

23 Financing community-based watershed reforestation in the Philippines

Danilo C. Mero*

ABSTRACT

*In 1992, the National Power Corporation (NPC), a government operated and controlled corporation, secured funds for the development of about 1 000 ha of tree farms within the Lake Lanao-Agus River watershed reservation in Lanao del Sur, Philippines. About US\$1.1 million was used to finance development activities in reforestation and environmental rehabilitation in determined areas within the watershed reservation. Community participation was ensured after six to nine months of social preparation prior to the initiation of the project. More than 150 individual cooperators representing their households participated by way of a contract for the development of their areas into tree farms. Technical support and assistance were provided by the Paper Industries Corporation of the Philippines (PICOP). More than 1 500 ha of private land were developed into tree farms and planted with *Acacia mangium*, *Durio zibethinus* and other indigenous tree species. Post-project monitoring and evaluation of the established tree farms indicated a very high tree survival rate of 98 percent and favorable growth rates. In 1996, the project was turned over by the PICOP to the NPC which then continued the rehabilitation effort through internal funds. This innovative experience in community-based reforestation and environmental stewardship may set a good example of how to rehabilitate degraded lands.*

INTRODUCTION

Geographically, the Philippines is situated within the tropical belt at the range of 4–21°N and 117–127°E. It is an archipelago with over 7 000 islands, the largest being Luzon to the north and Mindanao in the south. Most islands have mountainous interiors rising

* Department of Forestry, College of Forestry and Environmental Studies, Mindanao State University, Marawi City, Philippines; Tel.: +63-633-520982; Cellphone No.: +63-919-4383905; E-mail: danmero@eudoramail.com

from 1 000 to 2 500 m above sea level. This topography supports a diverse forest ecosystem, and causes violent hydrological patterns that can promote severe erosion if the forest cover is removed.

Over the years, excessive deforestation has degraded the upland watersheds to a critical level. Recognizing this, the government has adopted community-based forest management as the national strategy to ensure the sustainable development of the country's forest land resources (Ramos 1995).

In the early 1990s, the Philippines experienced an energy crisis. The problem was compounded when the El-Niño phenomenon hit the country thereby adversely affecting hydroelectric power generation particularly in the central part of Mindanao. The indicative losses due to frequent power outages in Mindanao were at that time estimated to be about \$100 million per month. It is in this vein that this paper is being written.

THE COMMUNITY-BASED REFORESTATION PROJECT IN LAKE LANAO-AGUS RIVER WATERSHED

Significance of the project

The Lake Lanao-Agus River (LLAR for brevity) watershed is the main source of water used by the series of six hydroelectric power (HEP) plants for power generation. The combined generating capacity of these HEP plants is about 720 megawatts. The power generation potential of these HEP plants represents more than 60 percent of the electricity power demand of Mindanao in the 1990s.

The project concept

There is a need to reforest and rehabilitate the LLAR watershed. The forest cover of the area has been reduced to a critical level due to uncontrolled logging which started as early as in the 1960s and continued to the 1990s. The mesoclimate regime in the area has been unpredictable if not erratic. The free flow discharge of the Agus River declined from an average of $113 \text{ m}^3 \text{ s}^{-1}$ in 1950–1977 to a regulated discharge of $87 \text{ m}^3 \text{ s}^{-1}$ in 1978–1989.

Project objectives

The general aim of the reforestation project was to ensure stable hydroelectric power generation of the Agus plants through improved water yield of the LLAR watershed on a sustainable basis. The specific objectives of the project were: (1) to develop about 1 000 ha of tree farms within the LLAR watershed reservation within three years from 1993 to 1996, (2) to raise the level of stakeholder's awareness on the value of the watershed and the need for its protection and conservation, and (3) to gain the community's full support for the project.

Project financing and management

In 1992, the National Power Corporation (NPC), a government operated and controlled corporation, secured funds for the development of about 1 000 ha of tree farms within the Lake Lanao-Agus River watershed reservation in Lanao del Sur, Philippines. About US\$1.1 million was used to finance development activities in reforestation and

environmental rehabilitation in determined areas within the watershed reservation. The amount was contributed by the Mindanao Association of Electric Cooperative. This amount represents corporate investment of industries and utilities for the improvement of hydro-power generation. The Paper Industries Corporation of the Philippines (PICOP) was designated as the project implementor and takes charge of the management of the project. The NPC was the fund manager.

Brief background of the project area and the people

Lake Lanao, the second largest freshwater resource of the country, is located at the heartland of Mindanao. The lake has a normal water elevation of 702 m above sea level with a surface area of 36 000 ha. The lake is recharged by five major tributary rivers. The limnological study of Frey (1968) revealed that the deepest part of the lake is 118 m and the mean depth is 60 m. Its only outlet is the Agus River (the word “agus” in the local dialect means flowing) which cascades about 700 m down to Iligan Bay at a distance of only 36 km. The total area of the watershed is 186 000 hectares.

The Maranao

The Maranao or the people of the lake have an estimated 1980 population of about 750000 of which over 95 percent embrace the Islamic faith. The extent of their attachment to the lake was aptly illustrated by Washburn (1977) in her article, “Our lake for others”, which describes the Maranao this way: *“As long as the Maranao have been a people, Lanao—the lake—has existed. To the lake they bound their identity; in their own eyes and in the eyes of the outsiders they are Maranao, the people of the lake. On their shores they established their villages and towns and built their mosques, with its water they purify themselves for prayer, in its wetlands they cultivate their rice, from its depth they gather fish, across its expanse they transport their goods and people, from it they take water for drinking and cleaning. Each boulder and island in the lake, each hill and valley in the land surrounding it, seems woven into the legends and epics of the people. And each Maranao can willingly trace his ancestry to the original “pat a pengampong” – four encampments on the lake, and their mythical founders. Thus it is with some justification and no little pride that the Maranao consider Lake Lanao “Our lake.”*

THE PROJECT COMPONENTS

Social preparation

The project’s operation manager initiated a series of consultation meetings with various stakeholders, from the Barangay level up to the Municipal level. These included very frequent congregational meetings at the mosques during Friday, the day of worship among Muslims. The main context of these meetings focused on the need and importance of cooperation among the local folks in the preservation of the lake. The people were enjoined to take heed of the divine injunction to protect and preserve the natural resource, which is a gift from God. Coupled with these were scientific as well as helpful indigenous justifications for conserving the environment and restoring back the degraded areas. The project manager solicited the people’s willingness to participate in the programme by enlisting as farmer cooperators.

Establishment of tree farms and reforestation

People who enlisted to participate were asked to comply with some project requirements, such as letter of intent, proof copy of land ownership and tax payment, sketch of land property, and referral from the village chief. The management then acted upon the application by scheduling the following activities for each of the project cooperators: (i) land-use survey mapping and planning (LUSMP), (ii) site preparation, (iii) tree planting, and (iv) maintenance and protection.

RESULTS

Community acceptance of the project was ensured after more than six months of social preparation. Social activity prepares the community for the project implementation. Local community and religious leaders were instrumental in convincing the people to give full support to the project. They took it upon themselves and pride to endorse the project as it would be for their own benefit. More than these, the focus was not much of what they could get out of the project fund but what they could give and volunteer as their project counterpart. They were willing to offer their idle lands and even agricultural lands for a worthwhile endeavour.

More than 150 cooperators representing their households and clans participated by way of a formal contract for the development of their own areas into tree farms as well as agroforestry farms. Technical support and assistance were provided by the Paper Industries Corporation of the Philippines (PICOP), the project implementor. More than 1 500 ha were reforested or planted with trees and fruit trees by the project cooperators. About 3 million seedlings were planted by the cooperators and the supporters in the communities.

Cost effective analysis (CEA) indicated that social preparation costs were more than recovered in terms of the excess area reforested or planted with trees. Performance analysis indicated that project acceptability was the most important factor for the success of the reforestation project. Project acceptability leads to optimization of people's participation. Small landholding farmers, who comprise the major segment of the population, are the most sincere and effective implementors of reforestation projects.

When the project was subjected to post-project auditing by the external corporate auditor for the NPC, it was found out that the established tree farms had very high survival rates of more than 95 percent. Because of this, they recommended to the higher management that continued rehabilitation of the lake could be funded out of corporate funds. This recommendation was approved. An annual budget for the purpose was provided and managed by the Watershed Management Division of the NPC Mindanao Regional Office (MRO), based in Iligan City.

When the initial project ended in 1996, the tree farmers organized themselves into cooperatives by municipality and later on formed a federation for the province of Lanao del Sur. One of the purposes of the cooperatives was to update its members on the development of their own farms.

By this year 2002, most of the *Acacia mangium* and *Gmelina arborea* trees were of harvestable size. The lanzone (*Lanzium edule*) and durian (*Durio zibethinus*) fruit trees are now producing on season in commercial quantities. These species were interplanted or line planted on corn (*Zea mays*) as well as coffee (*Coffea robusta*) farms. The NPC was also involved in assisting tree farmers who wanted to utilize their timberland for value-added activities, such as lumbering and furniture-making, as alternatives to stumpage sale.

DISCUSSION

Reforestation is one of the most direct ways of restoring a degraded land. Yet reforestation will not be successful unless it is combined with other sound practices. This project proved that community acceptability of the project is very important to project performance or success. Social preparation is an assurance of project success, and without it the project is doomed. The project can only be implemented if community acceptability is indicated from the social preparation.

A comparative analysis of the project with other similar local and national projects illustrates this point as shown in Table 1.

Table 1. Comparative data on reforestation targets and accomplishments

Implementor	Source of funding	Budget (US\$)	Area targeted for reforestation (hectares)	Percentage accomplishment	Reforestation species
Local reforestation by contractors in the province of Lanao del Sur	Reforestation fund of DENR	2 M	2 000	<5	Fast growing (e.g.) <i>Paraserianthes falcataria</i> and <i>Sweitenia macrophylla</i>
DENR contract reforestation	ADB Phase I	300 M	300 000	10–15	Fast growing (e.g.) <i>Paraserianthes falcataria</i> and <i>Sweitenia macrophylla</i>
DENR contract reforestation	ADB Phase II	300 M	300 000	20–25	Fast growing (e.g.) <i>Paraserianthes falcataria</i> and <i>Sweitenia macrophylla</i>
This project	Industry contribution	1.1 M	1 000	>200	<i>Acacia mangium</i> and indigenous species

The table above shows very wide gaps in the performances of reforestation activities.

CONCLUSION

Forest rehabilitation is an amplification of man's role in the development of his environment for his own survival. How he plays the role spells the difference between success and failure.

BIBLIOGRAPHY

- Acosta, R.T.** 1999. *Community-based forest management: issues and initiatives in pursuing upland development*. Paper presented at the 12th Philippine Environmental Congress, 8–10 April, 1999. Laguna, Philippines.
- Cali, C.A.** 1991. *Assessment of Growth and Nodulation of Acacia mangium Willd. and Sesbania grandiflora (L.) Pers. in two Philippine soil types*. University of the Philippines at Los Baños, College, Laguna, Philippines. (Ph.D. dissertation)
- DENR.** 1996. *Basic community organizing handbook for community-based forest management programs*. Quezon City, Philippines, DENR.
- DENR.** 1996. *Administrative Order 96–29 dated October 10, 1996, Rules and Regulations for the Implementation of Executive Order 263, Otherwise known as the Community-Based Forest Management Strategy (CBFMS)*.
- DENR.** 1997. *Guidelines for the formulation of community-based resource management framework and annual work plan for community-based forest management areas*. DENR Memo Circular No. 97–12.
- DENR.** 2002. *Forestry sector project: policies and guidelines*. A compilation of FSP policies and other related guidelines 1996–2001. Dilliman, Quezon City, Philippines, Department of Environment and Natural Resources, National Forestation Development Office (NFDO).
- ETFRN.** 2002. *Innovative financing mechanisms for conservation and sustainable forest management*. ETFRN News No. 35 Winter 2001/2002. ETFRN Coordination Unit, Tropenbos International, PO Box 232, 6700 AE Wageningen, the Netherlands.
- Frey.** 1968. *Limnological reconnaissance of Lake Lanao*. Marawi City, Philippines, Mindanao State University.
- Gallardo, O.C.** 1991. *Reservoir sizing by transition probabilities as applied to Lake Lanao controversy*. International Post-Graduate Course in Hydrology. Water Resources Research Centre, Budapest, Hungary.
- Magno, F.A.** 1994. The contract reforestation program. *Philippine Journal of Public Administration*. XXXVIII (3): 260–274.
- Mero, D.C. & Miranda, P.T.** 1998. Habitat rehabilitation technologies for Lake Lanao watershed. *Proc. International Conference on Applied Tropical Ecology. Aspects on Ecosystem Management in Tropical Asia*. 8–10 September, 1998. Baybay, Leyte, Philippines, Visayas State College of Agriculture (ViSCA).
- NPC.** 1990. *Statistical data on Lake Lanao*. Iligan City, Philippines, National Power Corporation (NPC), Mindanao Regional Office.
- Poffenberger, M.** (Ed.). 1990. *Keepers of the forest: land management alternatives in Southeast Asia*. Quezon City, Philippines, Ateneo de Manila University Press.
- Ramos, F.V.** 1995. *Executive Order No. 263. Adopting Community-Based Forest Management as the National Strategy to Ensure the Sustainable Development of the Country's Forest Land Resources and Providing Mechanisms for its Implementation*.
- Sajise, P.E. et al.** 1990. *State of the Philippine environment*. University of the Philippines National Assessment Project, Dilliman, Quezon City, Philippines, U.P. Press.
- Serna, C.B.** 1993. Community-based resource management perspectives, experiences and policy issues related to forestry and upland development. In F.P. Jr. Fellizar, ed. *Community-based resource management perspectives, experiences and policy issues*, pp. 64–81. College, Laguna, Philippines.
- UNCED.** 1992. *United Nations Conference on Environment and Development*. Final advanced version of Agenda 21, Chapter 11, Combating Deforestation.
- Washburn, L.** 1977. *Our lake for others*. Dansalan Research Center (DRC) Bulletin. Marawi City, Nov.–Dec. 1977.

24 Initiatives for improving reforestation strategies: an enabling framework of criteria and indicators for forest land evaluation

V.P. Mohan* and Vu Tan Phuong**

ABSTRACT

Viet Nam, a country in transition and passing through a process of economic renovation from 1986, is striving to balance development with environmental protection. In order to revamp the forestry sector and to counter the devastating deterioration of forests, it has launched since 1998 an ambitious National Five Million Hectares Reforestation Programme (FMHRP) aiming to restore forest cover to 43 percent by 2010. With a view to assist the Ministry of Agriculture and Rural Development to effectively implement the National FMHRP, the Food and Agriculture Organization of the United Nations is supporting a technical cooperation programme, TCP/VIE/0066, from March 2001 to March 2003. The project seeks to evolve an enabling implementation framework by focusing on three interrelated outputs: (1) generate a set of criteria and indicators (C & I) for forest land evaluation, (2) develop guidelines for participatory forest land use planning, (3) elaborate guidelines for monitoring and evaluating plantation establishment and natural forest regeneration. The process of completing work on output (1) from August 2001 to May 2002, essentially an institutional collaboration between two national level institutions had three stages: (1) conceptualization and developing of a set of preliminary C & I, (2) testing of preliminary C & I by applying at two sites to assess their relevance, (3) finalization by integrating results of testing and documenting the final version of C & I for forest land evaluation. Consequently a framework of C & I as tools for microlevel field assessments of non-forested bare lands has been evolved having two parts: the first part comprising 6 biophysical criteria with matching 23 indicators, and the second part comprising socio-economic criteria with matching indicators. To consolidate and integrate

* Sunny Villa, Nigam Vihar, Shimla 171002, India; Tel/Fax: 0091-177-223753; E-mail: vpmohan@bol.net.in, vpmohan@ndb.vsnl.net.in, vpmohan59@hotmail.com

** Land Use and Management Division, Forest Science Institute of Vietnam, Dong Ngac-Tu Liem, Hanoi, Vietnam; Tel: 00844-8388431; Fax: 00844-8389434; E-mail: ttsinhthai@hn.vnn.vn, vutanphuong71@yahoo.com

field assessments, a method has been suggested to assess the suitability of sites by three potential productivity classes, namely High, Medium and Low. By matching this classification with the socio-economic criteria, the next step of narrowing down priorities of forestry/ agroforestry interventions according to location and specific requirements is suggested.

The paper describes how this evolving methodology, which has potential and relevance for other countries as a model for replication, can be usefully scaled up for efficient planning and for improving the eventual implementation of reforestation.

INTRODUCTION

The Food and Agriculture Organization of the United Nations has been a partner of Viet Nam since 1978 in supporting agricultural development. From the beginning of 1999, the multilateral and bilateral organizations that are most active in forestry have joined together with the government in support of the National Five Million Hectares Reforestation Programme (FMHRP). This ambitious initiative launched to counter the devastating deterioration of forests aims to restore the forest cover of the country to 43% by 2010. The FAO is an active partner in the Government–Donor Partnership, and is committed to its future success. More specifically, a technical cooperation programme, TCP/VIE/0066*, has been designed to assist the Ministry of Agriculture and Rural Development to effectively implement the National FMHRP. The project, lasting 24 months from March 2001 to March 2003, has a budget support of US\$333 230. The Forest Inventory and Planning Institute (FIPI) is responsible for its execution. The project seeks to evolve an enabling implementation framework by focusing on the following three interrelated outputs:

- I. Generate a set of criteria and indicators (C&I) for forest land evaluation (FLE).
- II. Develop guidelines for participatory forest land use planning (PFLUP).
- III. Elaborate guidelines for monitoring and evaluating plantation establishment and natural forest regeneration.

This paper reports on work carried out in Viet Nam by highlighting conceptual issues and the methodological development of an enabling framework of criteria and indicators for forest land evaluation designed for the eventual implementation of reforestation. The process of developing this methodology and testing was completed at all stages as a collaborative work based on consultancy inputs by the first author and the support of two national level institutions, namely the FIPI and Forest Science Institute of Viet Nam (FSIV).

OBJECTIVES

The key objective of evolving an enabling framework of C & I for FLE is to improve the methodology for evaluating a forest land in terms of its productive potential and suitability for natural regeneration and tree planting. It aims to provide simple guidelines to planners and implementing agencies to assess the potential productivity and suitability of a certain piece of land for any intended silvicultural treatment/choice of given species for planting.

* Project Implementation Plan 2001–2003, May 2001 Version.

PROCESS AND METHODOLOGY

The process of conceptualization, testing and finalization of the basic framework of C & I to its present stage was conducted from August 2001 to April 2002. It underwent refinements, broadly in three interlinked phases as follows:

Conceptualization phase

Conceptualization commenced with the first mission undertaken between August and October 2001 (60 days). The mission accomplished the following activities:

- institutional contacts with national agencies and key international projects;
- evaluation and analysis of available documents;
- frequent internal discussions with the FIPI, FSIV and other key related institutions to develop a shared vision;
- field visits to two sites, namely Son Dong district and Bac Giang province in the northeast region, and An Khe district, Gia Lai province in the central highland region; 13 consultative meetings at province, district, commune and village levels to assess existing practices and constraints;
- synthesis of all inputs for conceptualizing a basic framework to elaborate key issues;
- sharing in a workshop in October 2001, the rationale and conceptual parameters necessary for developing a set of preliminary C & I;
- finalization of a preliminary set of C & I for FLE of bare lands, to be tested by the FSIV and developing a working draft report on the first mission for comments and suggestions.

Testing phase

The FSIV having been contracted for field testing and related activities carried out the preparatory field surveys and actual testing of the preliminary set of C & I from October 2001 to April 2002. Testing results at two sites have established the relevance of the preliminary C & I as a workable framework to assess the suitability of bare lands for forestry/agroforestry interventions. In addition, many useful practical findings have emerged.

Finalization phase

In the finalization and validation phase, a second mission lasting 30 days was undertaken in March–April 2002. The finalization of C & I integrates in a holistic manner the results of testing and the necessary adjustments suggested, i.e.

- synthesis of results of testing by the FSIV;
- adjustments of preliminary C & I;
- validation and consolidation for documentation of the final C & I including drafting of guidelines for application of C & I in the field;
- consultations with the FSIV/FIPI to incorporate minor adjustments.

SITUATION ANALYSIS

An analysis of the current status of land use and key aspects of the forestry sector formed the basis of developing this methodology in order to relate it more closely to ground realities.

Country context

Since 1986, Viet Nam has embarked on an ambitious programme of reforms (“doi moi”) as a process of transformation and an important part of a wider national process of change. The “doi moi” philosophy encompasses a combination of policy and institutional adaptations associated with liberalization, opening up and reform. Its adoption has resulted in rapid economic advances in all sectors, particularly agriculture, forestry and fisheries. Recognizing the urgent need to promote development that balances environmental protection with economic progress for the benefit of the people, suitable strategies are being evolved.

Agriculture, forestry and fisheries, grouped in one of the three economic sectors, account for 24.30% of the total GDP at current prices as per preliminary figures for 2000. The gross output of forestry at constant 1994 prices is 5 652.5 billion dongs in 2000 (Statistical Year Book 2000).

Key issues of significance are as follows:

- There has been a phenomenal boost in the agricultural sector and food production from 1989–1990 onwards. As a consequence, the country has become a major rice exporting country in the world. Clearly this achievement has significantly contributed to a reduction in the pressure on forest resources.
- Decentralization has led to the strengthening of local governance structures (provincial, district and commune levels).

Status of land use

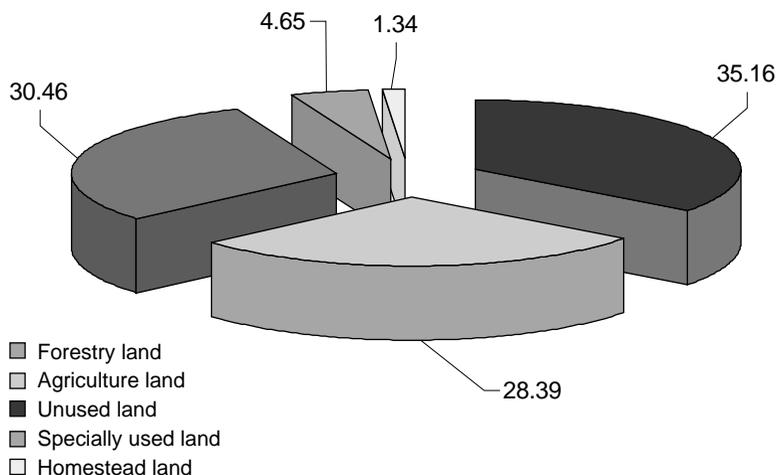
According to the overall inventory of land use in 2000 in the Prime Ministerial Order No. 24/2001/QĐ-TTg dated 1 March 2001, Viet Nam has a total area of 32 924,061 ha (32.92 million ha)*. Three-fourths of the terrain are hilly and mountainous, with a complex topography carved with many mountains, rivers, high plateaus and plains of different sizes. Hilly areas are relatively sparsely populated, and most of the 76 million* people are concentrated in intensively cultivated alluvial plains. The status of current land use is as follows:

Table 1. Existing land use statistics

Category	Total geog. area		Land granted and for rent	
	Area	%	Area	%
Total area	32.92	100.00	23.84	100.00
1. Forestry land covered by trees	11.58	35.16	9.81	41.13
2. Agriculture land	9.35	28.39	9.35	39.20
3. Unused land, springs, mountains	10.02	30.46	2.71	11.38
4. Specially used land	1.53	4.65	1.53	6.43
5. Homestead land	0.44	1.34	0.44	1.86

Unit: million hectares

* Statistical Year Book 2000.



Source: Statistical Year Book 2000.

Figure 1. Pie chart of existing land use

Key issues highlighted from Table 1 are as follows:

- The total area of unused land, rivers, streams and rocky mountains is 30.46%, of which only 27% is categorized as land granted and for rent implying that the remaining lands in this category could be allocated for reforestation under the National FMHRP to raise forest cover to 43% by 2010.
- The forestry land covered with trees comprises 35.16% of the total land area, of which 82% is under land granted and for rent category.

Forestry sector

Viet Nam is experiencing a fundamental transition period whereby great demands are being put on forests and other natural resources by rapid economic growth. Sustainability in the management of forests and forest lands is a key environmental and social issue. The ongoing policy reform, in particular the allocation of forest lands to farmers, is providing a new basis for future development strategies that have to be converted into action. The Government of Viet Nam is in the process of renovating its strategies for forestry development in order to bring these in line with new, broader socio-economic policies and orientation to a market economy.

Forest cover

An analysis* of the trend of changes of forest cover in Viet Nam indicates that in 1943 the forest cover was 43% of the country's total land, 31.8% in 1976, and 27.2% in 1990 and marginally went up to 28.1% in 1995.

Decision No. 661/QD-TTg dated 29 July 1998 takes into account the national forest cover of 28.1% as per the 1995 inventory which was to be raised to 43% (increase equivalent to 15% of the geographical area) by 2010 by raising additional 5 million ha of forests by natural and artificial regeneration.

* MARD-Department for Forestry Development, National FMHRP-HANOI 2001.

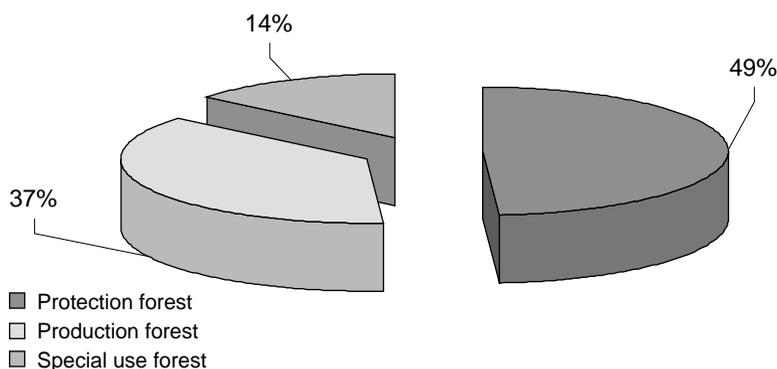
The latest statistics* on forests according to the overall inventory of forest in 1999 by Prime Ministerial Order No. 03/2001/QĐ TTg dated 5 January 2001 are given in Table 2.

Table 2. Statistics from the forest inventory

Million hectares

Category	Planned forest cover by 2010	Forested area			Non-forested land	FMHRP targets
		Total	Natural	Planted		
1. Protection forest	6.0–6.5	5.35	4.81	0.54	0.7–1.2	1.0
		49%	90%	10%		
2. Production forest	8 .0	4.04	3.17	0.87	4.0	3.0
		37%	78%	22%		
3. Special-use forest	2.0–2.5	1.52	1.44	0.06	0.5–1.0	1.0
		14%	96%	4%		
Total	16.0–17	10.91	9.44	1.47	5.2–6.2	5.0
			87%	13%		
Percentage of geographical area	50	33.14	28.67	4.46	15	15.0

Source: Draft Forestry Development Strategy 2001–2010.



Source: Draft Forestry Development Strategy 2001–2010.

Figure 2. Pie chart for three categories

The total forest area countrywide is 10.9 million ha accounting for 33% of the total geographical area. Natural forests comprise 87% and plantations 13% of the forest area. Forests are categorized into three functional categories:

- protection forest comprising 49%;
- production forest comprising 37%;
- special-use forest comprising 14%.

* Draft Forestry Development Strategy 2001–2010.

SIGNIFICANCE OF THE NATIONAL FIVE MILLION HECTARES REFORESTATION PROGRAMME

In Viet Nam, the entire thrust of reforestation activities is centered on the National FMHRP and consequently in relation to its objectives and key tasks, an effort has been made to develop the methodology of forest land evaluation and its intended application for improving planning and eventual implementation of reforestation activities.

Objectives

In December 1997, the second session of the Tenth National Assembly of the Socialist Republic of Viet Nam passed a Resolution on the creation of five million hectares of new forest during the period from 1998 to 2010. The National Five Million Hectares Reforestation Programme (FMHRP) has been launched in accordance with a Prime Ministerial Decision No. 661 of July 1998. Subsequently a Joint Circular No. 28/1999 of February 1999 elaborates the targets, guiding principles and tasks of this programme. Another related Circular No. 28/199 of March 1999 embodies detailed guidelines on the management of state funds for the FMHRP. The programme has three major objectives:

1. Establish five million hectares of new forest together with the protection of existing forests in order to increase the forest cover to 43% of the national territory, protect the environment, decrease the severity of natural disasters, increase water availability, preserve gene resources and protect biodiversity.
2. Use open land and bare hills efficiently, create employment opportunities, contribute to hunger eradication and poverty reduction, support fixed cultivation and sedentarization, increase income for rural mountain people, create stable social conditions and strengthen national defence and security, especially in border areas.
3. Provide material for construction as well as raw material for the production of paper, wood-based panels, non-wood products and also fuelwood for local consumption as well as for export; develop the forest product processing industry, make forestry an economic sector, and contribute to improvement in the socio-economic situation in mountain areas.

Tasks

1. Protection of existing forests
Highest priority will be given to the protection of natural forest classified as special-use forest, and essential and very essential protection forest, including protection forests in Programme 327, as well as production forests with rich and medium stocks. Allocation of forest land to organizations, households and individuals combined with supporting fixed cultivation, sedentarization, hunger elimination and poverty reduction should be made from the very beginning in order to protect, regenerate and plant the forest.
2. Planting of new forests
 - (a) Two million hectares of protection and special-use forests are to be created, of which one million are planted through assisted natural regeneration forest and one million through planting in combination with fixed cultivation and sedentarization.
 - (b) Three million hectares of production forest are to be created, out of which about two million hectares are for the supply of raw material for paper production, wood-

based panels, non-wood products, and logs of valuable species; and about one million hectares are for plantations of long-term industrial species and fruit trees. In addition, organizations and people are encouraged to plant scattered trees on open land.

Time frame

The planned duration of the programme is for a period of 13 years divided into three phases as follows:

1998–2000: plantation of 700 000 ha (of which 260 000 ha are protection and special-use forests), assisted natural regeneration of 350 000 ha;

2001–2005: plantation of 1 300 000 ha (of which 350 000 are protection and special-use forests), assisted natural regeneration of 650 000 ha;

2006–2010: new plantation of 2 000 000 ha (of which 390 000 ha are protection and special-use forests).

FINDINGS AND RESULTS

Approach and process for developing criteria and indicators for forest land evaluation

Conceptually the underlying approach followed in identifying most relevant biophysical site characteristics and socio-economic parameters (criteria) was mainly based on the existing site classification methods being followed in some projects. To strengthen this analysis, it was made consistent with concepts and principles from the publications listed below.

FAO. 1983: *Guidelines: land evaluation for rain-fed agriculture*. FAO Soils Bulletin 52. Rome.

FAO. 1984: *Land evaluation for forestry*. FAO Forestry Paper 48. Rome.

FSIV 2001: *Assessment of potential productivity of forest land in Viet Nam*.

However, standardized classification systems have to be adapted to match with country specific requirements.

Definitions

- Forest land

The definition of forest land as given in Decree 163/1999 of November 16, 1999 covering two types of land is as follows:

- land which has natural or planted forest
- land which does not have forest but should be afforested through planting, assisted natural regeneration, or protection of vegetation for forestry purposes.

- Non-forested land (bare land)

According to Regulation No. 84 on Forest Management and Planning issued by the former Ministry of Forestry, non-forested land (bare land) means that the vegetation on the land is not classified as forest.

Non-forested land consists of grass, shrubs or scattered woody trees with crown cover of less than 0.3 density. This is being considered by the FIPI for preparing vegetation status maps and has three categories as follows:

- vegetation cover typically with grass or banana plants;
- vegetation cover of mainly bushes and some scattered timber trees or bamboo;
- vegetation cover comprising regenerated woody trees. The number of regenerated woody trees is over 1 000 trees ha⁻¹ which are more than 1 m high.

Scope of use

It should be clearly understood that the proposed criteria and indicators for forest land evaluation have been developed basically for assessment of non-forested lands (bare lands) planned to be assessed for their suitability and potential for forestry/agroforestry interventions in:

- three categories of forests, namely production, protection and special-use forests;
- home gardens, forest gardens, village forests, community forests, commune forests and mass organization forests.

Framework of biophysical criteria and indicators for assessing natural potential productivity

The proposed framework of C & I for FLE has two parts, the first part comprising 6 biophysical criteria and matching 23 indicators (verifiable quantitatively) and the second part comprising socio-economic criteria and indicators (qualitative information). It is necessary to explain that after completing field assessments for each land unit, the next step of consolidating and integrating results from all C & I has to be followed. Therefore, it is proposed to adopt a positive point marking method for consolidation of results by integrating assessments of indicators of 6 biophysical criteria. By this method each indicator is assigned a numerical point 4, 3, 2 or 1 as an index of its potential rating and suitability for FLE. For example point 4 assigned for *Soil type* means that the individual rating of the indicator is the highest and in a descending order point 1 means that the rating is the lowest (Table 3).

Weight age for limiting factors

Based on practical considerations, two criteria, namely *Slope type* and *Soil depth*, which strongly affect potential productivity, are given an overriding weight age as limiting factors while assessing overall grading of a site and adjusting it in three productivity classes as follows:

- Class 1: multiply with 1.5 if slope class is < 15° or soil depth is > 100 cm;
- Class 4: multiply with 0.5 if slope > 35° or soil depth belonging is < 50 cm.

Combination of criteria and grading of indicators

For any intended combination of C & I, the suggested system for assigning points for grading of indicators is as follows:

Table 3. Suggested system for assigning points for grading indicators

No.	Criterion	Indicator	Base point	Adjusted point
1	Soil type	1.1. Loamy soil: medium texture	4	4
		1.2. Clayey soil: heavy texture	3	3
		1.3. Sandy soil: light texture	2	2
		1.4. Eroded and stony soil	1	1
2	Slope	2.1. Slightly sloping: < 15°	4	6
		2.2. Moderately sloping: 16–25°	3	3
		2.3. Steep: 26–35°	2	2
		2.4. Very steep: > 35°	1	0.5
3	Soil depth	3.1. Deep: > 100 cm	4	6
		3.2. Moderately deep: 50–100 cm	2	2
		3.3. Shallow: < 50 cm	1	0.5
4	Vegetation status	4.1. Regrowth trees > 1000 trees/ha, H > 1 m	4	4
		4.2. Regrowth trees 300–1000 trees/ha	3	3
		4.3. Regrowth trees < 300 trees/ha	2	2
		4.4. Mainly grass	1	1
5	Altitude	5.1. Low: < 300 m	4	4
		5.2. Moderate: 300–700 m	3	3
		5.3. High: 700–1700 m	2	2
		5.4. Very high: > 1700 m	1	1
6	Rainfall	6.1. High: > 2000 mm	4	4
		6.2. Moderate: 1500–2000 mm	3	3
		6.3. Low: 100–1500 mm	2	2
		6.4. Very low: < 1000 mm	1	1

Proposed natural potential productivity classes

Based on the above methodology, the potential productivity may be assessed and grouped into three classes as follows:

Table 4. Proposed natural potential productivity classes

Class of potential productivity	Total adjusted points of 6 indicators as per Table 3
1. High – land with few limiting factors for use	> 21
2. Medium – land with some limiting factors for use	12–21
3. Low – land with a number of limiting factors for use	<12

Socio-economic criteria

In Viet Nam a country-wide classification of all regions, down to commune level has been carried out into three categories reflecting the overall status of prevailing socio-economic factors by the Committee of Ethnic and Mountain Areas (CEMA). The three regions are as follows:

- I primary development region
- II relatively stable region
- III difficult region

The above classification is based on the following five criteria:

- residential location—accessibility;
- infrastructure—means of transport;
- social factors—living standards and literacy;
- production condition—agricultural production;
- living conditions—level of poverty and living standards.

Initially four socio-economic criteria, namely accessibility, market, local needs and population density, were identified in consultation with the FIPI and FSIV. However, during the finalization stage, it was considered appropriate to take advantage of the existing classification system to assess the present potential productivity of the land.

Assessment of present potential productivity

Based on the assessment of natural potential productivity, and matching it with the classification of socio-economic conditions based on the criteria and indicators of CEMA (region I, region II, region III), the present potential productivity can be assessed as follows:

- If the natural potential productivity of an area of forest land in commune A is assessed high, but commune A is classified as region III, then the present potential productivity of this area is considered medium.
- If the natural potential productivity of an area of forest land in commune A is assessed low, but commune A is classified as region I, then the present potential productivity of this area is considered medium.

Assessment of suitability of species

Finally for site and species matching, suitability of tree species is determined by comparing the actual results of field assessments based on biophysical C & I with standard criteria of suitability for each species. Suitability is classified into four categories:

- (i) highly suitable (S1)
- (ii) moderately suitable (S2)
- (iii) marginally suitable (S3)
- (iv) not suitable or very limited (N)

Clearly each species requires a certain environment for growth, such as soil type, slope, climate conditions and altitude. Therefore based on research results of the physio-ecological requirements of specific tree species, the optimum conditions for planting can be inferred. After establishing the standard criteria for suitability assessment of species, it will be followed by matching as described below:

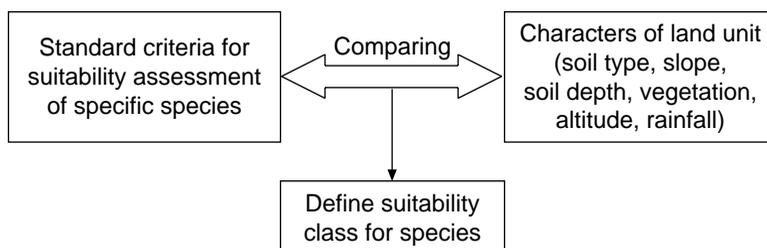


Figure 3. Suggested methodology for matching results

CONCLUSION

- *Innovative initiative:* Conceptually the key objective of developing an enabling framework of criteria and indicators for forest land evaluation is to improve the methodology to evaluate the potential and suitability of forest land for tree planting and natural regeneration.
- *Planning tool for implementation:* For the rehabilitation of degraded forest lands through reforestation, the application of C & I for FLE would be important for implementing agencies. This is done through an analysis of existing data and available maps, supplemented by on-ground verification. The agencies would then be able to realistically assess the potential productivity/suitability of the site and match suitable species for reforestation.

Thus from a practical perspective, the suggested methodology could provide a strong technical basis for sustainability and economic efficiency of any major reforestation programme.

- *Scope for replication:* The reforestation programmes in many developing countries are generally constrained by scarce financial resources coupled with poor site/species matching. Viewed in this context, the proposed methodology would facilitate efficient implementation through cost-effective field activities of planting suitable species matching with the potential productivity of the site and socio-economic factors.

Clearly the results, backed by field testing, suggest the scope and practicality of the above methodology as a model for replication in other countries. With the necessary adaptation the eventual implementation of reforestation can be efficiently planned and improved.

BIBLIOGRAPHY

- Agriconsulting S.P.A.** 2000: *Draft final report. Study on the policy and institutional framework for forest resources management (ADB 3255-VIE)*.
- CIFOR.** 1999: *The CIFOR criteria and indicators*. Criteria and Indicators Toolbox Series.
- FAO.** 1983. *Guidelines: land evaluation for rain-fed agriculture*. FAO Soils Bulletin 52. Rome.
- FAO.** 1984. *Land evaluation for forestry*. FAO Forestry Paper 48. Rome.
- FAO.** 1992. *Land evaluation for forest resource development planning at national level*. Rome.
- FAO.** 1998. *Asia and the Pacific: National forest programmes: Update 33*. Bangkok.
- FAO.** 1999. *Terminology for integrated resource planning and management*. Rome.
- FAO.** 1999. *State of the world's forests*. Rome.
- FAO.** 1999. *Terminology for integrated resources planning and management*. Rome.
- FAO.** 2001. *Country profile for the forum on "The role of forestry in poverty alleviation"*. Viet Nam.
- FAO.** 2001. *A compendium on criteria and indicators for sustainable forest management*. Working Paper FM/5.
- FSIV.** 2001. *Assessment of potential productivity of forestland in Viet Nam*.
- Ministry of Agriculture and Rural Development.** 2001. *National Five Million Hectare Reforestation Programme*. Hanoi.
- International Cooperation Department.** *Forest sector support programme and partnership, Part I. Draft memorandum of agreement*. Hanoi.
- Statistical Yearbook 2000.** Viet Nam, Statistical Publishing House.
- TCP/VIE/0066.** *Technical support for the Five Million Hectares Reforestation Project, Project Implementation Plan 2001–2003*.
- To Dinh Mai.** 2001. *Analysis of policies of the FMHRP*.