CASE STUDIES ON MEASURING AND ASSESSING FOREST DEGRADATION

ADDRESSING FOREST DEGRADATION IN THE CONTEXT OF JOINT FOREST MANAGEMENT IN UDAIPUR INDIA

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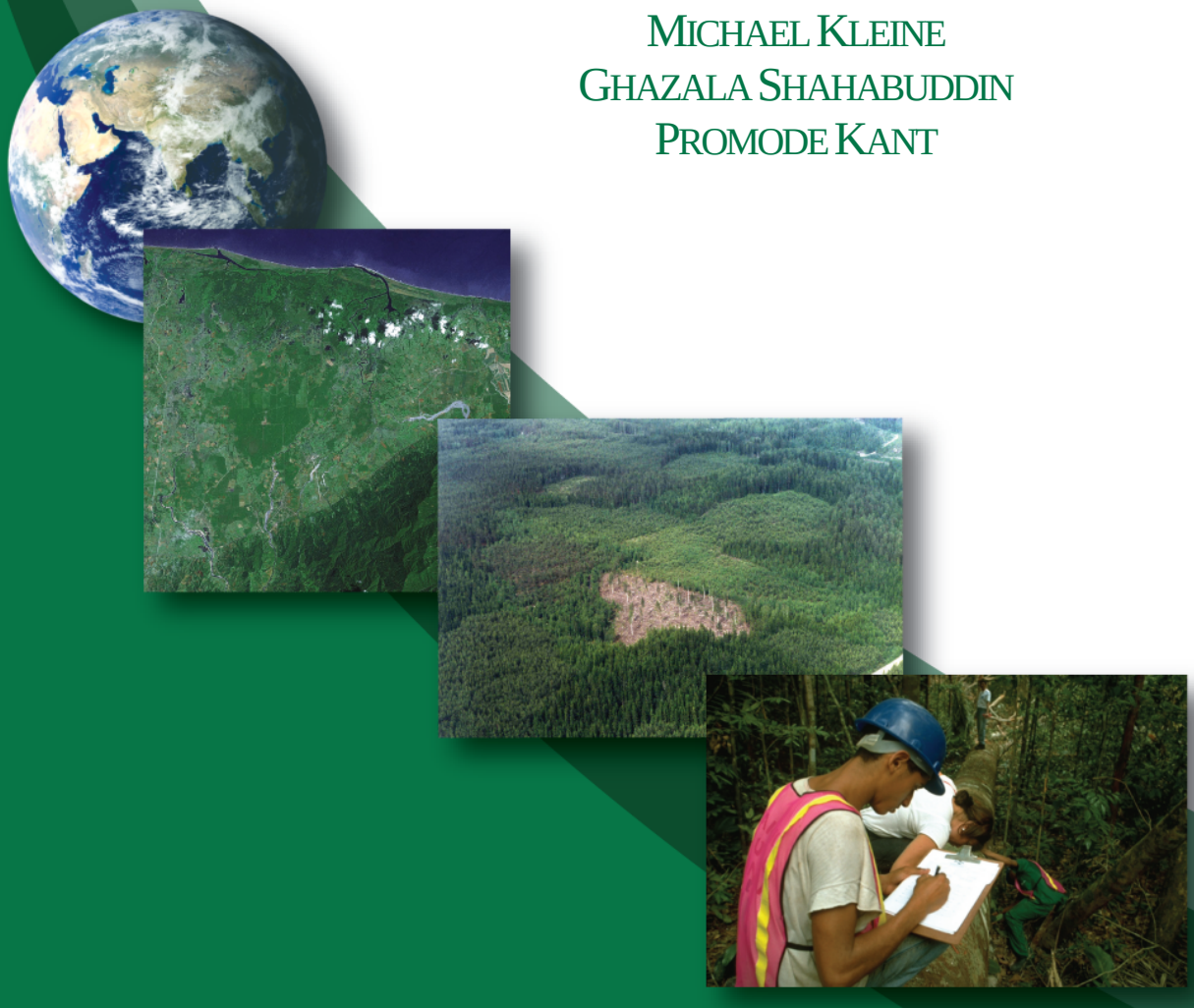

December, 2009

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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The coordinators of this work would like to acknowledge the financial contributions made by the Governments of Finland and Norway and by FAO, the GEF BIP programme and ITTO.

Forestry Department
Food and Agriculture Organization of the United Nations

Forest Resources Assessment Working Paper

Case Studies on Measuring and Assessing Forest Degradation

Addressing Forest Degradation in the Context of Joint Forest Management in Udaipur, India

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December, 2009

Forest Resources Assessment Programme

Working Paper 157
Rome, Italy, 2009

Abstract

This case study presents a forest rehabilitation initiative in the tropical dry forests in north-western India. This project is undertaken by an Indian Non Government Organisation (NGO), the Foundation for Ecological Security (FES), in cooperation with the Forest Department and aims at improving the livelihood of tribal communities. The framework of the project is the Joint Forest Management (JFM) Programme in which forest regeneration and protection is managed jointly by government and people. Various measures are being implemented ranging from actual field work to improving forest stocking and grass vegetation to institutional re-organisation aimed at enhanced access to resources, self-governance and benefit sharing between communities and the government.

The study highlights an indirect approach for assessing forest degradation, identification of forest rehabilitation objectives and targets and also illustrates lessons learnt for future forest rehabilitation in dry land forests, particularly with regard to degradation assessment, rehabilitation objectives and investments to bring about social changes required for sustaining the benefits of forest rehabilitation.

Keywords: Tropical dry forests, forest degradation, forest rehabilitation, joint forest management, reversing forest degradation

1. Introduction

Deforestation and forest degradation of forest ecosystems which once have been rich in species and well-stocked is a reality throughout the tropical and sub-tropical regions of the world. This has led to a significant reduction of goods and services provided by forests and to negative consequences for rural communities. According to results obtained from studies on forest degradation in South Asia, a total of 53 million ha of existing forests require investments into forest rehabilitation (Kant et al. 2008). The tropical dry forests of the north-western state of Rajasthan in India are no exception and over many decades have been subjected to heavy exploitation and over-utilisation by a growing rural population. A typical example can be found in the Udaipur District of Southern Rajasthan which is home to tribal communities living around foothills and valleys of the Aravalli Hill Ranges. In the past, these communities managed to sustain themselves by practicing rain-fed agriculture and by hunting and collecting forest produce. The need for cash income for a growing population, has led to loss of forests, fragmentation of landholdings, soil erosion, and low productivity of the farmlands. Today tribal people are largely dependent on cash support from the government, food-for-work programmes and migration to find adequate employment for their subsistence.

In order to address these economic problems and assist the tribal communities in improving their living conditions, an important initiative to rehabilitate tropical dry forests and grasslands in the Udaipur district was undertaken by an Indian NGO, Foundation for Ecological Security (FES), in cooperation with the Forest Department. The framework of the project was the Joint Forest Management (JFM) Programme in which forest regeneration and protection is managed jointly by government and people. The cash and in-kind benefits from forest recovery are shared between the government and local village committees. The primary concern of FES was the linking of ecosystem recovery with the tribal people's livelihoods, particularly those of the most marginalized groups.

The case study presented here essentially serves the following three main purposes:

- To show an indirect approach for the assessment of forest degradation, common practice in many developing economies, serving as starting point of a forest rehabilitation initiative;
- To demonstrate the importance of defining specific land use or forest management objectives that are in line with the needs of the local communities and serving as basis for successful forest rehabilitation; and
- To highlight the need to invest into transforming local economies in order to successfully rehabilitate forests and maintain desired environmental services on a sustainable basis.

2. Assessment of Forest Degradation

The project area managed by the Chitrawas Village Forest Protection and Management Committee covers 14 habitations of three adjacent villages having a beneficiary population of 1500 people in 350 tribal households. The Committee currently oversees the management of 291 hectares of forestland and 167 hectares of pastures. The households together own 133 hectares of mostly rain-fed agricultural lands.

The region is also the catchment area for the Mansi and Wakal rivers, which go on to meet with the Sabarmati River in Gujarat eventually draining into the Arabian Sea. The area falls under the upper Aravalli Super Group and the typical formations are Tidi, Mochia-Magra, Zawar, Udaipur, Dewari and Sishmarga-Dantahiya. The typical soil in this area is chemically matured but texturally immature. The soil type varies from red loamy to sandy, gravel to medium black soils. Agro-climatically the region comes under the Central (Malwa) Highlands and Kathiawar Peninsula.

These uplands were once covered with dry deciduous forests but are at present largely degraded. Substantial areas have degenerated to grasslands and open scrub forests. Dry forests in these areas often merge into arid or even desert margin zones where natural tree cover becomes increasingly sparse.

The establishment of a forest rehabilitation project was primarily an analysis of the prevailing socio-economic conditions in the villages including the lack of goods and services from forests rather than a quantitative assessment of the forest conditions in the field. This indirect approach of assessing forest degradation applies criteria at three different levels as follows:

Level 1: Overall socio-economic situation
A growing population with insufficient income requires increasing state budgets to provide cash support and continuous implementation of food-for-work programmes. In addition, migration of people in search of employment creates socio-economic pressures in other areas. Beyond doubt, these aspects are strong reasons for local decision makers to address these problems.

Level 2: Reduction or loss of vital goods and services from natural resources
When FES began its intervention, tribal livelihoods were based on a mix of subsistence agriculture and livestock dairying, both of which were operating at sub-optimal levels, due to recession of the water table, drying up of streams and lakes and severe degradation of forests and erstwhile pastures. At that time, degraded forests, on three legal categories of land, namely forest land, revenue wasteland and village-owned pastures, were still important sources of biomass for the locals. The FES' initial assessment suggested that the forest commons provided critical support to tribal people during the period of drought and stress. Even in the degraded state, the share of income from biomass of the degraded commons was 20-25%, which was envisioned to be increased substantially through restoration efforts. This assessment showed that reversing forest degradation in the area will significantly contribute to improve aspects of the overall socio-economic situation of the tribal households as described at Level 1.

Level 3: Status of forest degradation
The conditions of the forests prior to rehabilitation measures were characterised by low stocking density and loss of important tree species. This was caused by unregulated and unsustainable exploitation for fuel wood and other wood and non-wood products (Figure 1). In addition, forests play an important role in the provision of fodder for livestock rearing and mainly serve as grazing grounds. Excessive over-grazing had caused extensive loss of grass cover in the forests (Figure 2). It should be noted that at the field level, there was no quantitative assessment prior to the implementation of forest rehabilitation measures, because of the rather obvious levels of forest degradation. However, local knowledge about the absence/lack of desirable products and services from these forests assisted in describing the level of forest degradation.

Figure 1. Heavily degraded forest stand with low stocking

Figure 2. Overgrazing has resulted in complete loss of grass cover

3. Forest Rehabilitation Activities

Based on the results of the assessment in the project area it is obvious that forest rehabilitation measures need to focus on restoring vital forest functions and services as detailed below:

- Enhancement of ground vegetation cover, in order to improve grass production, reduce soil erosion and promote the quantity and quality of available water; and
- Increase of tree biomass for improved fodder and fire wood production.

Through a detailed tripartite agreement made between FES, village committees and the Forest Department, several ecosystem restoration activities were undertaken from 2000 onwards. Such activities include live and stonewall fencing of forests and pastures, bunding, check-dam construction to stall erosion and planting of native tree species and bamboos in hedgerows. Restoration of forest cover upstream of village water sources was expected to help rejuvenate the water and nutrient cycles, thereby enabling the community to get increased income from their agricultural plots as well. The forest protection duties lie primarily with the villagers

who take turns on a voluntary basis. Fodder-grass harvesting and fuel wood extraction is closely monitored and controlled, with equitable distribution of benefits among the participating households and special concessions for families in need.

More specifically, there are three main projects being implemented, each focussing on specific aspects of income generating activities and community organisation. The three projects are briefly described below (FES, http://fes.org.in/includeAll.php?pId=Mi05LTM):

Project on natural resource management and dairying

The tribal communities in the region practice mixed farming systems, typical of semi-arid areas. Milk production is a gainful secondary occupation and can generate surplus, especially in marginal households, when a significant part of material inputs come from commons and agriculture residues. Various studies illustrate that nearly 40 % of the total fodder and forage intake of even milk animals come from the common lands, which are usually degraded forest lands, grazing lands and revenue wastelands near villages. Besides decreasing fodder production from these lands, in certain areas, groundwater depletion has already raised serious questions about the viability and growth of agriculture and dairying. The lack of fodder and water has tended to influence both the quantity and quality of milk production of marginal and small farm households. Recent droughts have brought to light the reason and need for a healthy and productive natural resource base for the very survival and sustenance of rural life and especially for those who depend on animal husbandry or mixed farming based livelihoods.

Therefore, the project aims at improved biomass production both from commons and private lands through strengthening village level institutions and providing legal rights on the usufructs from commons and forests to the user communities. This allows for more active village governance entailing better protection of forests and grassland, establishing some form of rotational grazing providing sufficient time for the vegetation to recover and enrichment planting with desired fodder and fuel wood species.

Poverty alleviation through social mobilisation around natural resource management

Tribal livelihood systems which are predominantly based on wage labour, agriculture and forests, experience a dynamic pattern of interaction between socio-economic and bio-physical factors for meeting the consumptive and non-consumptive needs of local communities. In these agro-ecosystems, appropriation of the natural resources - such as biomass and water - from within the physical and natural environment plays a crucial role in sustaining the subsistence livelihoods. Degradation of the resource base has resulted in a disturbance in the equilibrium and in a collapse of the livelihood base of the dependent community.

In order to reverse or stall this downward spiral intervention in the ecological, economic and social domains is required. Besides enhancing the productivity and diversity of commons and private lands and improving farm and non-farm income, this project also strengthens institutional mechanisms in order to improve the governance of natural resources and collective action, in a way that the arrangements are conducive to women and the poor. In addition the project works towards shaping the policy environment and subsequently improving livelihood security.

Developing models of local self-governance at village and inter village level for the management of forests and natural resources

This project assists local communities in strengthening the management and governance of natural resources involving forest dependent communities, agriculturists and landless wage labourers who live in areas close to forests. The main focus is on the functioning of the village and inter-village governance institutions (Panchayats), in order to enhance mechanisms that allow determination of land use based on the principles of social justice, conservation and sustainable development.

Overall, the various project activities related to physical rehabilitation work, training as well as institutional arrangements resulted in a significant departure from previous practices that were characterised by over-utilisation of the land and continuous degradation of forest resources. Some areas have recovered in terms of ground vegetation (grass), fodder (tree leaves) as well as stocking density because of enrichment and planting of hedgerows (Figures 3 and 4).

Figure 3. Partially recovered forest stand with higher biomass compared with the stand conditions before rehabilitation measures.

Figure 4. Grass cover has improved substantially resulting in increased fodder production

4. Discussions and Conclusions

The case study presented here demonstrates the specific conditions under which forest rehabilitation can be successful in tropical dry forest zones. Reversing forest degradation under prevailing socio-economic circumstances requires special considerations with regard to the assessment of forest degradation, rehabilitation targets and activities and priority areas for investments. The lessons learnt from this project are summarised below.

With regard to the assessment of forest degradation it is interesting to note that an indirect approach to assessment prior to the project without intensive quantitative field measurements was sufficient to commence with the rehabilitation initiative. Although it is recognised that certain reference states, thresholds and baselines are needed for reporting on forest degradation at the national level or in the context of climate change mitigation initiatives, these quantifications are less important for the implementation of forest rehabilitation projects aiming primarily at restoring specific forest services in support of rural livelihood. In such projects the use of the generic definition of forest degradation by FAO (FAO, 2002) which reads “The reduction of the capacity of a forest to provide goods and services”, appears to be appropriate provided relevant forest services are identified and used to formulate site-specific rehabilitation targets.

As outlined earlier in this paper, the focus of forest rehabilitation in this project is on increasing the production of grass/fodder and fuel wood. Although the actual state of forest degradation has not been measured in the field at the start of the project, it is intended to establish a field monitoring system providing information on progress made in vegetation recovery including increase in grass cover and tree stocking. Such assessments will apply quantitative indicators for stand structure, biological diversity, site conditions (e.g. erosion), and for goods and services from the forest. Such a monitoring system is essential, in order to determine the effectiveness of the measures undertaken by a rehabilitation project.

In the context of climate change mitigation the case study also allows to highlight another interesting aspect related to the interpretation of remote sensing data on forest degradation and national planning for increasing forest-based carbon stocks. Because of its low stocking level mainly caused by over-utilisation, the dry forests in the region will certainly be classified as degraded forests. However, there is only a limited scope for a significant increase in carbon stocks through rehabilitation measures as the production of grass/fodder and fuel wood is the main objective. Therefore, future forest stands will need to be managed at moderate stocking levels far below the potential density. Thus their carbon stocks will be comparatively low.

The case study also demonstrates the need for investing in “social transition”, in order to ensure that the degradation process does not re-appear once the rehabilitation measures in the field have been completed and the forests are maintained in a healthy state in the long-term. The project components described under Forest Rehabilitation Activities are mainly addressing issues of access rights to resources, community organisation, self-governance, and benefit sharing between the local communities and the government. These social changes are considered indispensable for long-term successful forest rehabilitation. To allow these changes to happen, significant investments in terms of financial resources, advisory services and assistance to local communities are required and should be considered as an integral component of any forest rehabilitation project.

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