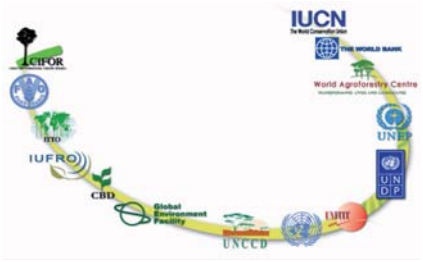

CASE STUDIES ON MEASURING AND ASSESSING FOREST DEGRADATION

"LADA-LOCAL" A LOCAL LEVEL LAND DEGRADATION ASSESSMENT APPROACH AND A CASE STUDY OF ITS USE IN SENEGAL

SALLY BUNNING
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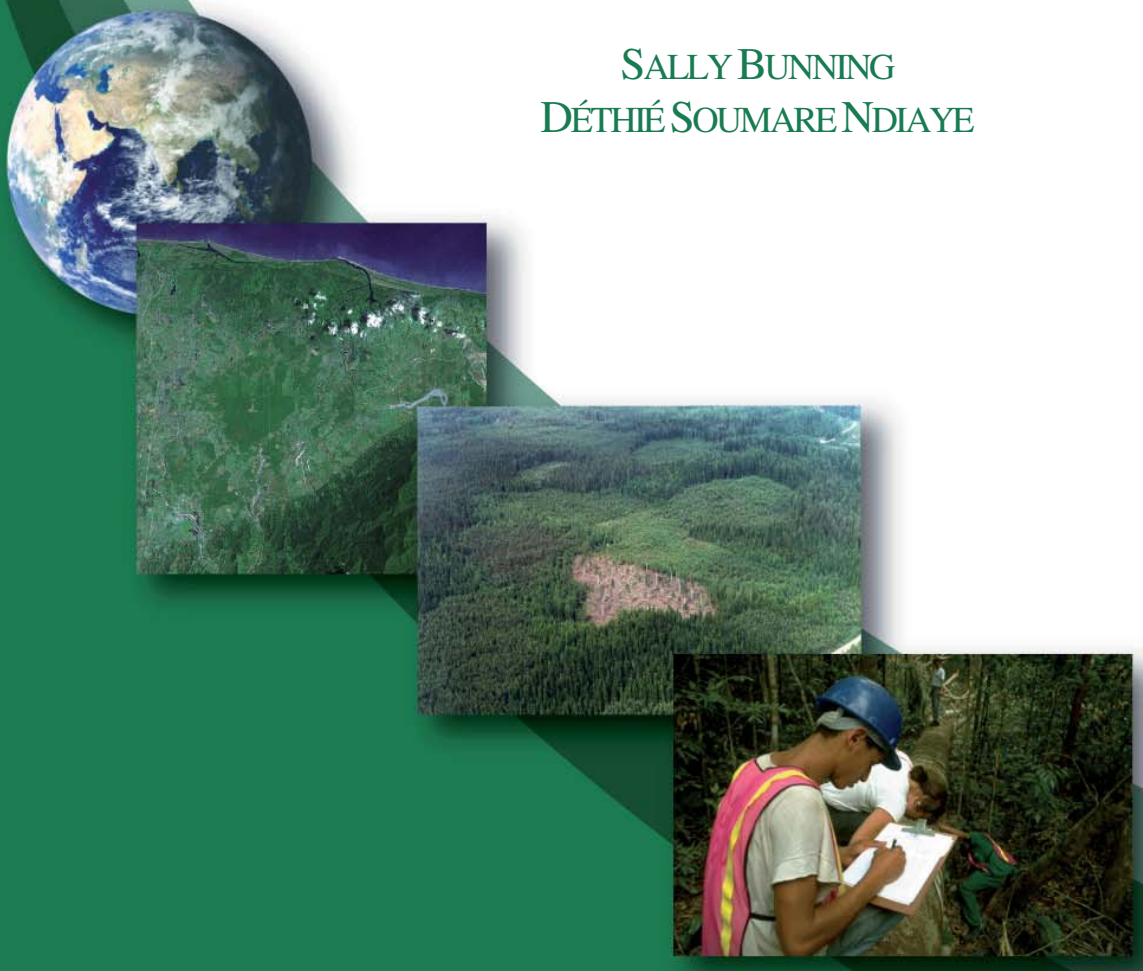

December, 2009

Sustainably managed forests have multiple environmental and socio-economic functions which are important at the global, national and local scales, and they play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

Under the umbrella of the Global Forest Resources Assessment 2010 (FRA 2010) and together with members of the Collaborative Partnership on Forests (CPF) and other partners, FAO has initiated a special study to identify the elements of forest degradation and the best practices for assessing them. The objectives of the initiative are to help strengthen the capacity of countries to assess, monitor and report on forest degradation by:

- Identifying specific elements and indicators of forest degradation and degraded forests;
- Classifying elements and harmonizing definitions;
- Identifying and describing existing and promising assessment methodologies;
- Developing assessment tools and guidelines

Expected outcomes and benefits of the initiative include:

- Better understanding of the concept and components of forest degradation;
- An analysis of definitions of forest degradation and associated terms;
- Guidelines and effective, cost-efficient tools and techniques to help assess and monitor forest degradation; and
- Enhanced ability to meet current and future reporting requirements on forest degradation.

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Food and Agriculture Organization of the United Nations

Forest Resources Assessment Working Paper

Case Studies on Measuring and Assessing Forest Degradation

"LADA-Local" A local level land degradation assessment approach and a case study of its use in Senegal

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December, 2009

ABSTRACT
The LADA-Local level land degradation assessment has been developed for use in drylands in all regions through a practical interactive process led by the FAO Land and Water Division (NRL), in close cooperation with institutions in 6 LADA countries - Argentina, China, Cuba, Senegal, South Africa and Tunisia. The process was supported by the Overseas Development Group, University of East Anglia, UK, and the Centre for Development and Environment, University of Berne - which hosts the World Overview of Conservation Approaches and Technologies (WOCAT). A set of guiding principles has been applied to provide a standardised, robust, but flexible assessment that integrates socioeconomic and biophysical considerations, and can be replicated quite consistently across dryland ecosystems and regions, and even across other ecosystems: LADA-Local assessment includes a participatory field assessment, with a multidisciplinary team of experts and land users, of degradation processes and effects of current and recent land use and management practices on: soil erosion and soil properties (including salinity, nutrient mining, the carbon cycle), water resources (notably quality, quantity and changes in the hydrological regime), vegetation (cover, quality and biomass) in grazing, forest and croplands. Attention is paid to both on- and off-site impacts of land degradation (LD) and the effectiveness of sustainable land management measures (SLM). The assessment includes interviews and discussions with land users and key informants to understand effects of LD/SLM on local peoples' livelihoods and on the range of ecosystem services - provisioning, ecological and socio-cultural. The approach and tools ensure the participation of the local land-users and decision makers to incorporate their knowledge and perceptions and to analyse the livelihood implications of LD and SLM. LADA Local methods and tools are being validated in each country through 3 or 4 local pilot assessments in a range of agro-ecological zones aiming to produce a set of methods and tools that can be applied beyond the drylands to most ecosystems and contexts. An example of the use of LADA local for assessing a SLM technology and strategy in Senegal is provided in Box 3.

Key words: land degradation; assessment; monitoring; local

1. Introduction

LADA Local - Local level Land Degradation Assessment aims to deliver a practical and integrated biophysical and socio-economic assessment of land degradation (LD), and improvement, its causes and impacts on the range of land resources, ecosystems and livelihoods.

The target audience includes Country Parties to the UN Convention on Desertification (UNCCD) and their institutions concerned with monitoring progress in achieving objectives and targets of the national action plans (NAP) and agricultural and environment strategies; and those working with communities to promote SLM and meet the Millennium Development Goals.

Despite the focus on drylands, the approach and tools are applicable for a wide range of ecosystems with minimal adaptation. Moreover, LADA-local tools are designed to identify the interactions between land degradation, loss of biodiversity and climate change impacts and to identify integrated response measures that not only combat degradation and promote SLM but also contribute to sustainable use of biodiversity and climate change adaptation and mitigation.

By linking the local with national level assessments through the characterisation and mapping of land use systems (LUS), the findings can be used to support informed decision making for scaling up of improved SLM interventions including action on the ground and policy and institutional support.

The LADA-Local manual is available on the Internet, www.fao.org/nr/lada in English (updated version), and a previous version in French, Spanish, Arabic and Russian. This will be updated based on experiences and then published at the end of 2010.

2. Materials and Methods

A set of guiding principles has been applied to provide a standardised but flexible assessment that can be replicated quite consistently across dryland ecosystems and regions, and even across other ecosystems.

The approach and tools ensure the participation of the local land-users and decision makers to incorporate their knowledge and perceptions and to analyse the livelihood implications of LD and SLM.

- Land users are key informants on the history and reasons for land uses and management practices and are also the ones who should benefit from improved understanding of why degradation is taking place and the identification of solutions - improved practices and required support.
- Local decision makers and stakeholders are involved to review effectiveness of past technical or policy measures and help identify adaptive responses.

A multi-disciplinary team of local experts (soil, water, crop, livestock, forestry, ecology and socio-economic) is trained to conduct the integrated assessment. The process is also expected to help catalyse more integrated land resources planning and interventions among institutions and sectors and with communities.

The methodology and core-set of tools are simple, robust and replicable, using Specific, Measurable, Achievable, Relevant and Time-bound indicators to assess the status and trends of soil, water and vegetation resources in relation to land uses, management practices and the typology of land-users.

- An important aspect is in evaluating the **impacts of human activities and land degradation processes and SLM measures on key ecosystem services (ES**), as applied in the Millennium Ecosystem Assessment. One of LADA's aims is to identify the wider effects of land degradation or its reversal - land improvement – in terms of the maintenance of global environmental benefits. A focus is thus placed on LD impacts on the provisioning services and key regulating and socio-economic services.
- Adequate accuracy and validity is ensured through combining a range of **field measurements and observations and information from land users and local informants** through interviews and discussions. The process of "triangulation" helps validate data and provides a broad, deep understanding of LD. Degraded areas are compared with protected or better managed areas in terms of the range of ecosystem goods and services provided and to understand LD and SLM implications on production capacity and the effectiveness of conservation and SLM measures.

- LADA-Local aims to be a **cost effective, efficient assessment approach** (time, equipment, funds, expertise). It is also **flexible -** additional tools can be used to assess specific conditions or issues identified (soil or water laboratory analysis, groundwater pollution, land tenure problems).
- The **sampling process** guides the selection of **study areas** (community territories, watersheds, areas representative of a given land use system (LUS) with specific LD issues to be investigated) within wider **geographical assessment areas** that are identified through the national LD assessment. Links with LUS enable the extrapolation of findings to some extent, from local to provincial and national scale.

The **LADA-Local Analytical Approach**, recognizing, the complexity of land degradation - human activity - poverty interactions, makes use of three analytical frameworks to assess impacts on livelihoods for the range of land users and on ecosystem services for each land use type: It helps to understand impacts of current or recent land uses and management practices on LD (in terms of whether land resources and ecosystems are actively degrading, stable, or improving, and the nature, extent and magnitude) and impacts on the functioning of the ecosystems and on human wellbeing. It also analyses institutional, economic and policy implications on land users' capacity and behaviour.

1. Using the **Pressure – State – Impact** analysis expert teams assess the various components of the land use system with the land users and build up a good understanding of the critical interrelations between the **driving forces** (in particular climate change, land conversion and pollution) and direct **pressures** that cause degrading land use practices, and the **environmental and socio-economic impacts.** In this way, the effectiveness of current measures and interventions in agriculture, natural resources and environment sectors can be evaluated and priority **Responses** that are within the reach of local populations and required support measures can be identified to prevent or mitigate LD and promote SLM.

2. An **Integrated Ecosystem Approach** improves understanding of the biophysical and socio-economic / human interactions that determine LD or land improvement using representative local sites. The LD/SLM impacts on Ecosystem Services are assessed including impacts on:

- **Provisioning services:** crop and livestock production (food, biomass for energy, fibre), other goods, risks of failure; water productivity, availability of land;
- **Ecological services:** notably the key **regulating services** of nutrient cycling, organic matter management/C sequestration, maintenance of the hydrological regime (flood, drought risk), and to some extent biodiversity conservation and climate change adaptation;
- **Socio-cultural services** notably those provided by the environment, in terms of livelihoods, vulnerability and risk aversion, for example, ecotourism, landscape value, conflict, food security. See Box 1.

To allow a reasonably rapid assessment less attention is paid to aspects requiring more social or environmental research, such as LD/SLM effects on: climate change regulation (GHG emissions); services that contribute to life support (soil formation, soil biological activity, pollination, predation of pests); and on health, education, cultural heritage values.

Box 2. Example of how to assess impacts on ES

Ecosystem Service	Status (-3 to +3)	Description
Productive services		
P1 animal/ plant quantity and quality	**++**	increased yield due to irrigation
P2 water for human, animal and plant use	**---**	river water extraction reduces flow and quality
P3 land availability (productive area/caput)	**+**	wetland developed for irrigation
Ecological-regulating & life support services		
Hydrological regime	**--**	downstream water shortage; risk of flash floods
Carbon cycle	**--**	C emissions from drained wetland
Species diversity	**--**	less cultivated spp /loss of wetland spp.
Sociocultural services		
Food security.	**+/-**	More food but poorer farmers not benefiting

Sustainable Livelihoods Analysis helps understand how different household livelihood systems interact with the natural, socio-economic and policy environment. For specific types of land users, it helps analyse the drivers of LD/SLM and impacts on their livelihoods and vulnerability. The socio-economic divisions such as wealth, gender, ethnicity and so forth determine the natural, physical, human, social and financial assets and influence LD/SLM. The context also determines the key drivers of LD/SLM as they affect the access people have to key assets and what they can do with them.

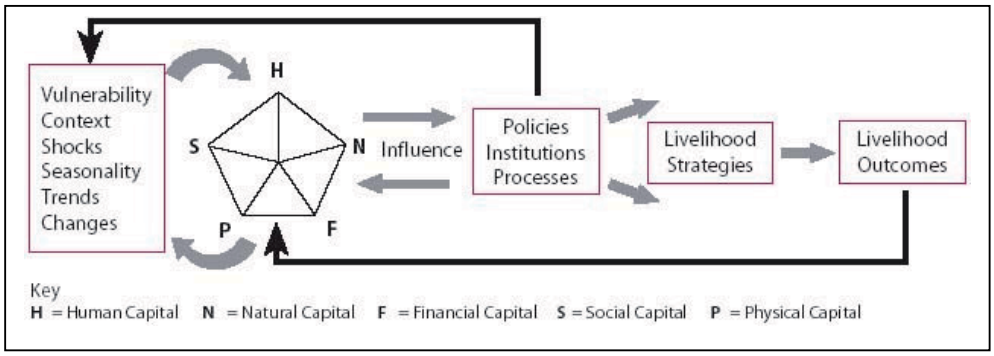


Figure 1. The Basic Livelihoods Framework (Source: Ellis & Allison, 2004) The livelihood strategies of individuals and households are shaped by their **asset base** (pentagon of Natural, Physical, Human, Social and Financial assets) and by their **vulnerability context** e.g. seasonality, trends and shocks that are beyond the household's control. (left) and the **policy and institutional context** (centre).

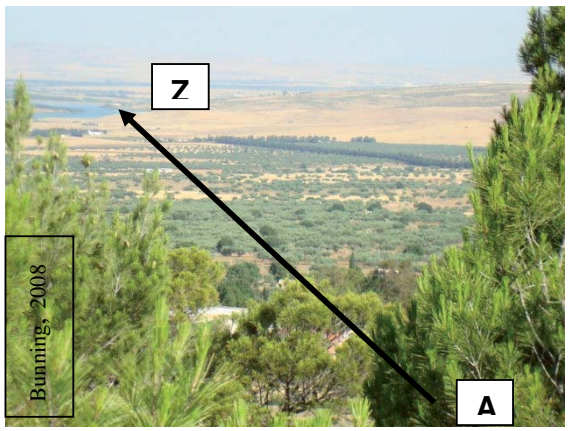
Particularly with poor land-users in marginal areas (common in the drylands) there are many factors relating to resource and market access, institutional and policy environment and the characteristics of poverty itself that influence the perspective land-users (male and female) have on their land resources. These factors can enhance or constrain their ability to practice sustainable land management, land degradation control or rehabilitation. Some assets that open up opportunities for people are: credit, education, labour, secure land tenure, rights to use natural resources (for example, harvesting fuelwood, road access to market). Access to assets is important; but also the ability to use the assets productively and sustainably which depend on the vulnerability and institutional context.

The livelihoods component of the local assessment improves understanding of how socio-economic, cultural and institutional factors influence land-users' views and management of their land resources. It helps analyse both the drivers and pressures leading to LD/SLM and the impacts of LD/SLM on people. Understanding these LD drivers helps to identify policy responses for the diverse land user groups.

LADA Local Tools for the Field Assessment

A set of tools has been developed and a stepwise approach for conducting the assessment:

1. CHARACTERISATION OF THE STUDY AREA: Six tools provide a reconnaissance of land use and LD issues in the selected study area and an understanding of how socio-economic and institutional factors influence land user's perception and management of land resources at farm/ community/ landscape level.



- The **Focus group discussion**, **Wealth ranking** and **Participatory mapping** with the community, guide the location and conduct of **Transects** (2 to 3 per study area) and **Rapid assessments of Soil erosion** and **Vegetation and Water resources degradation** in relation to land use with the land users. The findings provide a rational basis for location of sites and households for more detailed assessments.

Photo 1: Transect across the landscape from A- a forested mountain escarpment, across a range of land use types to Z -a dam (Tunisia)

2. DETAILED SITE ASSESSMENTS OF LAND DEGRADATION IMPACTS (Natural and Human induced)

For each land use type along the transect and at all sample sites qualitative visual indicators and simple field measurements are made comparing well managed and poorly managed land and assessing the following:

SOIL PROPERTIES - physical, biological, chemical - using the **VS-Fast Tool** and indicators to provide a comparable score of **soil health** including:

- soil surface & structure (cover, crusting, compaction, depth, water infiltration rate);
- soil organic matter, rooting, earthworms
- pH , salinity, plant nutrient deficiencies

➢**SOIL EROSION** - Is it Active, or Partially or Fully Stabilised?- What Erosion Type - raindrop splash, rill, gully, stream bank, or mass movement- and Severity (none, slight, moderate, severe)?

Optional measurements are used to estimate the volume of soil loss, where it is a critical issue.

Photo 2: Measuring extent of bare soil % and size & extent of rills/gullies Tunisia

Photo 3: Exposed roots in stony shallow soil under woody garrigue, Tunisia (Bunning, S. 2009)

Photo 4: Use of a line transect to assess species diversity and health Tunisia (Bunning, S.)

VEGETATION AND BIODIVERSITY are assessed in a $1m^2$ grid quadrat for herbaceous species or a 5, 10 or $20m^2$ plot in cropland and shrub/tree vegetation (depending on vegetation density):

- Protective cover (% of plant, litter, bare soil);
- Vegetation structure (% trees, shrubs, herbs)
- Plant vigour (height, diameter), biomass, regrowth;
- Habitat and species diversity: richness, abundance, useful /undesirable /invasive species and products;
- Productivity: crop, livestock, forestry, energy;
- Effectiveness of vegetative measures: wind breaks, reforestation, fire control.

This includes vegetation in forest land (See also Box 2), grazing lands as well as in croplands. The assessment of pasture condition and health uses an indicator scoring and gives an overall score. It is hoped to do the same for forest land.

WATER RESOURCES: Some key water indicators are assessed visually with land users (quality, use, access) but as the assessment is conducted at one moment in time information on seasonality and change in water resources is obtained from community /household discussions. A focus is placed on LD effects on water for human and livestock consumption and effective use of rainfall or irrigation due to management.
Indicators include:

- Rainfall (distribution, intensity, amount) and Climate variability and change;
- Water sources (types, number, size), water availability (seasonality) and quality;
- Water uses for human consumption, livestock, agriculture, industry;
- Water resources management (over a 10 year period) for example, water conservation and harvesting activities;
- Water policy and institutional aspects (water allocation, rights and conflicts).

Off site impacts of degradation are important to assess, in regard to water resources such as, flooding, sedimentation from runoff water or dust storms, salinity due to over-abstraction/irrigation, point contamination of water by housing or industry, upstream land use effects on resources downstream e.g., water recharge, loss of productive land.

Box 2. Drawing from the field protocol of FAO **Forest resources assessment (FRA),** condition and productivity of trees in woods, forests, crop and grazing lands can be assessed and compared with a benchmark site in good condition using the following indicators:

- Tree /shrub species: common or scientific names of all for few or the dominant tree spp. (3) and shrub spp.(3);
- Tree & shrub canopy covers: as %s of total ground area;
- Growth measurements of average height (m) and diameter at breast height (dbh in cm) for trees/stumps (dbh ≥ 20 cm in forests; dbh ≥ 10 cm in non-forest land; or at stump height (dsh) if <1.3m.);
- Overall tree condition: (good = no symptoms of disease /other effects on growth and vitality; to slightly or severely affected; dead/ dying = severe damage or fallen tree);
- Crown condition/health: (good = dense, no dieback; moderate, poor; to dying = sparse, high dieback; dead);
- Tree stem quality: to assess if it is straight and extent of damage (high: straight without visible damage; to medium: slight; or low: several defects or damage);
- Causes of damage are recorded, where land users know, (e.g. insect infestation; presence of fungus; burning; wild or domestic animals; human induced (for example, cuttings, bark damage, logging); extreme climatic events (for example, broken branches by wind, snow, lightning); other.

3. ASSESSING SLM TECHNOLOGIES AND APPROACHES

Where successful SLM practices are observed in the local study areas and elsewhere in the country the expert teams are encouraged to use the WOCAT questionnaires to evaluate and document SLM Technologies (QT) and Approaches (QA) and to upload the case studies in the WOCAT database to share the experiences more widely. The WOCAT questionnaires on soil and water conservation technologies and approaches have been adapted in collaboration with LADA and members of the WOCAT network to address a wider range of sustainable land management measures in croplands, grazing and pasture lands and to include effects on the productive, ecological and socio-cultural services provided by ecosystems. The questionnaires help in being more rigorous in the evaluation and carrying out additional research to collect valuable additional information for example on required inputs and costs, constraints to adoption and are increasingly of value for policy makers' efforts not only for land degradation but also for biodiversity conservation and sustainable use and climate change adaptation and mitigation. The case study in Box 3 shows a successful afforestation strategy and technology in Senegal, that was the subject of one of the LADA local study areas. The WOCAT questionnaires and database are available on the Internet www.wocat.org.

4. ASSESSING LAND DEGRADATION IMPACTS ON THE LIVELIHOODS OF LAND USERS is conducted using a range of tools, backed up by field data and secondary information, during the 2/3 weeks in the field to help build up a picture and understand impacts of LD/SLM on people and their livelihoods.

Box 3 CASE STUDY IN SENEGAL: Dune fixation with *Casuarina equisetifolia* (Filao)

Plantations of *Casuarina equisetifolia* (Filao), an exotic species, were established along a long stretch of the coast of Senegal from Dakar to St.Louis, during the period 1970s to late 1990s in order to halt wind erosion and the resulting movement of sand dunes. This reafforestation scheme "Bande de Filao", covers about 9,700 ha of land, on a strip some 200m wide; that was previously largely a desertified wasteland.

This sustainable land management (SLM) technology was employed in order to reduce wind speed and to stabilize sand dunes along the Senegalese coast which would as a consequence protect vegetable production in the interdunal depressions. A secondary objective was to build up wood resources that could at some point be used as firewood or even timber. There were four phases: i) Initial protection with an artificial windbreak and fascines; ii) Excavation of wells to allow for irrigation of Filao; seedlings iii) Production of seedlings in tree nurseries; iv) Establishment of plantations on a 2.5m square grid at the start of the rainy season.

It is both a vegetative and a structural measure aiming to prevent land degradation and rehabilitate and reclaim denuded land. It was introduced through an experimental research project Projet d'appui à l'entreprenariat paysan (PAEP), some 50 years ago. Inputs included: plastic bags and tree seedlings for the tree nursery, labour for planting and for a guard to protect the enclosure, wire fencing (385US$/ha) and transport costs to transfer seedlings from the nursery to the plantation (880US$).

Reforestation of the northern littoral was a great success and its positive impacts were numerous and widespread in protecting the area known as the Niayes and its livelihood system. The Niayes territory is between 5 and 30 km wide and covers an area of some 4,200 km2. The region benefits from a cool, humid climate, caused by the northern maritime winds (alizés) during the dry season, while the rest of Senegal experiences the dry and hot Harmattan winds from the East. This provides favourable conditions for vegetable production during the dry season. However, without this afforestation initiative, life in the Niayes would today be impossible as villages and their agricultural system would constantly be threatened by the dunes.

Sand dunes cover the entire territory (white or wandering dunes, yellow semi-fixed dunes and continental fixed red dunes). The continental sand dunes support a shrub savanna which has been used as grazing ground by Fulbe pastoralists for centuries. The near-surface groundwater is the key that allows for cultivation of the zone, however considering the decline in rainfall during the last 60 years, the future of this water source remains uncertain. Lack of rainfall was one of the causes that led to the retreat of natural vegetation which as a result was not sufficient to stabilize the dunes any longer. Deforestation in the early 19th century and overgrazing were also important factors causing gradual desertification in this system.

Further action is now needed in the area as Filao reaches senescence at about 50 years, an age already attained by some trees and will be soon reached across a large part of the plantation. Thus, the future of this technology is very uncertain, as the senescent trees need to be replaced. Their loss could have serious impacts on the livelihoods of about 120,000 people in the Niayes and on Senegal's economy in general. Therefore a management plan has been developed to replant and replace old trees in order to assure the sustainability of this important protective system.

Strengths and how to sustain (→):

- Stabilisation of dunes - protecting villages and allowing vegetable cultivation in interdunal depressions through reduction of wind speed and erosion (→ replacing senescent trees)
- Production of fire wood, dead wood collection and use of litter as mulch and for composting by vegetable farmers or by fishermen to smoke fish (→ encourage composting technique)
- Making agriculture and fishery possible during the whole year, through windbreak effect, and thereby creating additional income sources (→ improve marketing)
- Socio-cultural benefits:increased recreation opportunities and community institutional strengthening

Weakness and how to overcome (→)

- High establishment and recurrent costs for large scale plantation and replacement of trees (→ need for multi-partner collaboration)

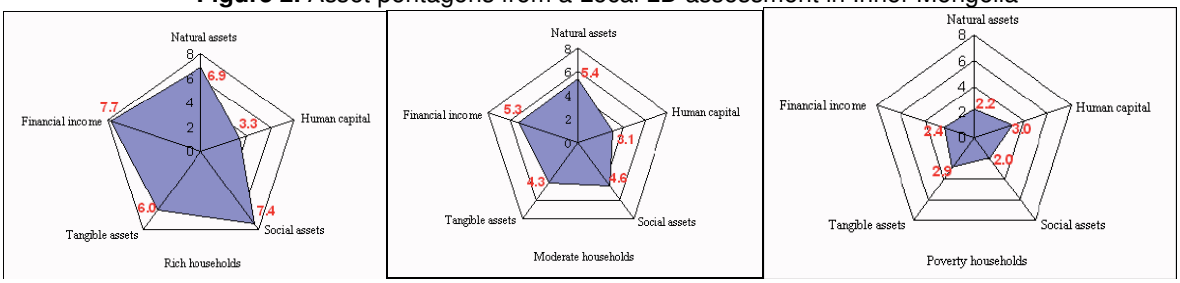
This case study was compiled in the WOCAT database by Julie Zähringer, Switzerland, with Déthié Ndiaye, LADA Senegal Coordinator and Paul Waly, (SLM Approach 12 October 2009).

The LADA local livelihoods (socioeconomic) and institutional assessment is carried out through:

- **Community Focus Group Discussions:** generate initial information about the range of land-users, their individual and communal management regimes and the area history. This provides information on how the socio-economic and institutional factors influence land user's perception and management of land resources at landscape level. It helps in locating suitable transects and study areas with communities and in interpreting assessment results, complemented by guided discussions with land users during transect walks and site assessments. They are essential to obtain community feedback on assessment findings, to complete the understanding and develop recommendations for action from community to policy levels.
- **Wealth ranking** is used to categorize the household/livelihoods in the community in terms of relative wealth status or well being since this determines views and behaviour in relation to the land resources that are used directly (e.g. farmland) and those in the wider study area (fuelwood, water, recreation). Both the extent to which people are responsible for LD/SLM and how they are affected by the impacts of LD/SLM are strongly linked to their wealth status.
- **Household livelihoods interviews** A guiding questionnaire helps identify most relevant issues that determine sustainable resource use and land degradation and "trends" or changes over the last 10 years or so. At least 20 households are interviewed (depending on community heterogeneity) representing various categories of land users (using the wealth ranking). They improve understanding of the effects of socio-economic and institutional factors on ways in which people view and manage their land resources.
- **Focused discussions with key informants and thematic groups** help crosscheck and further discuss specific aspects of LD problems and SLM responses with land users and officials from local offices. They may further investigate issues that are less visible in the field such as water resources, use of farm inputs, livestock management or experiences of by laws and policies and risks of current practices and or their conservation effectiveness and benefits and constraints to adoption of SLM practices.

These tools provide information on the pressures by land-users, their effects on land resources (status and trends), the consequences of LD/SLM on ecosystem services and the impacts on households such as in terms of food insecurity, poverty, out-migration[1]. Asset pentagons (see Figure 2) can be drawn for each of the household profiles identified showing different livelihoods strategies, trade offs and management practices.

Figure 2. Asset pentagons from a Local LD assessment in Inner Mongolia



In Ulan'aodu, Wengniute Banner, Inner Mongolia, 21 households were interviewed 7 better off, 7 moderate and 7 poorer. In terms of human capital, the average household comprised 2-4 persons and did not show significant differences. Natural capital differed most as farmlands of poor households were rented by richer households whose increased land area increased their income and opportunities. Moderate households could maintain self-sufficiency on the basis of their land area and through hard work. In terms of social capital, in poorer households the limited economic conditions inhibited social activities, and in turn, low social competence further restricted economic development.

Trade offs that the various households are making over time (e.g. 5 -10 years) in terms of their various assets can be analysed to understand how to intervene to prevent the continuous drawing down of natural resources and promote more sustainable and productive practices. Strategies of small and large farmers

[1] The approach draws on the work on sustainable livelihoods analysis by Ellis (2000) and Carloni and Crowley (2005).

can be assessed in terms of technologies (prevention, mitigation, restoration) and investments in SLM (labour, funds) and the effects of markets as well as policies and laws.

Analysis of the findings helps to understand the constraints and extent to which land users are addressing LD and reveals the various factors that influence the land users' perspectives on their land resources and that enhance or constrain their ability to practice SLM or LD control/rehabilitation. Besides land users' knowledge of improved management options, and socio-economic situation (relative poverty) such factors relate to resource and market access, access rights, tenure and other institutional/ policy issues including associated perverse outcomes (indirect negative effects).

3. Results and Discussion

Stakeholder consultation during planning and implementation is critical to ensure that the results are of interest and use to the various clients and for convincing policy and decision makers to mobilise adapted policies and interventions and for priority setting. This may include involving:

- local land users and their producers' associations, water users' associations;
- local and provincial authorities for priority setting and planning;
- Government departments (environment, land resources, agriculture, forestry, water, local development) and NGOs and projects in the area; to assess and adjust their interventions for increased impact;
- the GEF, other donors, Country Parties to the UNCCD, and the scientific community to assess the impact of their strategies, technologies and investments.

Attention is paid in the land use and livelihood analysis to consider what people are already doing or trying to do to manage their resources and meet their needs. Why are certain households, innovators, entrepreneurs succeeding? What are the constraints or opportunities for others to follow? In a specific study area it may be possible to identify several different strategies: those intensifying crop or livestock farming; others who depend on mobility and diversified income from off- farm work and so forth. The review of assets (pentagon diagram) helps to understand the strategies and trade-offs operating e.g. natural assets such as forests and land quality may be drawn down in order to build up human capital in the form of education or health care. In the short term households find ways to cope with change but in time their longer strategies also adapt to the new context. In this regard, the expert teams should pay attention to the ways that households and wider communities are coping with and adapting notably to population pressures and climate change (for example to address rainfall variability and increased incidence of extreme events - storms, drought, floods).

The assessment findings and analysis are documented in the form of concise reports supported by community drawn sketch maps and digitised maps, and tables and diagrams to present and summarise data. They should:

- Explain the location of transects and assessment sites in relation to national LUS;
- Present the layout and distribution of land resources and land-use types;
- Describe land use and management practices and their effects on land resources in term of LD status and trends (type, extent, severity) and effectiveness of conservation and improvement measures and SLM;
- Analyse apparent causes (drivers and pressures), impacts and policy implications on livelihoods and food security, land productivity and selected ecosystem services.

Case studies of successful SLM practices in the study area can also be developed by experts with land users to document and share experiences through the WOCAT (World Overview of Conservation Approaches and technologies) database. Adaptations for different context can be recorded over time. See Box 3 that shows a successful afforestation strategy and technology in Senegal.

The reports and databases will be an important record of the assessment findings and should be used to mobilise better coordinated follow up action among land users and the range of actors that provide support for natural resources management and development. Moreover, they provide the baseline for subsequent monitoring of changes and to assess progress in addressing LD and impacts of interventions.

4. Conclusions

Synthesising data from the LADA local and national assessments, through a consolidated national report, is expected to help highlight broader impacts of land use/management practices on ecosystem services and to draw out policy implications in relation to national action plans (NAPs) to combat degradation, natural resources management and agricultural and forestry strategies, and linkages with climate change and biodiversity.

The LADA local assessment methodology deserves to be widely used as a basis for supporting concerted efforts towards sustainable land management through for example targeted local and provincial action plans as well as for future monitoring of impacts of interventions and investments to prevent or reverse land degradation and promote SLM. The better understanding of the land use/livelihood strategies to meet their needs and cope with change, seasonality and shocks can help with the design of policies and interventions to strengthen existing coping and adaptive strategies of different land users and their wider communities. This could include building capacities and improving access to knowledge and education on better SLM, strengthening rights to land for settlement and agriculture, providing financial and enterprise development services (and not just credit for farm equipment) and promotion of diversification.

To promote wider use and feedback of LADA methods and tools, Regional Training Programmes are being developed in each of the LADA countries in 2010 in collaboration with competent national technical and higher education institutions to catalyse interest and build capacity in each region for scaling up and to ensure sustainability. Wider uptake of the LADA local approach and tools will require further practical training of multi-disciplinary teams in pilot areas in interested countries. It is expected that FAO and its partners with support of UNEP, UNCCD and GEF secretariats, will further support such a follow up process through SLM projects and existing programmes such as TerrAfrica (a Partnership for mainstreaming and scaling up sustainable land management (SLM) in sub Saharan Africa), MENARID (a programme for Integrated Nature Resources Management in the Middle East and North Africa Region) and CACILM (Central Asian Countries Initiative for Land Management) and through generating wider private and public sector support. Collaboration of the 6 LADA pilot countries will be required for sharing their expertise and training of trainers.

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