 using satellite imagery was also documented and a software to support the work (MADCAT) was produced in collaboration with GLCN (Technical report #18).

At **local** level a comprehensive manual with several annexes was produced to guide the detailed assessment in the countries. the document was produced in several stages following refinements after field testing and local workshops. The document is available as Technical Report #11.

The activity is completed.

2.5 Activity 5: Collating, geo-referencing and digitizing all available relevant information on regional and global scales.

This activity concerned the collection of information products and reports that served as background to the final products. Individual reports were for instance produced on a global soil and terrain database (Technical Report #10) and on the individual risks for land degradation including establishing differences between actual and potential yields (Technical Report #14). Other databases were simply collected, digitized and incorporated in the final products mainly GLADIS.

The activity is completed.

2.6 Activity 6: Carrying out Global and regional Land Degradation studies at low resolution.

This was a major activity for the project and went through several stages.

(1) Global Land Use Systems: human-induced land degradation is driven by land use and land use decision. Knowledge about these systems and their attributes is essential in order to make a correct assessment of land degradation. A new system to map land use systems at global scale was developed by the project, documented and was put on-line.

(2) Global land degradation assessment by NDVI Analysis (GLADA): in cooperation with ISRIC the project undertook a global analysis of the trends in greenness of vegetation over the period 1981-2003 (later expanded to 2006). The methodology was enriched by using the Rainfall Use Efficiency to tease out a proxy for land degradation processes during that period. The approach was first tested in two countries (Kenya and Northwest China) The study resulted in a large database (available on-line), a technical report and a press release. After field testing within the LADA countries and a peer review workshop (January 2008), the method was adapted and simplified (December 2009) and finally incorporated in GLADIS, which is the final product of the global land degradation assessment (June 2010 – see below).

(3) Global Land Degradation Information System (GLADIS): to reflect the fact that land degradation is a result of decline in all ecosystem services, a methodology was developed centrally that took this into account and evaluated biomass, soil health, water resources, biodiversity and socio-economic and cultural services. The system is documented (GLADIS Working paper) and on-line and incorporates the two products described above. It makes use of many of the additional information collected under Activity 5.

The activity is completed.

2.7 Activity 7: Carrying out National/Regional LADA studies, including training and integration with GLADA results and identification and categorisation of areas at greatest risk of dryland degradation.

Originally, this activity concerned only work to be undertaken with the Global Land Cover Network (GLCN) aimed at carrying out land cover change studies for the period 1980-2005 in the 6 countries. The activity was undertaken within FAO, and was carried out in five countries (Cuba, Kenya, Senegal, South Africa and Tunisia), while Argentina and China have not been implemented due to their size and consequent time constraints. Comparison with GLADA/GLADIS results proved to be difficult to generalize. The project contributed to the development of a software (MADCAT) that significantly enhanced the speed of analysis and produced a manual on the analytical procedure to follow (Technical Report #18). The reports on the country results are available on-line (Technical Report 7 for Kenya and Country Reports).

An additional complementary methodology was developed in collaboration with WOCAT that involved the production at national level in each country of:

- (1) A National Land Use System map (jpeg images on-line).
- (2) The participatory assessment of land degradation and sustainable land management using the WOCAT/LADA questionnaire in each land use system in each appropriate Administrative Unit of each country.
- (3) Publication of software, guidelines and GIS results of the national degradation and sustainable management status
- (4) Carrying out an overview of nationally important good practices that contributed to sustainable land management. (Country Reports).

Several international workshops were held to discuss results and refine the methodology.

The activity is completed.

2.8 Activity 8: Developing capacity of national (pilot country) professionals to carry out detailed assessments of land degradation, related to key developmental questions such as livelihoods, poverty and food security

This activity concerned the participatory development of a local assessment methodology and further training of nationals in the methods. It also established the capacities in the LADA countries to train surrounding countries in their region. The local assessment methodology was developed with the assistance of the University of East Anglia, UN-U, the Visual Soil

Assessment group, WOCAT and the lead institutions in each LADA country. Four international workshops were organized which included extensive field exercises (United Kingdom, Tunisia, Argentina and The Netherlands). Internally, each of the LADA countries organized local training courses and a workshop to give feedbacks on results obtained. The original idea to establish full fledged regional training centres was abandoned in view of the inadequate budget and operational problems related to its implementation. Instead training of countries in the region were undertaken (A change discussed in the technical workshop in Nairobi, April 2009, and endorsed by the Steering Committee Teleconference June 2009).

Overall several hundred experts in the LADA countries have been trained, while more than 30 additional countries were trained in the regional workshops and independent regional LADA workshops organized by the executing agency.

South–South cooperation was also stressed by an exchange of experts amongst LADA countries for specific activities.

A curriculum and course material was prepared for local assessment training by the University of East Anglia.

The activity is completed.

2.9 *Activity 9: Carrying out surveys of user needs and information system needs at national level*

Stakeholder workshops were organized in each country at the onset of the project to mobilize interest and cooperation with other Ministries, Organizations and Institutions.

Two user surveys were organized related to the establishment of information systems in which all LADA countries were fully involved. A SWOT analysis training was organized in Italy with all LADA countries and followed up by them nationally. Policy reports have been produced in all the participating countries. The latter was also relevant for activity 11.

The activity is completed.

2.10 *Activity 10: Carrying out Pilot detailed assessments in ‘hot spot’ and ‘bright spot’ areas; and recommending how to scale-up the findings to national level.*

A number of local assessments took place in each of the LADA countries. The participatory assessment followed the guidelines of the local assessment manual and reports for each area were produced (Country Reports). A total of 24 sites were investigated (3 in Senegal, 3 in Tunisia, 4 in South Africa, 5 in Argentina, 6 in China and 3 in Cuba). Analysis of results was undertaken for the case of Senegal with the assistance of the Free University of Amsterdam

and a number of ways identified to scale up results (mainly through modeling and expanding the number of case studies per land use system – country reports Senegal).

The activity is completed.

2.11 *Activity 11: Analyzing National and local level policy processes for renewable natural resources information, determining suitable entry points for land degradation information, and making available and operational the information system for national and district level planning and practice.*

A Strength-Weakness-Opportunity-Threats (SWOT) analysis training was organized in Italy in collaboration with the University of Sassari with all LADA countries and followed up by them nationally with the production of policy reports. The latter were also relevant for activity 9.

A full statistical analysis was undertaken for results obtained in Senegal as a case study (Technical report #19).

The information and tools are progressively being integrated in the national planning process in all the LADA countries.

The activity is completed.

2.12 *Activity 12: Developing and testing the framework for analysis of critical components and driving forces for land degradation based on DPSIR*

The activity was undertaken with the University of Sassari in close collaboration with the LADA team from Tunisia (Technical report #15; country reports Tunisia).

All local assessments in all countries made an analysis of the results in terms of the DPSIR framework.

The activity is completed.

2.13 *Activity 13: Collating and synthesizing information on best practices for land conservation, and preparing a report including policy and resource needs for implementation of the best practices identified.*

A report on best practices has been produced in all countries, following guidelines prepared in collaboration with WOCAT, based on the summary format presented in “Where the land is greener – Technical Report #3”. More than 200 examples of different best practices were collected and published. (Country papers)

The assessment of the policy and resources needed for implementation of these has been carried out (Country Reports).

The activity is completed.

2.14 *Activity 14:* LADA involved with other stakeholders in assisting policy development with UNCCD through COPs

Throughout the project lifetime close contact was kept and consultation done with UNCCD, the CST and participation in the COP. Regular meetings of the CST were attended and LADA side events organized in the COP and other related meetings. A special agreement was also made with the CBD to assist with their preparation for BP2010 particularly on sustainable land management in agro-ecosystems. The LADA team was fully involved in the Scientific Conference held at COP-9 in Buenos Aires, where it also held a side event in collaboration with WOCAT and the DESIRE project. LADA was the subject of positive comments and resolutions of the COP in Havana, Nairobi, Madrid and Buenos Aires (Notably Decision 19, COP9). An implementation phase using results of the LADA project was discussed with UNCCD who also attended many Steering Committee and Technical meetings organized by the project. Starting in 2010, LADA has been actively involved in the refining process of the impact indicators of the UNCCD.

The activity is completed.

2.15 *Activity 15:* LADA works with UNEP and GEF Secretariat to develop support advice for implementation of OP15

Throughout the project lifetime close contacts have been kept with UNEP and the GEF Secretariat, which participated in all the sessions of the Steering Committee. The project collaborated with other GEF-funded activities in China, Cuba and Argentina, as well as with regional initiatives like CACILM, PALM and the Kagera project. Contacts were also kept with UNCCD, as stated above. The assessment methodology was developed having in mind the needs for synergies with the other focal areas and aiming at supporting decision making for development.

The activity is completed.

2.16 *Activity 16:* Final packaging, communication and exchange of land degradation information globally, regionally and nationally

The project products have been disseminated through websites (central-FAO and pilot countries), training and awareness workshops at sub-national, national and regional level. All project reports are available on-line, as well as the global maps and databases. Brochures, posters and dissemination leaflets have been produced during the project time. About 40 countries have been involved, while LADA products have been used in at least 27 countries. Four main manuals have been editorially finalized. A DVD with all the project outcome has been prepared and disseminated. All the project products are available through the website, which will be maintained by FAO.

The activity is completed.

3. PROJECT OUTCOMES

The project outcomes were grouped under four major headings which are discussed corresponding with a range of activities as described in section 2. The four main outcomes are given below.

3.1 *Outcome 1: An improved and needs-based and process-driven approach to drylands degradation assessment tested and disseminated.*

This outcome corresponds with activities one to four. At the onset of the project the only global information on land degradation was the GLASOD study (Oldeman et al, 1991) which apart from being outdated gave a static image of human-induced soil degradation only. By the end of the LADA project a methodology had been developed (GLADIS) that allowed evaluation and assessment of the processes leading to a decline in a set of major ecosystem services. This information was collated in an easily accessible on-line format, containing a wealth of land degradation parameters on status, pressures, drivers and impacts. It visualizes information in an original way through the use of radar diagrams and is also available off-line through the development of the programme on a pen drive. In addition the extensive use of “hard” satellite images allowed the analysis of trends in vegetation greenness to a detail that had not been undertaken till then (GLADA). The GLADA results are also available on-line and contain several GByte of information.

At the onset of the project no unique approach existed to assess land degradation at a (sub)national level. Most of the existing studies relied on a generalization of the USLE approach which is limited to potential risks for erosion by water, or on a national/regional application of GLASOD principles suffering from the same disadvantages of the GLASOD global methodology. At the end of the project a double pronged approach was developed, based partly on the analysis of high resolution satellite data and national datasets on the one hand, and on the use of a participatory sub-national assessment on the other. This approach allowed consistent mapping not only of the land degradation in all its DPSIR aspects but also an approach to inventory and map sustainable land management interventions. This methodology is now requested by many countries as the most comprehensive way forward to:

- (1) Obtain a reliable picture of the state of natural resources and their use in the country.
- (2) Prepare the way to establish a monitoring system on land use, land degradation and land management.

- (3) Prepare the way and identify areas of greatest interest for more local and detailed assessments and interventions
- (4) Involve the technical and scientific community in the national assessment, so to obtain a widely accepted product
- (5) Use the results to inform decision makers on the wisest uses of natural resources, in particular land and water.
- (6) Obtain a solid basis to report to the different UN conventions in particular UNCCD, CBD and UNFCCC.

Outputs for the six LADA countries are available on the LADA website.

At the local level at the start of the project there were many methodologies and a plethora of punctual case studies. Monitoring of single parameters such as organic carbon was not widespread and international initiatives such as the EU forest soil assessment used methods which were highly expensive. The LADA project developed a comprehensive and systematic toolbox approach and methodology that allowed a focus both on socio-economic drivers of land degradation as on the biophysical characterization of the process. The methods developed, particularly the visual soil assessment were relatively cheap and easy to apply in the field also by land users, making them tools of choice for monitoring purposes.

Throughout the three levels of assessment the land use system and the DPSIR framework are used as the common denominator to link global with local over national results and vice versa. The combined outputs are a set of manuals and guidelines that complement each other. One or more versions of the national and local guidelines have been translated in several languages.

A single volume summarizing the approach is also available.

These guidelines, manuals and associated brochures have been widely distributed in international meetings and on the internet (to date, LADA documents have been downloaded more than 465,000 times from the website [four hundred and sixty-five thousand]). They were used as basic training material in national and regional workshops in several regions of the world.

The outcome was fully achieved at all levels.

3.2 Outcome 2: A map with information retrieved from the global/regional land degradation assessment in drylands, which will constitute a baseline of the status of land degradation in drylands, with an especial emphasis on areas at greatest risk.

This concerns activity 5 to 7 described above and was intended to focus originally on global and regional studies rather than on national ones and great confidence was placed in the NDVI

approach to identify areas of greatest risks. Early steering committee meetings refocused this outcome on global and national studies. After the extensive testing of NDVI approaches under GLADA it was concluded that the outcome in terms of identifying hot spots of land degradation was not an unequivocal success. Alternative and additional studies were undertaken under GLADIS that did indeed in a better way identify these critical areas. GLADIS is at this stage a comprehensive database and map that illustrates the complexity of ecosystem services decline which often involves trade-offs between environmental (soil, health, biomass, water resources and biodiversity) and socio economic services. These cannot be simplified to a single figure described as “land degradation”. Impact of declining ecosystem services was also estimated taking into account population pressures and poverty. At the same time the national approach was intensified compared to the original provisions and comprehensive national studies were undertaken in each of the LADA countries. Database and maps were produced that illustrate the critical areas at sub-national level in each country and at the same time inventory and map the applied sustainable management practices.

Results of the global NDVI analysis were also checked at country level but did not prove promising, as most critical areas were typically located in tropical and boreal forests rather than in drylands. Drylands were generally showing an improving land status trend with this method. Further refinement of the NDVI methodology allowed to qualify this answer but still did not yield satisfactory critical areas according to the expert opinion in the countries concerned. This is not completely surprising as NDVI captures information mainly on vegetation and biomass trends which may vary or show trends due to factors not necessarily related to land degradation.

The outcome was achieved, with modifications.

3.3 *Outcome 3: Detailed local assessments and analysis of land degradation and its impact in the pilot countries.*

Four international workshops were held to train experts in each of the LADA countries in methods and approaches to local assessment. Within each country further training took place (training of trainers), so that more than one thousand persons have been trained in the six countries. Based on this capacity building 23 local assessments have been carried out that resulted in important local databases on biophysical and socio-economic provisions in each of the countries. Reports on the status of land degradation and SLM in the various areas investigated were produced.

Analysis of the results were included in the reports in terms of historical reasons and more direct pressures that led to the land situation as it is today. A case study was made in Senegal, where mathematical and statistical studies were undertaken in order to illustrate the links between pressures/drivers and land status in a more rigorous fashion. Impacts have been described in terms of ecosystem services and human livelihood. Present and potential responses have been identified.

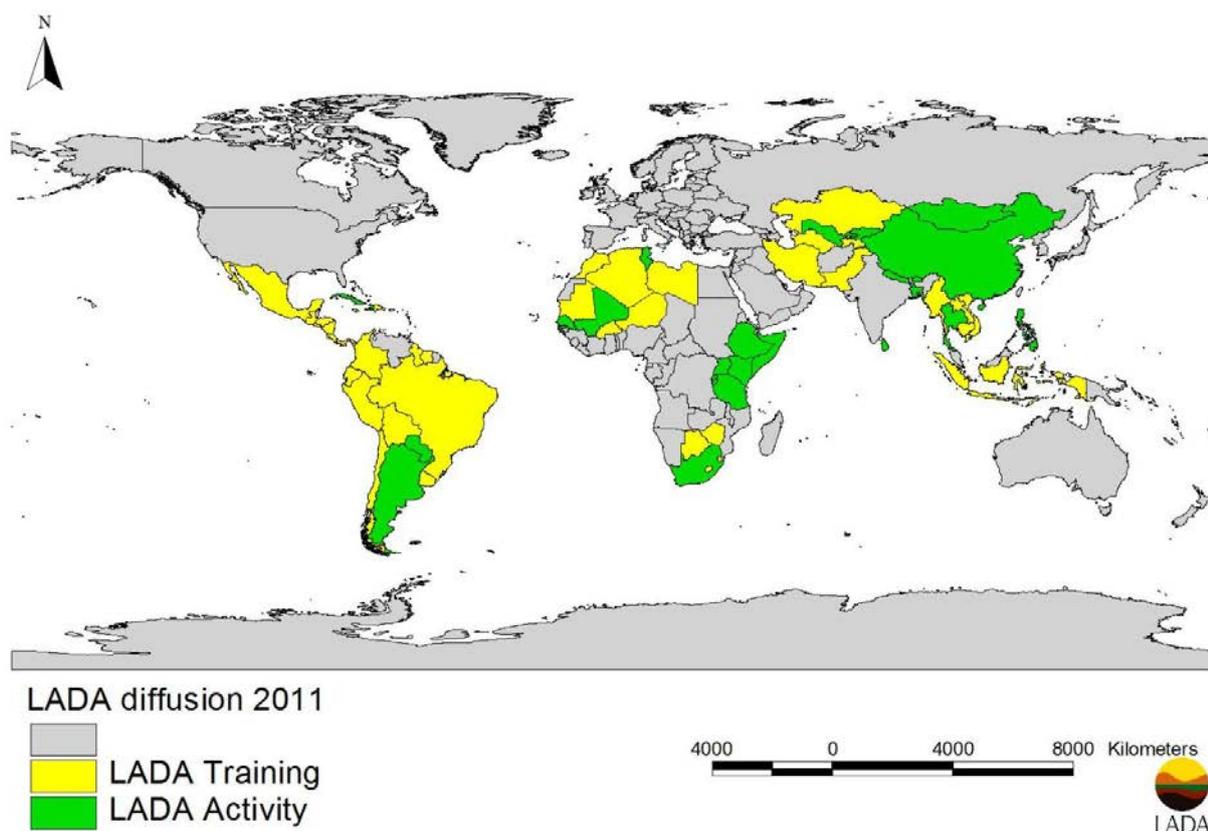
The national staff of the pilot countries used their expertise and case studies to prepare a training course for other countries in their respective regions. This resulted in an higher number of people trained and countries exposed in LADA methodologies, particularly at national and local level.

The outcome was achieved and all local assessments were undertaken and reported upon. An important amount of capacity building was delivered.

3.4 *Outcome 4: Dissemination and scaling-up, conclusions and recommendations for further action.*

The original outcome concentrated on producing a global action plan, but in parallel with the renewed emphasis on national level analysis this was changed following the project's Mid Term Evaluation to a scaling up exercise within countries and on a regional basis. This was agreed upon in the Steering Committee meeting in June 2009.. The analysis by the VU Amsterdam using national and local assessment results and the SWOT analysis undertaken are a sound basis to upscale some of the results achieved under the project. The long term interaction with UNCCD and its CST during the whole lifetime of the project has also paved the way for a more extended way of involvement, in line with the strategy to monitor impact indicators during the next years, on the basis of the recommendation accepted by COP9 which recognizes the project as one to be consulted in the first place for such an undertaking to take place (Decisions 17 and 19, COP9).

Regional workshops reached more than 40 additional countries, including the Central Asian countries within the CACILM and PALM programs; the Caribbean small island countries in two regional workshops, the Southeast Asian countries through a joint initiative from the Department of Land Development in Thailand and FAO with assistance of the China LADA team, plus the countries reached by each LADA pilot country in their regional training activities. To date, at least 27 countries have applied LADA tools under various arrangements. The following map shows the outreach of LADA at the time of reporting.



On the other hand it should also be recognized that a full adoption/institutionalization of the LADA methods and approaches by the core LADA countries within the lifetime of the project was not a realistic objective. Nonetheless, several LADA pilot countries have introduced to various extent LADA tools and concepts within their national land degradation control processes.

MEETINGS

2006	
Panama, 16-23/07/06	Latin American and Caribbean Regional Conference of Parties of the UNCCD
Tunis, 18-23 June 2006	Year of Desert meeting UNESCO
Cape Town 28-31/08	GEF council: LADA launch
Havana October	LADA National Workshop on national assessment
Hammamet 14-15 November 2006	LADA launching workshop
Alma Ata 15-16/11/06	Regional CACILM task force meeting
Mexico	National Dryland meeting
Rome, 28/11- 1/12/06	LADA Project Steering Committee Meeting and Technical Workshop
Algiers 16-20 December 2006	Joint International Conference: Desertification and the International Policy Imperative
2007	
Rome, January 2007	GEF meeting
Beijing 23-25/01/07	LADA National inception meeting
Pretoria, 13-14/03/07	LADA stakeholder launching workshop
Buenos Aires, 28-30/03/07	LADA stakeholder launching workshop

Havana, 26-27 April 2007	LADA Second national workshop
Norwich, 4-8 June 2007	LADA local level assessment workshop
Palermo, 26-30 June 2007	Congress of the European Society for Soil Conservation
Tashkent, 1-5 July 2007	Inception workshop of the CACILM programme
Bern, 4-6 July 2007	WOCAT/LADA/DESIRE on finalization manual of national land degradation mapping
Reykjavik 28/8-3/09 NOT LADA FUNDED	International Forum on Soils, Society and Global Change, Selfoss
Wageningen, 26-28 September 2007	LADA-ISRIC meeting
Tunis, 28-30 October 2007	LADA indicator meeting launching workshop
Pretoria, 15-19 October 2007	WOCAT workshop on national mapping of LADA and land improvement
Bohol Island (Philippines) 13-17/11	WOCAT Workshop
Bishkek, 29/10-4/11	Regional CACILM Steering Committee meeting
Beja, 18-30/11/07	LADA Local Assessment Workshop
Bridgetown 8-12/10	Regional Workshop on Land Degradation Assessment Methodologies in the Caribbean
Tunis, 28-30 October 2007	LADA-Desertlinks indicators workshop
2008	
Bonn 29-30 January 2008	KM project meeting
Rome, 28-29 Jan. 2008	LADA/DE SURVEY Technical meeting - Global and Regional NDVI based analysis
Bariloche, Argentina, 2-9 February 2008	LADA workshop on local assessment
Havana, 10-16 February 2008	LADA Training workshop
Beijing 13-19/04	LADA National Workshop
Washington 6 May 2008	GEF meeting LADA and SLM.
Argentina May 2008	LADA workshop on national assessment
Tunis 25-29 May	LADA/Desertlink 2nd indicator workshop
Hammamet 13-18 July	LADA: national assessment workshop
Pretoria, 16-18/09/08	LADA:National Land Degradation Assessment meeting
Bari 18-22/09/08	5th International Conference on Land Degradation
Inner Mongolia 10-15/10/2008	LADA Local assessment workshop
Istanbul, 7/11/08	LADA Steering Committee Meeting of the project. LADA side event at CRIC meeting
Ispra 2-5/12	Participation in the First meeting on Desertification Atlas
Marsa Matrouh (Egypt) 14-16 December	Training workshop for N. Africa and M. East countries
2009	
Wageningen, 14-16 January 2009	LADA-ISRIC meeting
Mendoza, 26-31/01/09	LADA Local Assessment Workshop
Bonn 3-5/03	UN-CCD: 4th Meeting of the Bureau of the CST
Bonn 25-26 May	UN-CCD: 5th Meeting of the Bureau of the CST
Bonn, 1-3 July	UN-CCD: preparation scientific conference COP-9.
Kenya, 7-9/04/09	LADA International Meeting Global Assessment
Bangkok, 25-29/04/2009	LADA/FAO/DLD training workshop for Southeast Asia
Tunis, 7-18/06/09	LADA local assessment workshop
Dakar, 9-20/06/09	LADA/GLCN workshop on LU change and land degradation map
Godollo, 28-30/07/09	FAO/EU: Soil Summer School Meeting
Buenos Aires, 20-26/09/09	UNCCD-CST and LADA Steering Committee
Cuba 11-25 October 2009	LADA training workshop national assessment
Morocco, 12-20/10/09	WOCAT Workshop and Steering Meeting
St Lucia 16-20/11/09	Caribbean investment workshop
Alghero, 24-27/11/09	LADA workshop on integrating country specific indicators in LADA indicators sets and updating DIS4LADA. SWOT analysis training

2010	
Washington, 13-17/01/2010	GEF monitoring/GIS meeting
Tunis 24-30/01/10	LADA local training workshop
Rome 16/02/2010	WOCAT/LADA workshop
Cuba February 2010	LADA: local training workshop
Jujuy, Argentina, 8-12 March 2010	National indicators workshop
Buenos Aires May 2010	LADA workshop in preparation of regional training
Mendoza, 7-18 June 2010	LADA Regional Training Workshop.
Tunis, 5-7 July 2010	LADA institutionalization workshop
Tunis, 19-23 July 2010	LADA summary review workshop
Beijing, 19-24/07/2010	LADA final national workshop.
Brisbane, 31/7 - 7/08/2010	19th World congress of Soil Science: LADA Poster.
Pretoria, 1-7/08/2010	LADA Regional Training Workshop.
Namibia, 1-3/09/2010	FANRPAN 2010 Regional Policy Dialogue
Wageningen/Amsterdam, 6-14/09/10	LADA: International Meeting/Scientific Committee
Tunis, 20-30 September 2010	LADA training and final national workshop
Bonn, 20-22 September 2010	LADA-UNCCD meeting
Dakar, 3-10 October 2010	LADA final national workshop
Rome, 6-8 December 2010	LADA international workshop and Steering Committee
Bonn, 16-17 December 2010	UNCCD workshop on impact indicators
2011	
Bonn, 16-24 January 2011	UNCCD CRIC meeting
Bariloche, Argentina, 18-19 January 2011	LADA national meeting
Beijing/Inner Mongolia, China, 10-16 April 2011	Asia regional training workshop

4. DEGREE OF ACHIEVEMENT OF THE OBJECTIVES/RESULTS

More was achieved than expected for the methodological output as a whole, while some weakness remains in the institutionalization process of the outcome. On the other hand, the project's up-scaling reached many more countries than foreseen.

Global assessment data and information system (GLADIS): the project produced an on-line information database on land degradation that is unique and very rich in information both NDVI and Land Cover-based, as on global land degradation phenomena and their impact.

National assessments processes and reports: The national assessment process provided the basis for the participation of national stakeholders, while the national assessment reports were the foundation of the local assessments. Without the national processes there would not have been the same country ownership and commitment within the LADA countries.

Local Assessments and reports: the LADA project provided training to a large number of individuals in local assessment methods including biophysical and socio-economic dimensions and developed a comprehensive manual in a participatory way. The knowledge gained was demonstrated and reported upon in more than 20 sites in every region of the world.

Capacity Building: The 6 LADA countries benefited from training courses within their country and internationally reaching more than one thousand national experts. Up-scaling of project methodologies in Regional LADA training workshops reached a further 120 experts from more than 40 countries.

Best practices: a significant amount of information has been built up of agronomic and other interventions that have proven their worth to enhance productivity as well as environmental protection. This achievement complements the work of WOCAT.

Indicators: the project in close cooperation with the UNCCD, CST and the 1st Scientific Conference developed examples of how LADA global and national assessments could provide ways and means to derive indicators required by the UNCCD process. An important repository of indicators was established in close cooperation with the DESERTLINK project. This achievements will be of much use for future monitoring of impacts of desertification.

Advocacy: the LADA project has been highly successful through its central and national websites to provide information that has reached a wide audience (465,000

downloads of documents) . In addition press releases, brochures, participation in side events and peer reviewed articles have raised the interest in the project.

5. CONCLUSIONS

The following are the main lessons learned from the implementation of the LADA project:

- (1) The process of project approval is considerably hampered by different rules and regulations in different UN agencies. This results in unacceptable delays (e.g. a 2 year gap between the PDF B phase and the full project) in the approval of the project but also in a more than cumbersome way to deal with budgets and audits.
- (2) Operationally dealing with six very different countries with very different internal rules stretched the capability of the project to deal efficiently with each country in the same way. Some of the contractual arrangements should have been more carefully considered beforehand. Overall this went smoothly in the project, in part thanks to understanding by the partner countries and the flexibility of the implementing and executing agencies.
- (3) The flexibility to deal with new developments that lead to enhanced outputs during the lifetime of the project that are more time & resource consuming should be duly compensated for. In the present arrangement the cost of these additional outputs had to be absorbed by the executing agency.
- (4) Land Degradation remains and will remain a controversial issue as long as there is no general agreement on its definition, while its economic impact cannot easily be estimated as long as there are no agreements on the value of environmental services.
- (5) Land degradation cannot be properly assessed without taking into consideration the trade-offs, that is the choices among different ecosystem services that are made by the actors managing the land. Particularly at national and local level, they can explain the motivations that lay behind land degradation, providing those insights needed for the identification of remedial actions.
- (6) Methods and approaches developed under this project deserve a wider and more systematic application to streamline assessments and reporting on land degradation and sustainable land management.
- (7) Land degradation assessment should be considered part of the broader assessment of natural resources, which in turn should be seen as the basis for land use planning, rural development and sustainable land management.
- (8) The linkages between land degradation, biodiversity and climate change need to be highlighted, not only in scientific terms but also in the perception of the users.

6. RECOMMENDATIONS

6.1 Recommendations to improve effect and impact of similar projects in the future

Donors could have been associated more closely to project activities and meetings throughout the project lifetime. Peer reviewed articles documenting achievements of the project should have been prepared more frequently. A more modern communication system may have strengthened the collaboration between countries and with the central unit.

MAJOR ITEMS OF EQUIPMENT PROVIDED

LADA - Equipment Purchases (as of 22/09/2010)		
Country	Description	USD
Argentina	PC equipment (WEB computación)	1,357.17
Argentina	invoice 3914 (Casa Goñi)	533.97
Argentina	invoice 4602 and 4605 (Sony Argentina)	411.37
Argentina	PC equipment as per invoice 4134 (Packard Computación)	1,209.48
Argentina	invoice 49152 (COMERCIAL SUMA SRL)	2,126.71
Argentina	Material (Note Sell srl)	1,948.91
Argentina	Material for pilot site (AXIS srl)	1,846.61
Argentina	Material for pilot site (XP Dynamic srl)	2,224.21
Argentina	notebook for pilot site Chubut-Proy	1,555.12
Argentina	notebook for pilot site Puna	2,210.70
Argentina	Meteorological station – pilot site Esquel P	3,303.49
Argentina	Equipment for Bariloche (Cavadevices com)	2,165.87
Argentina	Equipment for Bariloche (Multiservice)	560.90
Argentina	Material for pilot site Iadiza	2,395.95
Argentina	Workstation UBA	2,043.44
Argentina	UBA workstation	2,778.88
Argentina	Material (Novadata S.A)	1,270.95
Argentina	Material set up Iadiza	245.11
Argentina	PC material	3,275.89
Argentina	material (Mercobras)	722.15
Argentina	GPS	811.67
Argentina	material (Cavadevices)	995.28
Argentina	Material (Instrumentos del Sur)	1,400.00

Argentina	Material (Mercobras)	2,275.26
Argentina	Material (J.M Rojo)	547.01
Argentina	Material (Instrumentación Científica)	1,149.43
Argentina	Material (Runco S.A)	1,280.42
Argentina	hard disk	121.45
Argentina	Field equipment	410.77
China	laptops/desktops	25,513.20
China	Camera/GPS	12,175.95
Cuba	Field equipment	1,653.58
Senegal	Suunto Tandem 360 PC/360 R Zone 3 Clinometer and compass combination	372.48
Senegal	Garmin eTrex H GPS	157.05
Senegal	Freight and handling expenses	163.19
Senegal	Suunto Tandem 360PC /360R Zone 3 Clinometer and compass combination	60.15
Senegal	Garmin eTrex H GPS	25.36
Senegal	Freight and handling charges	26.35
Senegal	Large Soil pH kit	27.28
Senegal	Freight	35.28
Senegal	EC waterproof tester	131.00
Senegal	Freight	90.00
Senegal	Pocket colorimeter II 550NM	726.00
Senegal	Freight	181.00
South Africa	Sharp W/proof cond. tester	86.08
South Africa	PC	2,304.69
South Africa	PC accessories	56.31
South Africa	PC accessories	416.20
South Africa	Projector and notebook	1,430.13
South Africa	PC, 2GB DDR3	10,350.84

Tunisia	Laptop, printer and flash disk	1,813.01
HQ	License Adobe Acrobat v9 in English for windows	287.31
HQ	DVD set up (Adobe Acrobat)	48.81
HQ	External drive Iomega eGo	100.42
HQ	External drive Iomega eGo	0.85
HQ	DVD set up (Adobe Acrobat=	0.42
HQ	License Adobe Acrobat v9 in English for windows	2.42
HQ	Poster stand(s)	82.08

DOCUMENTS PREPARED DURING THE PROJECT

Technical reports and manuals

[TR24 - LADA Methodology and Results](#)

[TR23 - An update of GLADA - Global Assessment of Land Degradation and Improvement](#)

[TR22 - Best practices in the 6 LADA countries](#)

[TR21 - GIS-procedures for mapping SOTER landform for the LADA partner countries](#)

[TR20 - Soil and landform properties for LADA partner countries](#)

[TR19 - Review of the national assessment methodology in LADA - the case of Senegal](#)

[TR18 - Mapping Device - Change Analysis Tool \(MAD CAT\) LADA - Tutorial](#)

[TR16 - Guidelines for using LADA for assessing UNCCD minimum set of indicators - beta version](#)

[TR15 - Guidelines to the LADA indicators database](#)

[TR14 - Compilation of selected global indicators of Land Degradation](#)

[TR13 - Socio-economic Indicators for Causes and Consequences of Land Degradation](#)

[TR12 -GLADA Report 5 - Global Assessment of Land Degradation and Improvement 1. Identification by remote sensing](#)

[TR11_2 - French - Manuel d'évaluation locale de la dégradation des terres \(LADA-L\) Annexe V1.2](#)

Ancienne version du manuel. Un nouveau manuel est en cours de préparation, la version en anglais est toutefois disponible [ici](#).

[TR11_2 - English - LADA manual for local level assessment - part 2 - toolbox - V2.0](#)

[TR11_1 - French - Manuel d'évaluation locale de la dégradation des terres \(LADA-L\) V1.2](#)

Ancienne version du manuel. Un nouveau manuel est en cours de préparation, la version en anglais est toutefois disponible [ici](#).

[TR11_1 - English - LADA manual for local level assessment - part 1 - methodology - V2.0](#)

[TR11 - Spanish - Manual de Evaluación Local de la Degradación de Tierras Áridas - V1.0](#)

Versión anterior del manual. La nueva version está lista en [Inglés](#), la traducción en Español está en preparación.

[TR11 - Chinese - LADA manual for local level assessment - V1.0](#)

[TR10 - SOTER landform report](#)

[TR09 - Manuel sur l'évaluation de la dégradation des terres au niveau national \(Version 0.9\)](#)

[TR09 - Manual para la evaluación de la Degradación de las Tierras al nivel nacional \(Version 0.9\)](#)

[TR09 - Manual for the assessment of National level land degradation, in Russian \(Version 0.9\)](#)

[TR09 - Manual for the assessment of national level land degradation, in Arabic \(Version 1.0\)](#)

Thanks to the LADA team in Tunisia and Magdoline Fedail for the translation in Arabic.

[TR09 - Manual for the assessment of national level land degradation \(Version 1.0\), in Vietnamese](#)

[TR09 - Manual for the assessment of national level land degradation \(Version 1.0\)](#)

[TR08 - Mapping LU Systems at global and regional scales for Land Degradation Assessment analysis V1.1](#)

[TR08 - Mapping LU Systems at global and regional scales for Land Degradation Assesment, in Russian](#)

[TR07 - Kenya land cover change](#)

[TR06 - NDVI Kenya pilot study](#)

[TR05 - Biophysical indicators toolbox](#)

[TR04 - Results of the Second Worldwide User Survey of LADA project May, June 2009](#)

[TR04 - A worldwide survey for the LADA virtual centre](#)

[TR03 - Where the land is greener](#)

[TR02 - NDVI China pilot study](#)

[TR01-Framework for characterization and mapping of land use](#)

Argentina reports

[Evaluacion de la desertification en Argentina - Resultados del proyecto LADA/FAO](#)

[Taller Nacional sobre Metodologías de Evaluación Local](#)

[Sitio piloto Mendoza, Informe final, LADA local assessment. Año 2011](#)

[Sitio Piloto Ingeniero Jacobacci, Bariloche LADA local assessment Año 2011](#)

[Region Patagonia Sitio Piloto Jacobacci Estacion Experimental Agropecuaria INTA Bariloche Año 2011](#)

[Publicación sobre la degradación de la tierra en Argentina para decisores politicos](#)

[Protocolo de validacion de LUS](#)

[Programa del Curso Regional de capacitación LADA](#)

[PDF-B Informe LADA Argentina](#)

[Memorias del Taller Puna sobre indicadores](#)

[Memorias del taller Barilochee - 18 y 19 de Enero de 2011](#)

[INFORME FINAL Región Patagonia Sitio Piloto Cushamen](#)

[Informe final evaluación nacional](#)

[Informe final de la Ejecución de las Cartas Acuerdo N° 1 Escala local](#)

[Informe de buenas practicas LADA Argentina](#)

[Informe de Avance Escala local. Arg. Abril 08](#)

[Evaluacion a escala local Region Valles aridos Argentina Año 2010](#)

[Evaluacion a escala local Region Valles aridos Año 2011](#)

[Evaluacion a escala local Region Puna Argentina](#)

[Evaluacion a escala local Region Patagonia sitio piloto Cushamen Argentina](#)

[Evaluacion a escala local Region centro oeste sitio piloto Mendoza Año 2010](#)

[Degradación de la Tierra en zonas secas e identificación de prácticas de manejo sustentable en Arge.](#)

[Best practices - Argentina](#)

Cuba reports

[Taller nacional de insercion al proyecto LADA](#)

[Sistema de registros de Buenas Practicas](#)

[Relattoria LADA cuba Octubre 2009](#)

[Relatoria Taller 11 al 15 de febrero del 2008](#)

[Relatoria sobre Taller de inicio del proyecto LADA a Cuba](#)

[Relatoria Seminario sobre aplicacion de metodologias de monitoreo y evaluacion de la degradacion](#)

[Relatoria del taller de evaluacion del proyecto LADA April 2010](#)

[Relatoría del proceso de levantamiento de Buenas Prácticas Agrícolas para el Manejo Sost. de Tierras](#)

[Relatoria del proceso de levantamiento de Buenas Prácticas Agrícolas para el Manejo Sost. de Tierras](#)

[Proyecto LADA CUBA](#)

[Procesamiento y analisis de imagenes de radar para LADA cuba land cover](#)

[Mapas temáticos para la evaluación de la degradación de la tierra a escala nacional, Cuba](#)

[LADA Cuba Evaluacion de la Degradacion de las Tierras Secas Relatoria Taller 13 al 16 de octubre 09](#)

[Informe tecnico final LADA Cuba](#)

[Informe final de las evaluaciones locales del proyecto LADA en Cuba](#)

[Informe evaluacion nacional de la degradacion de las tierras a parti del SIGQM](#)

[Evaluación de la Degradación de tierras secas Área Piloto Cuba \(LADA Cuba\)](#)

[Evaluacion de la degradación de tierras en zonas aridas Informe de linea base](#)

[Centro de Capacitacion sub Regional para Mesoamerica y el Caribe](#)

[Best practices - Cuba](#)

[Annexes del informe final de las evaluaciones del proyecto LADA en Cuba](#)

China reports

[Sustainable land management Technologies QT, China](#)

[Sustainable land management Approaches QA, China](#)

[Summary report of the LADA project training workshop for Asian countries](#)

[SLM best practices report of China](#)

[Report on Training Workshop on LADA July 20-25th, 2009, Inner Mongolia, China](#)

[Report on Land Degradation Assessment of Ulan'aodu in Wengniute Banner, Inner Mongolia, China](#)

[Report of Land Degradation Assessment in Yanchi Geography Assessment Area](#)

[Report of Land Degradation Assessment in Lindian Assessment Area in China](#)

[Policy report \(in Chinese\)](#)

[Methodology of a Visual Soil - Field assessment tool to support and enhance the LADA program](#)

[List of Participants in China LADA Local Assessment Training Workshop](#)

[Land Use Systems of China](#)

[Land Degradation Assessment Report of Zhenglan Geographic Assessment Area Northwest](#)

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[Final Report on China LADA Project Local Assessment Training Workshop](#)

[Final Report of Land Degradation Assessment in Minqin](#)

[Final Report of Land Degradation Assessment in GAA of Xiaobazi, Fengning](#)

[China National Level Report of Land Degradation Assessment in Drylands](#)

[China LADA Project Policy Report](#)

[China assessment report on GLADIS beta](#)

[Assessment on land degradation of Wengniute geographic assessment area](#)

[Agenda of China LADA Local Assessment Training Workshop](#)

Senegal reports

[Recueil d'expériences de gestion durable des Terres au Senegal](#)

[Rapport final de l'évaluation nationale de la dégradation des terres, Senegal](#)

[Rapport final de l'atelier de formation sur les outils et méthodes de LADA](#)

[National Land Degradation Assessment analysis for Senegal](#)

[LUS Préparation du guide pour la stratification - Rapport intérimaire 3 09](#)

[LUS Préparation du guide pour la stratification - Rapport intérimaire 2](#)

[LUS Préparation du guide pour la stratification - Rapport intérimaire 1](#)

[Local Land Degradation Assessment analysis for Senegal](#)

[LADA-Local A local level land degradation assessment approach and a case study of its use in Senegal](#)

[Final workshop report - Senegal](#)

[Evaluation locale de la dégradation des terres, zone d'étude de Touba Ndar fall \(g.a.a. de Barkedji\)](#)

[Evaluation locale de la dégradation des terres, zone d'étude de Diabal Niakha \(g.a.a. de Barkedji\)](#)

[Evaluation locale de la dégradation des terres, Rapport zone d'étude de Diagaly \(g.a.a. de Barkeji\)](#)

[Draft Land Cover Change Study of Senegal](#)

[Best practices - Senegal](#)

South Africa reports

[Final Report: LADA/UNCCD Pilot Impact Indicator Tracking Exercise](#)

[Training manual for the assessment of LD and SLM based on the LADA/WOCAT mapping methodology \(QM\)](#)

[South African national land-cover change report](#)

[South Africa National progress report - Feb 2009](#)

[South Africa best practices report](#)

[Mapping Land Use Systems at National Scale for Land Degradation Assessment Analysis in South Africa](#)

[Local Level Land Degradation Assessment on commercial farms in Winterton, Kwa-Zulu Natal Province](#)

[Local Level Land Degradation Assessment in the Mphanama Village](#)

[Local Level Land Degradation Assessment in Mankotsana, Sekhukhukne](#)

[Local Level Land Degradation Assessment in the Ga-Kgatla Village](#)

[Local Level Land Degradation Assessment in the Emmaus area, Kwa-Zulu Natal Province](#)

[LADA UNCCD Indicator Testing – National Inception Workshop Report 26 July 2011](#)

[LADA policy report](#)

[GLADA verification in South Africa](#)

[Best practices - South Africa](#)

Tunisia reports

[SWOT - Analyse stratégique en vue de l'adoption/mise en œuvre de l'approche et méthodologie LADA](#)

[Recommandations de l'atelier de clôture LADA Nov2010](#)

[Réalisation d'une carte d'utilisation des terres \(LUS\) de la Tunisie](#)

[Rapport Final Atelier LADA Juillet 2010](#)

[Rapport de politique nationale](#)

[Rapport de l'Evaluation Nationale - QM WOCAT](#)

[Pour une évaluation de la dégradation des terres en Tunisie - Nov2006.pdf](#)

[Land cover change analysis LADA Tunisia](#)

[LADA Evaluation locale – Siliana](#)

[LADA Evaluation locale – Mednine](#)

[LADA Evaluation locale – Kasserine](#)

[LADA - dégradation des terres en Tunisie - Cadre institutionnel et législatifs. Etat des connaissances](#)

[Identification des indicateurs de suivi et d'évaluation de la dégradation des terres en Tunisie](#)

[Bonnes pratiques Tunisie aout 2010.pdf](#)

[Best practices - Tunisia](#)

[10. Rapport de l'atelier de formation régional](#)

Working papers

[Local land degradation assessment, soil conservation and nutrient balances in Senegal - draft](#)

[Guidelines for the identification, selection and description of nationally based indicators of LD](#)

[GLADIS manual 1.0](#)

[Conceptualisation d'un système d'indicateurs](#)