

FOREST MANAGEMENT SYSTEMS IN THE UPLANDS OF VIETNAM: SOCIAL, ECONOMIC AND ENVIRONMENTAL PERSPECTIVES

Nguyen Nghia Bien

ABSTRACT

The North Upland of Vietnam is characterized by biophysical, social and cultural diversity as well as its important role in the national economy's development. However, the region, like those in other developing countries, suffers from serious environmental problems such as deforestation, soil degradation, loss of biodiversity and unsustainable livelihoods. Major causes are attributed to ineffective institutional arrangements such as inadequate property rights and enforcement, lack of local participation and empowerment, and misguided government policies.

This research project began in early 1999 with financial and technical supports from the Economy and Environment Program for Southeast Asia (EEPSEA). It aimed to determine the better institutional structures for promoting sustainable forest management in the North Upland using the multiple criteria decision making and participatory approaches. In other words, the project assessed and compared various forest management regimes against different socio-economic, environmental and institutional variables.

Methods used in this research included Participatory Rural Appraisal (PRA), Criteria and Indicators (C&Is) Framework (CIFOR approach) and Multi-criteria Decision Analysis (MCDA). PRA is used to learn about rural livelihoods and identify problems emerging from forest resource management and use, making sure that all information from the grassroots, including their views, interests and desires, is taken into consideration. C&Is Framework is widely used by CIFOR to test and develop C&Is for sustainable forest management in various locations around the world. It can result in a number of context-specific and locally adapted C&Is which are used for further treatment with MCDA. TopDec, one of the recently developed MCDA programs, was chosen for data analysis.

Moi Hamlet (ThungNai Commune, KySon District, HoaBinh Province), **Village 7** (YenThai Commune, VanYen District, YenBai Province), and **DongVanh Village** (LucSon Commune, LucNam District, BacGiang Province) were chosen as study sites. They represent three human-ecological sub-regions of the North Upland and are characterized by different types of forests. In all three sites, most of the important stakeholders are households, forest enterprises and commune's authority.

The results of MCDA showed that “household” was the most preferable option in all three sites, regardless of the different ratings of C&Is that were alternately used. “Forest enterprise”, however, was still an important player in forest management, particularly in the case of protection forests where forest enterprises were as important as households. Other options such as contract-based, village-based and joint management, unfortunately, were not preferred. However, it was noted that although the results of MCDA indicate the preference ranking of the different management systems, they do not tell how one system is preferred over the others.

A number of policy recommendations are made in regard to more support and intervention from the Government in terms of policy on food security for upland areas; creation of market for locally produced commodities; human resources development involving the local population, and legalization of land tenure for local people including customary land and areas under their actual management. The report also recommends the conduct of further research to develop separate sets of C&Is for particular forest categories such as protection, production and special use forests. Steps for enabling the dissemination of research results should also be taken into account.

1.0 INTRODUCTION

The North Upland of Vietnam is characterized by biophysical, social and cultural diversity as well as its important role in the national economy’s development. However the region, like those in other developing countries, suffers from serious environmental problems such as deforestation, soil degradation, loss of biodiversity and unsustainable livelihoods. A significant phenomenon is that over only a few decades forest resources have rapidly depleted, directly threatening livelihoods of local inhabitants. According to Be Viet Dang (1993), prior to 1954 most of the northern mountain region were covered with forests. But recently in many parts of the region only 8 to 10% forest cover remains on the surface, meaning there are now more than 13 million ha of bare land. This situation is mainly attributed to ineffective institutional arrangements such as inadequate property rights and enforcement, lack of local participation and empowerment, and misguided government policies.

Although a number of studies relating to the issues of changing forest management have recently been conducted in the North Upland, these have not addressed the links between the existing management structures and the sustainability of forest resources. Nor have they clarified what factors and how these factors affect the choice of an appropriate management regime within a sustainability framework. Therefore, it is essential to switch the focus of the recent research framework more on how to fill this gap.

With that purpose, a small research project began in early 1999 with financial and technical support from the Economy and Environment Program for Southeast Asia (EEPSEA). It aimed to determine the better institutional structures for promoting sustainable forest management in the North Upland using multiple criteria decision making and participatory approaches. Its specific objectives were:

- to analyze the institutional context in which the contemporary forest management in the North Upland had taken place;
- to verify context-specific, locally adapted indicators of sustainable forest management;
- to demonstrate the multiple criteria decision making approach in reconciling the social, economic, environmental and institutional criteria for defining a better forest management scheme, and
- to make policy recommendations for promoting better management of forest resources in the North Upland.

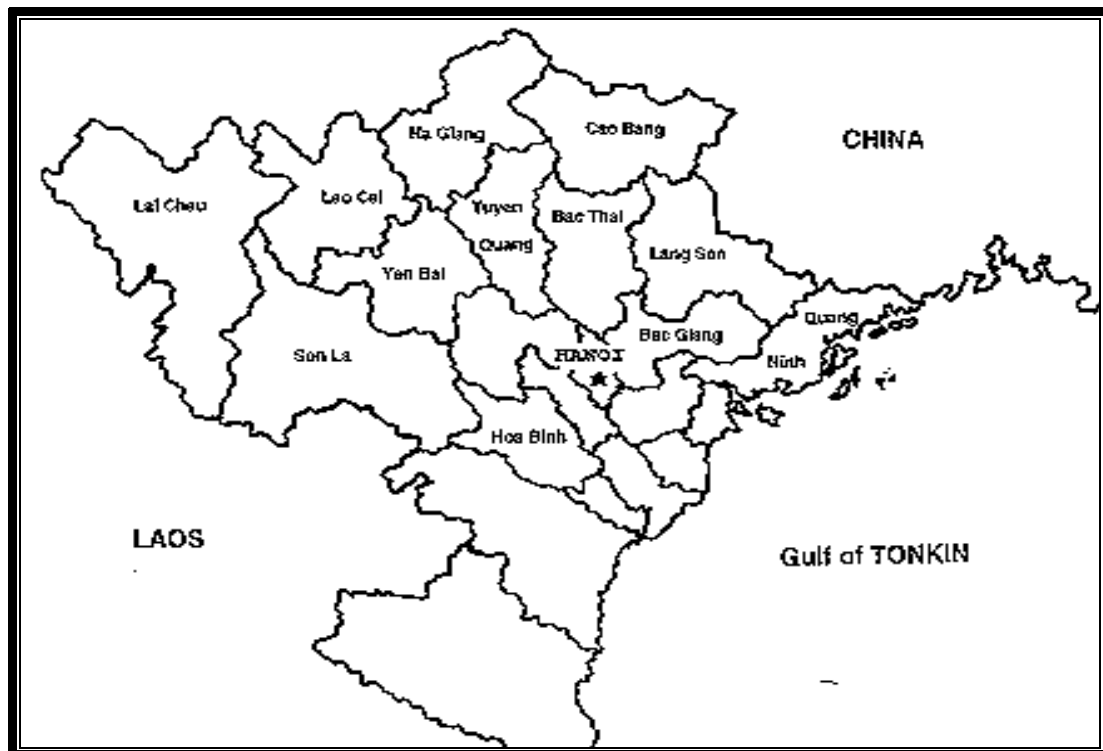
Simply put, the project aimed to assess and compare various forest management regimes against socioeconomic, environmental and institutional attributes to find out which is the better management regime within the local context. Based on the main findings of the study, appropriate policy recommendations can be made to promote better forest management in the North Upland. The focus of these policy implications will be on policy concerns such as rights and access to forest resources; management responsibility, and an incentive mechanism for a more effective management and use of forest resources. The better resource management regime will not only assist in filling the above mentioned gap, but also in promoting sustainable development in the region.

1.1 Overview of the North Upland

The North Upland of Vietnam can be divided into two ecological-climatic zones: the Northeastern and the Northwestern (Chu 1995). The Northeastern zone extends from the coast along the border of China to the Red River, and covers an area of 67,006 km². This is the ancestral domain of the Tay, Nung and Dzao people and other less numerous minority groups belonging to 38 ethnic groups. Its population density of 150-300 persons per km² is significantly higher than those in other upland zones. Compared with the other upland zones the Northeastern zone boasts of better educational level among its inhabitants, material-cultural standards and transportation network.

On the other hand, the Northwestern zone covers an area of 36,101 km² from the western side of the Red River along the border with China to the beginning of the common border with Laos. It is the homeland of the Thai, Muong and H'Mong people. Generally, dry (terraced) and wet rice farming, pastoralism, fruit-crop cultivation, forestry and ongoing swidden cultivation are the prevailing economic activities in the North Upland.

Within the whole region, the mountains alone comprise 89,000 km² or 27% of the national territory, with a population of a little over 6 million, which is slightly less than 10% of the national population (Rambo 1997:5). Although referred to in Vietnamese simply as *Mien Nui Phia Bac* (northern mountain region), the zone, according to Le Ba Thao (1990), is topographically and ecologically diverse, ranging from the rounded granitic hills of VinhPhu and YenBai to the very steep limestone peaks of SonLa and LaiChau. Like the topography, the climatic conditions are also diverse from one location to another and form the so-called "micro-climatic zones". The ethnic and cultural diversity of this region is represented by 31 of 54 officially recognized ethnic groups speaking languages belonging to seven distinct groups and two major families (Khong Dien 1995:81).



Source: After Donovan *et al.* 1997

Figure 1. Map of Northern Vietnam

The development history of the region will be better understood by dividing it into three major periods: *French Colonialism* (pre-1945), *Collectivisation* (1945-1980s) and *Renovation* (late 1980s to date). The first period was extensively studied since the French established their control over the northern mountains only after the turn of the 20th century. For the most part, the French colonial regime relied on a relatively indirect system of rules based on native feudal lords of the Muong, Thai and Tay principalities or chiefdoms in the valleys. The Dzaos and H'Mongs shifting cultivators in the higher elevations, remained largely outside the French administration's reach except through its collection of head taxes and enforced purchase of their opium by the colonial monopoly (Rambo 1997). The major exploitation-based activities introduced by the French were modern mines, plantation establishment and tax collection, leaving behind poverty, illiteracy and a wide socioeconomic gap between the mountains and the lowlands.

The second period actually began after the defeat of the French in 1954, when special autonomous administrative zones were established in the northern mountains such as (i) *Khu tu tri Thai-Meo* (Thai-Meo Autonomous Zone) covering most parts of the present northwestern areas, and (ii) *Khu tu tri Viet bac* (Viet bac Autonomous Zone) encompassing the present northeastern zone. Many social and economic changes were introduced in the mountains. A series of successive mass mobilization campaigns were conducted to eliminate illiteracy and provide education, suppress shifting cultivation and sedentarise supposedly nomadic minorities, as well as expand the area under cultivation, introduce modern farming technology, and establish agricultural cooperatives (Rambo 1997). Land reform that was initiated even before the defeat of the French was linked to the democratization campaign that sought to break the native feudal nobility's power among the Muongs, Thais and Tays. Land reform was followed by the campaign to establish cooperatives, most of which were not successful. Agricultural stagnation was the ultimate result of imposing a mode of production unsuited to the actual conditions of the mountains (Be Viet Dang 1993:143).

The third period started in 1988 with the process of decollectivisation. Management responsibility for wet rice fields was handed over to households in many places. Presently, forest lands are being turned over to households based on land-use certificates. Rice output is rising and forest cover is slightly increasing. However, renovation has resulted in a social differentiation process between the rich and the poor households based on unequal access to land resources. Those with capital and better living conditions have gained control over large tracts of hill land, while the more disadvantaged households have obtained much smaller plots or lost out entirely (Le Trong Cuc *et al.* 1996). This observation is strongly supported by evidence from DongVanh Village (see below).

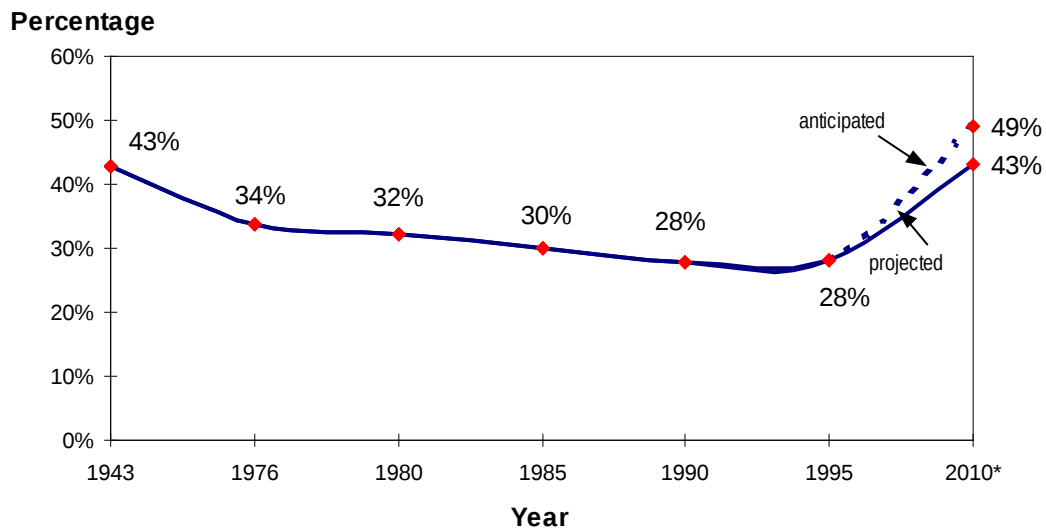
The continuing campaign to promote sedentarisation of shifting cultivators appears to have been successful in the case of the Dzaos but not the H'Mongs (Be Viet Dang 1993:133-142). Besides, the government-sponsored lowland-to-upland migration program has contributed to dramatic changes in the demographic balance of the upland which, in turn, has resulted in negative environmental impacts on natural resources. The program has undermined the sustainability of swidden agricultural systems (Rambo 1995, Khong Dien 1995).

1.2 Emerging Problems

Various problems and constraints prevailing in the North Upland are addressed in a number of studies (Chu Huu Quy 1995, Ngo The Dan *et al.* 1993, Be Viet Dang 1993:11). Rambo (1997) has consolidated them into seven major categories:

1. Physical constraints. It is estimated that 65% of the total area is located at an altitude of 200 m or higher and the remaining 14% at more than 1,000 m elevation. Cultivation for food on steep mountains, accompanied by heavy rains concentrated in a short period in a year, has caused severe erosion that makes soils poorer every year. Paddy fields and townlets located on valleys usually suffer from "sweeping" floods coming from surrounding mountains. An example is the capital of Lai Chau Province that has to move to Dien Bien Valley after several such natural hazards.

2. Environmental constraints. In 1943, the average forest cover of Vietnam was estimated to be as high as 43% of the total area. It seemed much higher in the North Upland with virgin tropical forests existing almost everywhere. After half a century (1990), the forest cover was reduced to 28%, leaving behind more than 13 million ha of bare land and nude hills (Figure 2). In the Northwestern sub-region, forest cover constitutes only 13.2% and even lower (8-10%) in many places. The figure is slightly higher in the Northeastern sub-region (22.8%). However, there are indications that it is lower in the provinces sharing border with China such as Lang Son (21%), Cao Bang (14%) and Lao Cai (19%) (Le Du Phong *et al.* 1998). Causes are identified as massive resettlement of people from the Red River Delta beginning in the late 1950s, logging and cutting of firewood, clearance of land for agricultural development projects, and shifting cultivation by the minority people. The barren areas are poor in terms of species diversity and soil fertility. The top soil has been intensively removed and may need several decades or more to recover.



Source: After Le Du Phong 1998; Nguyen Huy Phon *et al.* 1997

Figure 2. Changes in Vietnam's forest cover

3. *Infrastructural constraints.* Recently, big efforts have been made by the central as well as local authorities in developing a road system in the region. However, only provincial towns and part of district centres are accessible. Most communes and remote areas remain geographically isolated, particularly during the rainy season due to bad, temporary roads and tracks and flooded streams. For example, some upland districts of HaGiang and LaiChau are accessible only during the dry season, while 460 communes have no roads leading to commune centres (Le Du Phong *et al.* 1997:18). Although many people can watch television at home, the supply of electricity remains inadequate, and so do schooling and medical care.

4. *Economic constraints.* Although Vietnam has become a big rice exporter, the North Upland still faces food security problem. Statistics of 1995 indicate that a person in the region consumes an average of 238.3 kg food compared with 372.5 kg throughout the country, 335.1 kg in Red River Delta and 808.7 kg in Mekong Delta (Le Du Phong *et al.* 1998). Although yield from low fertile soils of the North Upland is much lower than that of fertile deltas, food production remains a primary task of the local population.

In fact, the regional economy is still subsistence-oriented and autarchy-committed. There is evidence of commodity production within newly established farms, but it is not steady due to lack of accurate information and permanent market for local products. A reduction in the production of existing crops such as tea, coffee, plum and orange due to impossible commercialization, and their replacement by others are no longer a surprise.

5. *Population problems.* Rapid population growth in the region is attributed to a number of reasons. Firstly, lowland-to-upland migration, both government-sponsored and spontaneous, has contributed to dramatic changes in the demographic balance of the upland. In two decades from 1960 to 1979, the Kinh¹ population increased by 3.3 times, climbing from 640,000 to 2.1 million. In subsequent ten years until the 1989 census, it rose further by 19.3% to reach 2.5 million people (Be Viet Dang 1993:22). Migrants usually settle in areas that are still rich in forests. They clear forests to grow food crops or cash crops instead. Successful migrants are usually followed by their relatives. This process has resulted in negative environmental impacts on natural resources and has undermined the sustainability of swidden agricultural systems (Rambo 1995, Khong Dien 1995).

On the other hand, population growth rates among local tribes are much higher than the country's reported annual average of 1.7% (VTV 1, 7/9/1999). It appears that the ongoing family planning propaganda/campaign has only influenced the urban areas and civil servants working in the public sector. In the rural and mountainous areas, people may feel humorous if asked what kind of punishment they must bear when they have more than two children. Division of agricultural and forestlands according to the number of household members, and thinking of labour needs in the future are primary reasons for having more children among the upland dwellers.

Too many people living in too little arable land undoubtedly leads to unemployment. In many areas small pieces of land are enough only for women to work on. Men usually look for casual jobs, even those low-paying ones (5,000-10,000 dongs or less than USD1 per day). Although they work well in upland conditions, they cannot compete with lowlanders for jobs in urban areas because they are likely to be less skilled and dynamic in such environment (see below).

6. *Cultural constraints.* The persistence of traditional patterns of behaviour results in misunderstanding of the cultural values of local tribes by outsiders, particularly when examined in relation to indigenous knowledge for the management and use of forests and natural resources. Recently, it has become less problematic owing to a process of integrating many minority groups such as the Tay, Nung, Muong and lowland Dzao with Kinh people in terms of farming, language, dress, cooking and housing.

¹ The “Kinh” is referred to the majority group of the Vietnamese population. Traditionally the Kinh people have usually settled in lowland areas such as deltas or fertile paddies along rivers – (Author)

Low level of education and knowledge is widespread among ethnic minorities. In many areas, 80-90% of the population is illiterate. Since very few are highly educated and trained, the implementation of development programs initiated by the government or international organizations may be hampered.

7. Intellectual constraints. It is recognized that inadequate scientific knowledge of the highlands and lack of suitable strategies to guide upland development planning have been ignored by policy makers, local authorities and civil servants in any management process. For decades, a top-down approach has been used by lowlanders-policymakers in formulating policies on upland development and without considering local initiatives and interests. Even local knowledge used by local people to survive in and adapt to changing environments has been neglected and considered as "backward". These are some reasons why many development programs such as agricultural cooperatives and afforestation campaign only succeed in areas other than the upland.

To summarize, the North Upland of Vietnam is characterized by physical, social and cultural diversity which needs to be simultaneously taken into consideration when planning and implementing development programs. Improvement of infrastructure and literacy and introduction of new technologies and others have significantly contributed to the development of the region. However, improved access to the area and better technologies, accompanied by rapid population growth resulting from government-sponsored migration programs have led to increased exploitation of upland resources and severe environmental degradation. Given this scenario, it is extremely important to find a sustainable path of development for the region, particularly in the domain of sustainable forest management.

1.3 Contemporary Forest Management in the North Upland of Vietnam

1.3.1 Policy context

From a critical viewpoint, natural resources in general and forests in particular during the Collectivisation period were managed and used unsustainably. This could be attributed to the following:

- *misguided policies* such as resource exploitation orientation, zero-price natural resources pricing, and below-cost pricing. In the past decades, forests were considered as infinite "green gold" resource and exploited as much as possible through a centrally planned mechanism. Yearly cut was usually higher than the annual increment. In terms of pricing, the true value of forest was underestimated because only part of use value was taken into account. In the timber price structure, there was no cost item associated with the value of

timber as raw material. Instead, an item of resource tax, which is much lower than stumpage price, was used. As a result of incorrect resource valuation, most natural forests have been rapidly used up. What are called "natural forests" today, in fact, are only secondary forests which are poor in both species diversity and quality.

- *inadequate institutional arrangements*. The unique type of state-owned property rights over all natural resources in general and forest resources in particular has led to the fact that forest resources have been *de jure* state property, but *de facto* open-access property for everyone. Therefore, local people and migrants also feel free to clear forests for food production and timber, and become driving forces that contribute actively to the deforestation process. Even today, this phenomenon still happens in DongVanh Village where all villagers, with their conventional perception of forests, exploit forest products and clear forests for *litchi* plantation in the area under the management of MaiSon Forest Enterprise (field notes) despite the fact that most of them have been allocated forestlands for their own management.
- *lack of local participation* in decision-making means that local interests and insights are not taken into account. Local dwellers have been removed from forest areas even though they depend heavily on the forests for subsistence. Past policy-makers perceived forest management as a process to protect forests from local dwellers, and to regard forests as a core of management. It has resulted in conflicts in resource use between local people and forest departments such as forest rangers and forest enterprises. Consequently, forests have been destroyed regardless of big efforts made by the state in terms of administrative punishment, law enforcement and propaganda. Many scholars relate these problems to the lack of adequate participation of local people in decision-making and badly structured institutional arrangements.

According to Panayotou *et al.* (1992:198), the past mismanagement (or rather absence of management) of tropical forests has its roots in the prevailing institutional arrangements. The problem is neither legal nor technical, but institutional and socioeconomic (1992:208). Further, de Montalembert *et al.* (1994) argue that institutional weaknesses constitute a major cause of unsustainable forest management and utilization.

The process of *Doi moi* (Renovation) that began in the late 1980s brought new inspiration into Vietnam's national economy. It resulted in considerable changes in institutional and legal frameworks. A great deal of laws, acts, decrees, regulations and decisions were promulgated and came into effect.

Key land-use and resource policies and laws that affected contemporary institutional arrangements included *Resolution 10* (Central Committee 1988), *Land Laws* (National Assembly 1988, 1993), *Forest Protection and Development Law* (National Assembly 1991), and *Environmental Protection Law* (National Assembly 1993). Resolution 10 played an extremely important role in land management reform. It was about the renovation of existing management mechanism in agriculture, recognizing the role of peasant households in agricultural production. By transferring more management rights and responsibility to individual households on a contract-based system, Resolution 10 has actually provided incentives to households for more productive use of land. However, in the long-run it was not secure enough for farmers to invest and cultivate land. What they needed were legalized/secured rights and access to long-term land use. This was one of the reasons that led to the promulgation of the 1988 Land Law which recognizes the rights of farmers over land use and confirmed the policy on allocation of land to households for long-term use. As a result, food-deficient Vietnam has turned into one of the world's top rice exporters only after a few years.

The 1988 Land Law, however, had some shortcomings in terms of recognizing limited rights of farmers over land use and management, thus it was revised. The newly promulgated 1993 Land Law amended more rights important to farmers such as *exchange, transfer, lease, inheritance* and *mortgage* of the land allocated by the State. The Law validated that land was the property of the entire population, uniformly managed by the State (Article 1). It also confirmed that the State would protect the legal rights and interest of land users (Article 3.1) and allocate land to organizations, households and individuals for stable and long-term use (Article 20). The land-use term could be up to 20 years in agriculture and up to 50 years in forestry, and renewable. But the 1993 Land Law also had some limitations because it did not address minority groups who constitute up to 15% of Vietnam's population and live mainly in forest areas (Corlin 1998). Nor did it legalize ancestral domains and community property rights. Hence, it was amended in 1999.

Nonetheless, both the 1988 and 1993 Land Laws have founded a basis for a series of key laws, regulations and decisions related to institutional arrangements for land and natural resource management, as follows:

- *1991 Forest Protection and Development Law;*
- *1992 Decision 327/CT on policies on the use of bare land, denuded hills, forests, alluvial flats and water bodies;*
- *1993 Environmental Protection Law;*
- *1993 Decree 64/CP on regulations on allocation of agricultural land to households and individuals for long-term use for agricultural production purposes;*

- 1994 Decree 02/CP on allocation of forest land to organizations, households and individuals for long-term use for forestry purposes; and
- 1998 Decision 661/QD-TTg on objectives, tasks, policies and organization for the implementation of the Five-million-hectare Afforestation Program.

As a matter of fact, fast socio-economic changes occurring after ‘Doi moi’ have necessitated the need for contemporary policies to pay more attention to seeking a more sustainable path for the country’s development. The 1991 Forest Protection and Development Law, based mainly on the 1988 Land Law, details all issues related to the management and sustainable use of current forest resources. According to the Law, forests are classified into three categories: *protection forests*, *special-use forests* and *production forests*. Each category is associated with a number of articles concerning forest protection and management, allocation procedure, rights and responsibility of forest users and the State, and so on. These clauses are further emphasized in Articles 12, 13 and 14 of the 1993 Environmental Protection Law which states that environmental protection is a cause for the entire population.

Program 327 has had some success in increasing forest cover during this decade (Figure 1), in terms of planting new forest areas and provision of financial resources to protect existing forests. Decree 64/CP and its successor-Decree 02/CP- have legalized the transfer of responsibility for managing both agricultural and forestlands from the state to individual households and organizations. Although the impacts of these initiatives are mostly positive, the present state of Vietnam's forests does not meet requirements for future development. Therefore, the Five-million-hectare Afforestation Program, which is considered the successor of Program 327, is launched primarily to achieve the objective of increasing Vietnam’s forest cover to 43% of the total area in year 2010.

1.3.2 Institutional arrangements for forest management

The above listed key legislation settings have significantly influenced institutional arrangements for forest management in terms of two ongoing trends. The first one is a shift from top-down to bottom-up, participatory approach to forest management. More attention has been paid to addressing local interests and involving local communities in decision-making and management processes. The second trend is a transformation of the existing management structure. During the Collectivization period, there was the only management scheme - the state-owned - which was represented by forest enterprises. Recently forest resources have been managed under various prevailing schemes (Table 1).

Table 1. Institutional arrangements and associated forests/forestlands

Management systems	Institutions	Status quo	Associated forests/forest land categories
State-managed	Forest Enterprises (FE); Forest Mgt. Boards (FMB); Forest Protection Dept. (FP); [Commune]	<i>de jure</i>	• Protection/watershed forests • special-use forests • production forests • bareland
Privately managed	Households/Group of HHs; Organizations (O)	<i>de jure</i>	• allocated forests and forestland • contracted forests
Community-based	Kinship family; Hamlet/Village; Commune	<i>de facto</i>	• village forests • sacred forests • grazing land
Joint management	FE/FMB/FD vs. HHs/O/Community	<i>de facto</i>	• protection forests • production forests • bare land

The institutional framework upon which the management of forest resources is based is "state management". In Forest Protection and Development Law, state management is interpreted as the overall responsibility of the state for the management of all forests and forestlands, and the ownership of all forest land as well as natural forests and state-funded forest plantations lying with the state (Articles 2 & 3). The functions of state management, which are clearly described in Article 8, are:

1. to carry out forest survey, categorize forests and delineate boundaries of forests and forestlands on maps and on the field down to the communal level, and to carry out inventory and monitor the state of forest resources and land;
2. to prepare plans for the protection and development of forests as well as for utilization of forests and forestlands at the national and local levels;
3. to regulate and organize the implementation of management, protection and development of forests, and the utilization of forests and forestlands;
4. to allocate forests and forestlands and to retrieve forestlands;
5. to register and keep cadastral archives, and to issue certification for legal use of forests and forestland;
6. to carry out inspection/control to ensure enforcement of various policies and regulations on management, protection and development of forests as well as utilization of forests and forestlands; and
7. to resolve conflicts over the use of forests and forestlands.

Further, Decision 245/1998/QĐ-TTg affirms the responsibility of all administrative levels for state management of forests and forestlands. Regarding the Decision, more responsibility is handed over to the General Department of Land Administration (GDLA) and local authorities including Commune's People Committees (CPC). Local authorities are now responsible for fulfilling most of state management functions while Forest Protection will have a narrower responsibility range. Although Decision 245 makes progress in clarifying the responsibility of government departments and local authorities for state management of forests and forestlands, it does not recommend how to go ahead with the enforcement. Nor does it address other relevant parties such as forest enterprises (FE), NGOs and local communities. Having been based on a top-down approach, Decision 245 is therefore likely less feasible within the context of contemporary forest management where various management schemes exist as described below.

1. *Forest enterprise.* As state representatives, forest enterprises manage forestlands covered with natural forests and state-funded plantation forests (Articles 3.1 and 5.1, Decree 02/CP). Land allocation term is determined for FEs regarding the state projection and planning. FEs also allocate forestlands to households and individuals living adjacent to FEs' forests, according to Decree 01/CP dated 4/1/1995 or Article 12.3 of Decree 02/CP (see also contract-based management).

2. *Household.* As privately managed entrepreneurs, households (HHs) manage the allocated forestlands according to Decree 02/CP dated 15/1/1994, mainly bare lands and lands arranged for production forests. HHs are provided with Land Use Title for long-term use up to 50 years, and can have five rights mentioned in the 1993 Land Law and its 1999 Amendment. HHs can also receive contracted forestland for a period of 50 years according to Decree 01/CP.

3. *Contract-based management.* It is implemented with commitments to a contract signed by both the Contractor (FE) and the Contracted (HHs or village) in regards to the Articles of Decree 01/CP. The term of contract is up to 50 years for protection forests, or business cycle length for production forests (Article 11.2). Annually the State provides the budget through Program 327 or the Five-million-hectare Afforestation Program to the Contractor (FE) to pay the Contracted for accomplished work (Articles 12, 13, 14 and 15). The Contracted also benefits from returns outcoming from their labour and capital invested in the contracted land, and all products from intercropping and animal rearing.

4. *Joint management.* This is also a continuum between FEs and household-based management in forestry. Generally, FEs act as land holders and contribute almost everything associated with forest creation like seedlings, fertilizers,

pesticides and technical assistance. Requirements in terms of species choice (generally *E. camaldulensis*, *Pinus*, *Acacia*), density and technical procedures are decided by the FEs. HHs mainly contribute labour to site preparation, planting, tending and protection throughout the business cycle. Information from DongVanh Village shows that benefits are shared between both sides as follows: 1) FEs get 15-20 m³/ha by the end of the business cycle (normally 10 years) after clear felling; and 2) HHs benefit from all intercropping products (food, medicinal herbs) and intermediate products (fuelwood, thinned timber) as well as the remaining timber after sharing with FEs. The entire joint business process complies with commitments of the contract signed by both sides and certified by the local authority (Commune's People Committee).

5. *Community-based management.* Commune's People Committee (CPC) is a basic administrative unit which has authority within a commune's boundary. It controls the local police and semi-armed forces to ensure public security and law enforcement within a commune. Geographically, a mountainous commune where different ethnic minority groups are living can be as large as a lowland district. Article 7.4 of Decree 02/sCP affirms: "In relation to small protection forest areas located within a commune's boundary or village but not allocated yet to particular users, the CPC Chairman is responsible for organizing the villages for the management, protection and development of these forest areas based on the guidelines of state management institutions for local forestry". According to Article 6 of Decision 245/1998-QĐ-TTg dated 21/12/1998, CPC has the responsibility for state management of forests and forestlands within a commune's boundary.

Management at the village level is attributed more to the community's nature because within a mountainous village, the majority of population belongs to a particular ethnic group. Forms of kinship organization, regulations on ancestral domains and local rules or village customs in natural resource use exist. Each ethnic group possesses its own farming methods. Hence, within a commune, forests still exist and are protected well in one village but not in others. People living in a village without forests usually encroach on others with forests in order to log and farm illegally. It is enhanced if the commune takes over the management of these forests. Under such circumstances, the forested village cannot protect its own forests. Therefore, the trend is to claim village-based management of existing forests.

1.4 Policy Relevance of the Study

Clearly, problems and issues emerging in the North Upland of Vietnam are diverse and complex. However, the study will focus on radical ones such as access to and rights over forest resources, management structures and

reconciliation of different stakeholders' interests. The rationale of this study is expressed at two levels. At the macro level, there has been an evolution of land and forest policies that causes substantial changes in land tenure. Although land ownership is still rooted in the State, more (use) rights over land and forests have recently been transferred to private resource users in regards to the Land Law and resource-related policies. In other words, more types of property rights, both *de jure* and *de facto*, are recognized and accepted by the legislation and the society. These changes in land tenure undoubtedly influence the sustainability of forest resources and challenge researchers in natural resource area.

At the micro level, the relationships between forest actors have also become more diverse and complicated as different stakeholders assert different, sometimes contradictory, interests and viewpoints on how forests are managed and used. The conflict among different stakeholders over natural resources including arable land, forests, grazing land, water and others implies that natural resources can be degraded faster as all stakeholders compete for resource extraction for short-term economic benefits. This kind of competition will negatively affect the sustainability of forest resources. On the other hand, the relationship among stakeholders can result in positive impacts on forest resources as in many cases forest actors (forest entrepreneurs and farmers) collaborate and jointly manage forests in a sustainable way. This picture therefore gives researchers a chance to explore many issues surrounding relationships between humans and forest and amongst forest actors.

In a wider context of the developing world, there has been a tendency to shift towards forest management in a sustainable way while securing sustainable livelihoods for local inhabitants. It results in a rationale for doing such studies that help find out what management system in forestry is likely to meet the objectives of sustainable development.

1.5 Research Questions and Hypotheses

The primary research question is as follows:

How are the better institutional structures for forest management of the North Upland of Vietnam defined and promoted?

Subsidiary questions to the primary one include:

1. How have the recent institutional settings influenced forest management in the North Upland?
2. What is the nature of the forest management regimes existing in the North Upland?

3. What is the better management regime within the context of sustainable development in the North Upland?
4. What policy recommendations may be formulated to foster better forest management regimes?

These research questions can then be operationalized into the following hypotheses:

- The extent of deforestation depends on: (i) the proximity to forests as well as to infrastructures (roads, market centres, etc.), (ii) the productivity of agricultural land, and (iii) the magnitude of household income.
- The degree of local participation depends on: (i) level of literacy of local people; (ii) perception of role, functions and sustainability of forest resources; (iii) local customs, values and attitudes; (iv) security of long-term use rights and access to forest resources; (v) existing institutional structures, and (vi) existence of a clear and effective incentive system.
- The better management of forest resources depends on: (i) higher degree of local participation; (ii) appropriateness and stability of land use policies; (iii) reconciliation of local and national interests, and (iv) collaboration and mutual understanding among different stakeholders.

1.6 Structure of the Report

As the final part of the research process, this report aims to provide the donors and related bodies with information on how the project has been implemented, and what the next steps including policy recommendations and further research are likely to be. The report begins with a brief introduction including an overview of the North Upland in terms of general geographical/physical and socio-economic characteristics, and an analysis of institutional framework for contemporary forest management in Vietnam in general, and in the North Upland in particular. The next component is a critical review of literature related to institutional issues of resource management such as property rights, institutions, and participation. The methodology presents summaries of the selection of the study sites, the methods used in data gathering and analysis. Results and main findings in the three study sites are described to give a picture of the common and/or distinctive features in the different locations of the North Upland, and generalization of issues emerging in the study sites. Analysis of data includes assessment of a number of C&Is and their further treatment using a multicriteria method (TopDec). A discussion of the strengths, weaknesses and reliability of the results is presented. The final section summarizes the justification of the hypotheses tested, and some suggestions for policy implications and further research. Information on field survey schedule,

changing sets of C&Is for sustainable forest management, consolidated data from the field, outputs of multicriteria analysis using TopDec, and a list of researchers involved could be obtained on request from the author.

2.0 LITERATURE REVIEW

2.1 Institutional Issues

2.1.1 Property rights

Property rights refer to a bundle of entitlements defining the owner's rights, privileges and limitations in the use of the resources. By examining such entitlements and how they affect human behaviour, environmental problems arising from government and market allocations will be better understood (Tietenberg 1992: 45). Property is the right to a flow of benefits, and that right is secured only as long as others agree to honour it. In contrast, a privilege is a use not accompanied by a right, and that use can be exercised because others have no rights either: this is open-access (Pearce and Warford 1993: 248).

Hanna and Munasinghe (1995) argue that property rights are fundamental to the use of environmental resources. They aver that most environmental problems can be seen as problems of incomplete, inconsistent, or unenforced property rights regimes. Other authors (Arrow *et al.* 1995) claim that humans interact with their environment through systems of property rights embedded in social, political, cultural and economic context. The outcome of that interaction affects both the quantity and quality of environmental resources. The “tragedy of the commons”² in Hardin's (1968) example is an environmental outcome resulting from an inadequate specification of property rights to the environmental services of pasture.

In most environmental economics literature, the broader term “property rights regimes” (or “resource management regimes”) has been widely used. Property rights regimes have two components: *property rights*, which are bundles of entitlements defining owners' rights and duties characterizing the relationship of individuals to one another with respect to a particular resource, and *property rules*, which are the rules under which those rights and duties are

² The meanings of common property and open-access regimes need to be stated clearly because the two regimes are often confused with one another. In an open-access system there are no exclusive rights and resource use is open to everyone. This may result in the over-exploitation of resources. In a common property regime the resources are owned and managed by defined groups, but the group managing the resources may not be the same group who owns the resources. In this regime, specific rules detail the composition of the group and regulate the use of resources (Tacconi 1997).

exercised (Bromley 1991). Property rights regime can also be understood as a subset of a society's institutions, the organizational constraints which structure incentives and shape human interactions (North 1990).

Bromley (1989, 1991, 1997) enumerates the four broad types of resources management regimes pertinent to environmental economics: (1) state-property regimes; (2) private property regimes; (3) common-property regimes, and (4) non-property regimes (open-access). Table 2 shows the characteristics of rights and duties and privileges of these four types.

Table 2. Definition of property regimes

Types of property	Definition
State	Individuals have a duty to observe the rules of use as determined by the controlling agency. The agency has the right to determine these rules.
Private	Individuals have the right to undertake socially acceptable uses and a duty to refrain from unacceptable uses. Others have a duty to respect individual rights.
Common	A management group has the right to exclude non-members. Non-members have a duty to abide by that exclusion. Co-owners comprise the management group and have the rights and duty related to the use of resources.
Open-access	No users or owners are defined. Individuals have the privilege but not the right to use resources.

Source: Adapted from Bromley (1989: 872)

When dealing with property rights and renewable resources, Pearce *et al.* (1993) conclude that:

- Open-access contains high risks of resource degradation even though, technically, an equilibrium should exist at which average profits are zero and the resource is used sustainably.
- Common property is associated with a set of rules typically existing for the management and sustainable use of the resource. However, common property can break down due to a number of influencing factors such as the insertion of alien values by colonialists, exogenous technological change, and population growth. It can work particularly when the incentives for communality are high.
- Privatization, in fact, is attractive because it provides incentives for individuals to develop/improve land and resources. It is, however, also consistent with optimal resource degradation and the continued existence of externalities among owners. It can work only with adequate enforcement.

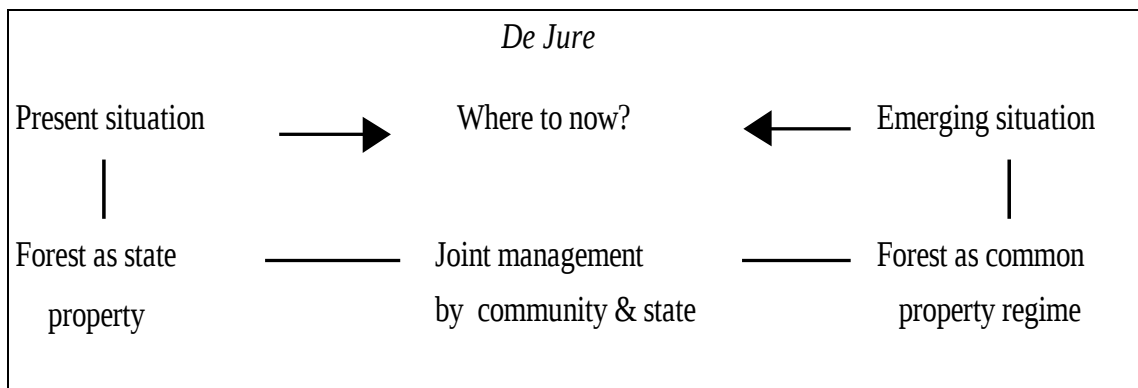
With a similar analysis of resource management regimes, Bromley (1991) argues that bringing resources under a regime of individualized private property in developing countries will often conflict with prevailing socio-cultural values. He also suggests that it may sometimes be more appropriate to restore a common property than to attempt to promote privatization. In regards to open-access regimes, it appears that the necessary precondition for any successful policy prescription is the conversion away from open-access to whichever other regimes.

According to Bromley (1991), converting open-access situations to common property systems is a complex process that cannot be done by administrative decrees. When such a process is attempted, the design of the change process must take into account a number of general variables and their local context. These variables are the: (1) nature of the resource itself; (2) supply-demand condition of the resource; (3) characteristics of the users of the resource, and (4) characteristics of legal and political environment wherein the users reside (Ostrom 1986).

The debate on property rights, however, continues. On one hand, some authors state that total privatization of resources to rational individuals will lead to more efficient and sustainable use (Demsetz 1967). On the other hand, the common property literature points to the potential of sustainable group management of forests, where there are adequate individual incentives to secure long-term tenure arrangements (Fortman and Bruce 1988) and group-imposed restrictions. Ostrom *et al.* (1988) detail many cases that indicate situations in which cooperation between a group of resource users does lead to careful and sustainable management. McKean (1995) questions the forms by which property rights should be divested and which are deemed important for consideration, as follows:

- To whom (how many persons, which persons, with what distributional consequences) should property rights be vested?
- Which rights should be transferred - full ownership with rights of transfer, or just use rights?
- What kind of resources should be privatized? Are all objects equally able to be divided up? Should ecosystem boundaries matter?

Runge (1986), however, contends that there are no single property rights scenarios, rather a continuum of options that need to be put in place regarding the particular conditions and context of the resources. An example of such continuum is shown in Figure 3.



Source: Kant, et al. 1991

Figure 3. The forest management continuum

2.1.2 Institutions

Institutions are organizations or groups with sets of rules that cover expected behaviour, sanctions for breaking the rules and rewards for behaving in the prescribed manner (FAO 1992). The word ‘institutions’ or ‘institutional arrangements’ encompasses a broad set of meanings. There are two main complementary concepts which underpin this analysis of institutions: (i) regulatory arrangements such as customs or set of rules, values or practices accepted by members of a particular group which tend to lead to repetition of patterns of behaviour, and (ii) organizational arrangements which include ordered groups of people such as a family, farm, private firm, non-profit or governmental agency (Gibbs 1986; Uphoff, 1986, 1992, 1993).

Hobley (1994) adds that in forestry there are several important levels of interpretation of what constitutes institutions, including: i) property rights institutions; ii) formal institutions (government forest departments - covert or overt); iii) non-formal institutions for resource management (extant or new). Furthermore, she mentions several ways in which local organizations for forest management may emerge: as a local (indigenous) response to resource management, or as an externally catalyzed response. For illustration, some indigenous organizations for forest management in both India and Nepal have been analyzed. Some of the issues surrounding the interface between new and existing organizations have also been highlighted. In debating the question on what is the most appropriate institutional structure for participatory forestry at the local level, Gilmour and Fisher (1991) pinpoint two issues: the recognition and the role of informal, indigenous local management systems versus the imposition of more formal externally developed organizations such as government forest departments.

When dealing with common property forest management in Nepal, Fisher (1989) claims that the essential features of all indigenous management systems are institutionalized patterns of behaviour that include so-called mutually recognized use-rights. He concludes that there is no single organizational model that can serve as a unique solution to the emerging problems. Having seen the role of the existing local organizations, he considers their replacement by ineffective ones unnecessary. Whereas, more support from outside should be required to promote local action. The approach he proposes is based on three steps: 1) recognizing the existing systems and leaving them intact if they are effective; 2) strengthening them if they are inadequate, and 3) assisting in establishing new institutions where necessary while taking into consideration the existing use-rights.

In Nepal and India, forest management takes different forms such as government forests, indigenous forests, externally imposed or sponsored forest management, and joint forest management as ideal scenarios. Each form is characterized by detailed institutional arrangements as described by Hobley (1994: 108-9).

2.2 Sustainability

2.2.1 Concept of sustainability

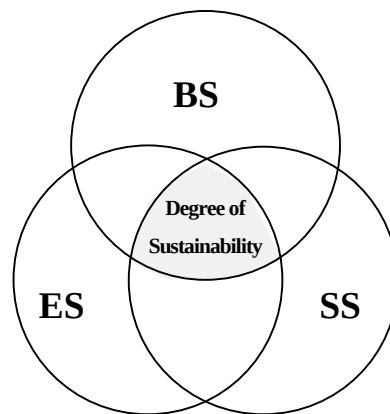
Sustainable development (SD) is a new term that grew out of the conservation and environmental movement of the 1970's. While the conservation/environmental movement focuses on questions about preserving the Earth's resources, sustainable development issues include questions on how human decisions affect the Earth's environment. At that time, sustainable development meant different things to different people or groups. The most widely held definition is that of the Brundtland Commission Report of 1987 which states that we must "*meet the needs of the present without compromising the ability of future generations to meet their own needs*". In other words, when people make decisions about how to use the earth's resources such as forests, water, minerals, fossil fuels, wildlife, etc., they must take into account not only how much of these resources they are using, but what processes they use to get these resources, and who has access to these resources. Will there be enough resources left for our grandchildren to use and will the environment be left as we know it today? (Adapted from <http://www.lbl.gov/Education/ELSI/sustainable-defined.html>)

The distinguishing features of SD are:

- it embodies a concern for equity between current and future generations;
- it pays particular attention to the significance of the environment as both a constraint to economic activity and as a contributor to human welfare, requiring the integration of economic and environmental policies;
- it affirms the need for improved living standards for the current poor, both as a matter of equity within the current generation and as a means of protecting the environment for future generations.

(From Pearce and Turner 1990:24; Repetto and Pezzey 1990:3; Barbier 1987:102-3; also Redclift 1992; Bromley 1990; Chambers 1983).

The current concept of sustainable development encompasses three key components - economic, social and environmental (Barbier 1987), or three dimensions - economic efficiency, ecological integrity and social well-being (IISD 1993). Barbier (1987) describes these subsystems with their own goals and the extent to which they overlap will determine the level of sustainability (Figure 4). To fulfill the goals of SD, it is necessary to take a holistic approach that considers the environment, economy, society and their interdependencies.



<i>Biological system (BS) goals:</i>	<i>Economic systems (ES) goals:</i>	<i>Social systems (SS) goals:</i>
• genetic diversity • resilience • biological productivity	• satisfying basic needs • equity enhancing • increasing useful goods and services	• cultural diversity • institutional diversity • social justice • participation

Source: Adapted from Barbier (1987).

Figure 4. Integrated approach to sustainable development

2.2.2 Sustainability and property rights

The question of sustainability is complicated, requiring answers involving more than the generic application of a property regime. Property rights regimes must reflect both general principles and specific social and ecological contexts. General principles are the structural and functional attributes of property rights regimes which transcend a particular context. They are the *necessary* conditions of effective property rights regimes because the latter cannot succeed in the long run without them. They include the congruence of ecosystem and governance boundaries; the specification and representation of interests; matching of governance structure to ecosystems characteristics; containment of transaction costs, and establishment of monitoring, enforcement and adaptation processes at the appropriate scale (Eggertsson 1990; Ostrom 1990; Bromley 1991; Hanna 1992).

To make general principles *sufficient* for effective property rights regimes, specific attributes of social and ecological context must be represented. Social contexts contain all the dimensions of the human relationship to environmental resources including social arrangements, cultural practices, economic uses and political constraints. Ecological contexts contain the structure of ecosystems in which humans live and work, as well as the particular functional properties of ecosystems. The match between a property rights regime and the contextual characteristics of the affected humans and ecosystems will determine the success or failure of sustainability (Hanna and Munasinghe 1995). Further, the correct economic valuation of environmental and socio-cultural assets, and their internalization in the price system is one means of ensuring that market forces lead to more sustainable resource use. The more equitable distribution of resources and assets is a step toward poverty reduction and social sustainability, as is greater participation and empowerment of disadvantaged groups. Clearly, property rights regimes that specify access to the natural resource base and rights of use have a crucial role to play in this context (Dasgupta 1993).

2.3 Criteria and indicators (C&I) of sustainable forest management

The issue of sustainability of forest resources itself cannot be considered separately from its criteria and indicators. Various C&Is have recently been formulated in major international arrangements such as The Montreal Process 1994, ITTO 1993, The Helsinki Process 1993, The Tarapoto Process 1995, and FAO/UNEP 1995 with reference to Chapter 11 of Agenda 21 and *Forest Principles* (Zentilli 1997:230-5). However, a more comprehensive and thorough study of C&Is of sustainable forestry has been devoted to CIFOR's recent research (http://www.cgiar.org/cifor/research/c_and_i/)

Basically, this present research was based on the “Guidelines for Developing, Testing and Selecting Criteria for Sustainable Forest Management” (Prabhu *et al.* 1998). To make sure that the sets of C&Is used were consistent, the definitions of principles, criteria, indicators and verifiers (Tropenbos 1997) were clarified as follows:

- A *principle* is a fundamental law or rule serving as a basis for reasoning and action. Principles have the character of an objective or attitude concerning the function of the forest ecosystem or concerning a relevant aspect of the social system that interacts with the ecosystem. Principles are explicit elements of a goal, e.g., sustainable forest management or well-managed forests.
- A *criterion* is a state or aspect of the dynamic process of the forest ecosystem, or the state of the interacting social system, which should be in place as a result of adherence to a principle. The way criteria are formulated should give rise to a verdict on the degree of compliance in an actual situation.
- An *indicator* is a quantitative or qualitative parameter which can be assessed in relation to a criterion. It describes in an objectively verifiable or unambiguous way features of the ecosystem or the related social system, or the elements of prevailing policy and management conditions and human-driven processes indicative of the state of the eco- and social system.
- A *norm* or *verifier* is the reference value of the indicator and is established for use as a rule or a basis for comparison. By comparing the norm/verifier with the actual measured value, the result demonstrates the degree of fulfillment of a criterion and of compliance with a principle.

Any set of principles, criteria, indicators and verifiers constitutes a tree-form hierarchy. That is, a principle may be followed by a number of criteria. Further, several indicators may stem from each of these criteria. One indicator may be interpreted differently in terms of different verifiers depending on what particular conditions this indicator is tested. An example is shown in Table 3.

Table 3. Illustration of principles, criteria, indicators and verifiers for SFM

P	C	I	V	Principles, Criteria, Indicators and Verifiers
1				Forest management should maintain or enhance the flow of benefits from forest resources, with access generally perceived as just by all stakeholders
	1.1			Forest actors' current and intergenerational access to resources is secure
		1.1.1		Intergenerational tenure and/or use rights to land/forest have been assessed and delineated
		1.1.2		Tenure and use rights are clear to all stakeholders, including forest women and men
		1.1.3		Effective mechanisms for forest resource management and conflict resolution exist, available to all stakeholders
		1.1.4		Forest actors feel comfortable about the security of their rights
			1.1.4.1	Little or no decrease in access to commonly used forest products
			1.1.4.2	Little or no reduced access to sacred or culturally important sites
			1.1.4.3	Few or no rumors about impending land grabs
			1.1.4.4	Few or no attempts to reinforce land security

Source: Adapted from Wollenberg and Colfer (1996:11)

2.4 Participatory Rural Appraisal (PRA)

In recent years, there has been a widespread shift from top-down, forest-focused to bottom-up, people-centred approaches to forest management (Guggenheim and Spears 1991; Cernea 1991; Chambers 1994a; Hobley 1996; The World Bank 1996). This shift has been widely seen as an alternative solution to the emerging problems of deforestation in most developing countries. Under most centralized forest policies, large management units are oriented to a single-use objective (such as timber production or policing on a conservation site) and the rights of local users are limited to low-value secondary products and temporary concessions. In contrast, participatory forest projects are based on a broader valuation of forest resources, taking into account the multiple values of forests and the social and economic needs of local forest users. Access and use rights to forests - as well as conflicts arising among competing users - are locally defined and managed. The structure of incentives and the choice of technologies are geared to environmental sustainability over the long term.

Self-help management of trees and forests by or with rural people is potentially one of the most effective ways of sustainably managing forest resources in developing countries. The real reason for the lack of *local participation* is that outsiders misinterpret local constraints to and attitudes towards participation. Important factors in this regard are institutional

opportunities to improve access to and tenure over forest resources and land-use rights. Only a feeling of ownership and a guarantee of benefits will encourage local communities to take on long-term forest and tree management. This can be provided only by *more appropriate institutional arrangements* that benefit those practicing management and those providing services (Hoskins 1994). Many examples of participatory approaches and methods that have been used and covering a variety of countries, sectors and types of activities can be found in the Participation Sourcebook (The World Bank 1996).

One practical set of approaches which coalesced, evolved and spread in the early 1990s bears the label Participatory Rural Appraisal (PRA). This has been described as “a growing family of approaches and methods to enable local (rural or urban) people to express, enhance, share and analyze their knowledge of life conditions, to plan and to act” (Chambers 1994b). PRA has also been called “an approach and method for learning about rural life and conditions from, with and by rural people” (Chambers 1994a: 953). It has five streams which are considered as sources:

- *activist participatory research* whose contributions to PRA have been more through concepts than methods;
- *agroecosystem analysis* whose major contributions to current RRA and PRA have been transects, informal mapping, diagramming (seasonal calendar, flow and causal diagrams, bar charts, Venn diagram) and innovation assessment (scoring and ranking);
- *applied anthropology* which has contributed to PRA through the idea of flexibility; importance of attitudes, behaviour and rapport; emic-etic distinction, and validity of indigenous technical knowledge;
- *field research on farming systems* which has contributed especially to the appreciation and understanding of the complexity, diversity and risk-proneness of many farming systems; the knowledge, professionalism and rationality of small and poor farmers; their experimental mindset and behaviour; and their ability to conduct their own analyses, and
- *rapid rural appraisal* (RRA) which shares with PRA some principles such as a reversal of learning, learning rapidly and progressively, offsetting biases, optimizing tradeoffs, triangulating and seeking diversity (Chambers 1994b). It has also contributed to PRA most of its methods and techniques.

The difference between RRA and PRA can be seen in several ways. In RRA information is elicited and extracted more by outsiders who then take it away and analyze it. In PRA it is more shared and owned by local people, meaning that outsiders are convenors, catalysts and facilitators who enable local people undertake and share their own investigation and analysis. RRA methods are more verbal, with the outsiders more active, while PRA methods are more visual, with the local people more active. The changing nature of RRA and PRA is better seen as a continuum (Table 4). Besides the principles shared with RRA, PRA has evolved four other principles that include *they-do-it*, *self-critical awareness*, *personal responsibility* and *sharing* (Chambers 1994b). Some of the more developed and tested methods of PRA are participatory mapping and modelling, transect walks, matrix scoring, well-being grouping and ranking, institutional diagramming, seasonal calendars, trend and change analysis, and analytical diagramming, all undertaken by local people (Chambers 1994c).

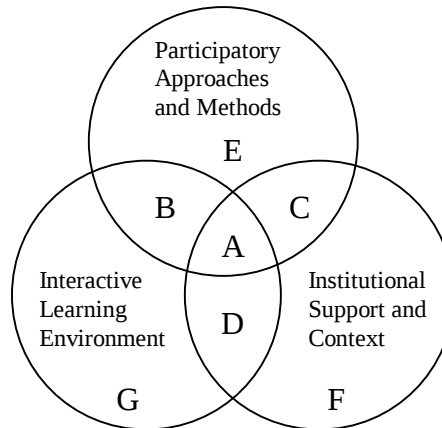
Table 4. The RRA-PRA continuum

Nature of Process	RRA-----PRA
Mode	Extractive elicitive sharing Empowering
Outsiders' role	Investigator-----Facilitator
Information owned, analyzed and used by	Outsiders-----Local people
Methods used	Mainly RRA plus sometimes PRA-----Mainly PRA plus sometimes RRA

Source: After Chambers (1994a)

PRA approaches and methods have evolved and spread so quickly that in early 1994 most of the known applications could be separated into four major types of process and into four major sectors (Chambers 1994a: 961). The four types of process include participatory appraisal and planning; participatory implementation, monitoring and evaluation of programs; topic investigations; and training and orientation for outsiders and villagers. The four major sectors are: (i) natural resource management including land policy and forestry; (ii) agriculture; (iii) poverty and social programs, and (iv) health and food security. Currently PRA is widely used and has spread in both the South and the North (Chambers 1994c: 1439-40).

Participatory approaches and methods alone, however, will not convert a conventional, technically-oriented institution into a more people-centered and sensitive one. Pretty *et al.* (1995:63) suggest three essential areas to tackle: new methodologies for field-level work, new learning environments for professionals and rural people to develop capacity, and new institutional environments including improved linkages within and between institutions (Figure 5).



Source: Adapted from Pretty *et al.* 1995

Figure 5. Participatory approaches, learning and institutions

3.0 METHODS USED

3.1 Selection of Study Sites

3.1.1 Criteria for selection of study sites

The study focused on the North Upland of Vietnam. Three study sites were selected: one in the west, another in the east, and the last in the central part of the North Upland. A number of criteria were used to select the study sites such as:

- *local willingness to participate and collaborate.* This is the precondition for a successful field survey, particularly when a participatory approach is employed. Local participation means involvement of local communities as well as local (forestry) staff.
- *existence of permanent forests that are being managed.* An area with forest cover will provide much more information on forestry in terms of problems that occur in the management and use of forest resources and insights toward future forestry.
- *significance of the site.* The sites must be significantly different. For example, one site relates to watershed forests, another is concerned more with production forests, while the third may be adjacent to both. On the other hand, different sites may have different development histories.

- *difference in institutional arrangements for forest and land use.* The difference is seen in terms of the progress of land allocation, different stakeholders involved and forest land uses.
- *geographical coverage.* Study sites must be scattered to represent different human-geographical sub-regions and to enable useful comparative study.

The process of selecting the study sites went through several steps. First, personal contacts with local staff working in forestry organizations such as the Department of Forest Development, Forest Enterprises and Forest Protection were made. These people were requested for advice as to which locations meeting the above criteria were existing in their area. Some basic information, therefore, was highlighted. Using this information, the team members sat together and screened each site for further consideration. A plan of preliminary visits to the pre-selected sites was then designed. Arrangements including contact with local staff to confirm the date and the length of visits were made.

3.1.2 Preliminary visits

The preliminary visits to each site took about 2-3 days. An introduction letter signed by the Director of Forestry University was presented to the local senior officers, either the Chairman of District's People Committee, the Head of Forest Protection Section or the Director of FE depending on how a particular institution most affects or influences forest management in a site. Aware of the visits' purpose, the involved local officers further introduced the study team down to the commune leaders. The procedure was repeated until the team reached the village heads.

A quick observation of the local landscape was taken, and part of the secondary data related to background information of the villages such as geographical/physical and socio-economic conditions was gathered. A short discussion among team members would decide whether to choose the site for conducting appraisal. An important thing that was addressed to the village leaders was the selection of 10 key informants to work with the study team during the PRA process. Criteria for their selection were as follows:

- *should belong to different ages (young, middle, old);*
- *should belong to different ethnic groups and/or families living within the site boundary;*
- *should come from different parts of the location because the site is usually large;*
- *should be balanced in gender number;*

- *should be cognisant of local conditions and events that happen at the site and have experience in farming and forest use;*
- *should actively participate in the appraisal process.*

The visits also helped the team members pre-test some C&Is for sustainable forest management (see below). Another issue was organizational arrangements for the formal PRA. The team informed the local people about the approximate time to conduct PRA, taking into account local farming calendar and special events, and asked them to arrange the venue for working, eating and sleeping before the next arrival of the team.

The three selected study sites were:

1. Moi Hamlet, ThungNai Commune, KySon District, HoaBinh Province located in a strictly protected area of watershed forests, in the west part of the North Upland.
2. Village 7, YenThai Commune, VanYen District, YenBai Province located in an area of protection-production forests, in the central part of the North Upland.
3. DongVanh-1 Village, LucSon Commune, LucNam District, BacGiang Province located in an area of production-protection forests, in the east part of the North Upland.

(Details of these study sites are found under the Section “Results”).

3.2 Study methods and approaches

3.2.1 Participatory Rural Appraisal (PRA)

To achieve the objectives of the research project, it was suggested that the PRA to be conducted should be more topical than exploratory. Therefore, a number of relevant PRA and PRA-related tools as found in Chambers (1994a; 1994b, 1994c) and in other PRA literature were selected:

- | | |
|---|---|
| 1. Village walk | 8. Institutional analysis/Venn diagram |
| 2. Opportunity map | 9. Transect |
| 3. Village historical profile | 10. Participatory consolidation of data |
| 4. Wealth ranking | 11. Seasonal calendar |
| 5. Participatory mapping | 12. Village meeting |
| 6. Livelihood analysis/Household interviewing | 13. Preference ranking |
| 7. Trend lines | 14. Semi-structured interviewing |
| | 15. Causal analysis |

The others were modified based on the techniques and tools found in Colfer *et al.* (1998) and Fraudenberger (1994), as follows:

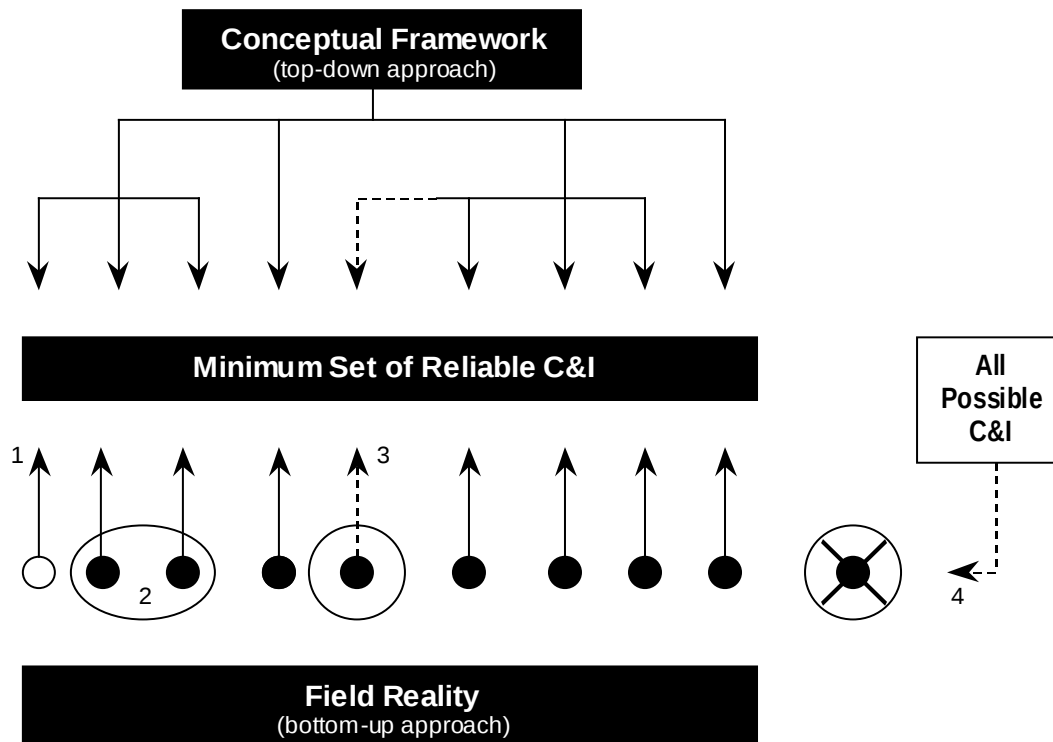
16. *Histo-ecological matrix/Access to resources by generations*
17. *Focus group analysis*
18. *Who counts*
19. *Rights/Mean to manage*
20. *Benefit sharing among stakeholders*
21. *Conflict matrix*

Generally, one PRA took about a week to accomplish in each site. The study team usually worked with a group of pre-selected key informants (see *Preliminary visit*). The principle of flexibility was extremely important here due to unexpected factors such as weather and key informants' performance. For example, the schedule for transect walk was changed several times due to heavy rains, thus other tools were resorted to. Information was primarily gathered while working with key informants, and this was verified by the villagers during village meetings. An essential part of the process was the discussion with the other relevant stakeholders like Forest Protection or Forest Enterprise on issues that emerged during the PRA in the village. All information gathered was used by the study team to assess C&I for sustainable forest management, and forest management regimes in later stages as well.

3.2.2 CIFOR approach

The theoretical background of this approach is described in detail in "Guidelines for developing, testing and selecting criteria and indicators for sustainable forest management" by Prabhu *et al.* (1999). Regarding this conceptual framework, the assessment process needs inputs from both the top-down and the bottom-up (Figure 6). 'The objective of the bottom-up process is to ensure that information, especially from the field, is not lost; that of the top-down process is to ensure that the right conceptual information is retained (Prabhu *et al.* 1999:54). In other words, the combined approach can ensure that the principles of sustainability are secured and the C&Is are context-specific and locally adapted.

Dendrite represents an outline of the critical issues manifested as principles and criteria. Black dots represent C&I in base sets. Number 1 denotes a gap in base sets (a new C/I to be proposed); number 2, a match between C&I in the base set and the conceptual framework — C/I selected; number 3, a gap in the expert's conceptual framework; and number 4, C&I outside the limits of the conceptual framework — C/I rejected.



Source: After Prabhu *et al.* (1999).

Figure 6. Schematic depiction of the 'top-down' and 'bottom-up' processes for evaluating C&I.

In this research, a simplified CIFOR approach was employed and included the following steps:

1. Short-listing of possible baseline sets of criteria and indicators proposed by CIFOR, ITTO, Montreal Process, and Tarapoto (Prabhu *et al.* 1998; Zentilli 1997). It involves a number of researchers with different backgrounds using Form 1 (Prabhu *et al.* 1999:135).
2. Sorting the short-listed C&Is regarding five domains: Policy (P), Social (S), Production of Good and Services (M), Ecology (E), and Financial and Economics (F). Each set of the sorted C&Is was allocated to an individual team member in regard to his background. The team members preliminarily selected which C&Is to use further in the field using a cut-off point. They then anticipated the possible information relevant to a C&I of their domain that would be needed in the field.
3. Testing the pre-selected C&I during preliminary visits to the study sites. The team members then decided which C&I could probably be appropriate to each site.

4. Testing the C&Is in the field (each site) during PRA process using Form 2 (Prabhu *et al* 1999:137). As a result, a final set of C&Is for each site was selected.
5. Using the selected set of C&I for each site to rank different forest management regimes against degrees of sustainability (10 = most sustainable, 1= least sustainable). These rankings were input into multi-criteria decision- making device (TopDec) for further treatment.

3.2.3 Multiple Criteria Decision Making (MCDM) Framework

Multiple stakeholders with various management objectives require a multicriteria decision making (MCDM) approach to upland forest management. MCDM refers to "making decisions in the presence of multiple, usually conflicting, objectives..." In MCDM there is (or are) a decision maker (or makers) who makes the decision, a set of objectives to be pursued, and a set of alternatives from which one is to be selected (Zionts 1989: 7-8). It is assumed that a decision-maker should always accept the options, which maximizes his expected utility given the following axioms:

- a. *Ordering* - things can be put in order of preference;
- b. *Transitivity* - if A is preferred to B and B to C, then A should be preferred to C;
- c. *Dominance* - if A is as good as B in every respect and A is better than the B in at least one respect, then A should be preferred to B;
- d. *Sure Thing* - when forming one's preference between A and B, one should not be influenced by identical aspects they hold in common, although identical aspects may mean different things to different options. (Adapted from <http://www.enterprise-lse.co.uk/mca.htm>).

MCDM considers the importance of determining a set of solutions and the choice of a mechanism for choosing an alternative. Zionts (1989:11) states that "an optimal decision is one that maximizes a decision maker's utility (or satisfaction)". In other words, the overall value of an option is considered to be the weighted sum of the values assigned to the different attributes (criteria). The decision-maker, being rational, will choose the option with the highest overall (cumulative) value. (<http://www.enterprise-lse.co.uk/mca.htm>)

According to Arrow and Raynaud (1986), the multicriterion ranking process consists of two steps: (1) an identification step involving the selection of relevant alternatives and relevant criteria (see above), and (2) a processing step focusing on the selection of an aggregation method and its application to the

data, and almost in any case a weighted majority method. In the first step, a large but finite set of competing alternatives and a set of criteria that are supposed to be pertinent for the decision are identified. In the second step, 'the quantity of information is too large to allow a simultaneous treatment by the short-term [human brain] memory...' This is often typical of the urge for help expressed by many decision-makers: they estimate that they are not able to consider concurrently all the projects and all the desirable criteria in order to make the decision as they would like' (1986:12). However, this kind of treatment can be done using computer-based programs.

Obviously, an MCDM Framework was employed in this research to ensure the connectivity of the information gathered with policy options or alternative institutional structures. The framework required pre-selected criteria as 'inputs' for an analytical process. Therefore, it was strongly suggested that the proposed criteria and indicators be 'verified' during the PRA process and used as a basis for the 'criteria' part of the MCDM.

TopDec is one of the recently developed computerized programs that can be used to assess the different institutional structures against sets of selected C&Is appropriate for each study site. It also includes explicit treatment of weightings on criteria. In other words, it is a decision support software which aims to assist in selecting a "best choice" from a range of options. The range of options can be drawn from possible scenarios. This kind of software works well with a large number of possible options, or with a small number of options that have numerous differentiating factors.

TopDec normally generates a result in the form of a table of final scores (Figure 7). The final score is actually a weighted sum of values assigned to different criteria that are used for assessing different management options. The criteria can be valued for each management system using *degree of sustainability* through a matrix ranking format. For this study, selecting and ranking these criteria were pursued based on CIFOR approach (see above) with information obtained during the PRA process. The rankings ranged from 1 to 5 (or 10) where 1 means least sustainable and 5 (or 10), means most sustainable. Values that fell in-between were regarded as continuum of the least and the most sustainable. The criteria can also be weighted using *level of importance*, that is, the more important the criterion, the higher the weight. These weightings vary from 1 to 10, with 1 as the least important and 10 the most important.

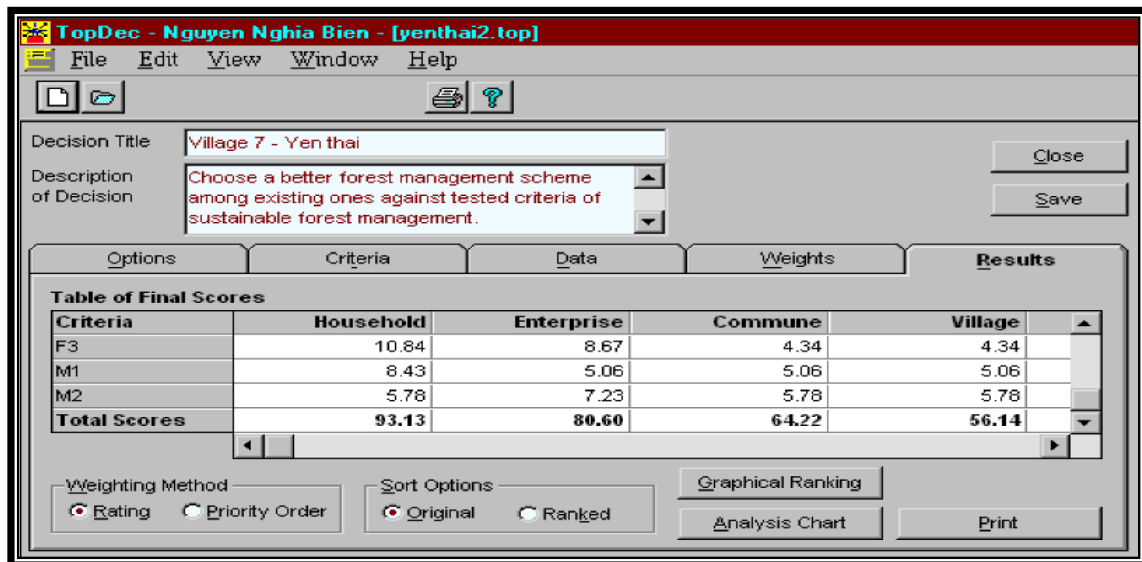


Figure 7. Illustration of a multicriteria decision analysis using TopDec

Therefore, the final scores can be used in interpreting whether an option is preferable or not because they take into account the effect of all criteria in terms of sustainability and importance of degrees. Simply put, the higher the final score is, the better the option. Nonetheless, the final score can only indicate preference ranking of different options in an ascending or descending order where the rule of *transitivity* can work. It does not show how much one management option is preferred over others. It sometimes results in difficulty in deciding between two options with almost similar final scores.

4.0 RESULTS

4.1 General Features of the Study Sites

4.1.1 Site 1. Moi Hamlet, ThungNai Commune, KySon District, HoaBinh

Moi Hamlet lies along the HoaBinh Reservoir bank. "Moi" means "new", because it was newly established after the uphill migration of local people as their former location was subjected to flooding in 1983. The hamlet can be reached by road from HoaBinh town centre to the west via a 20-km distance or a 25-km long river line from HoaBinh Dam (Figure 8). The hamlet is classified as a deep remote, upland area of KySon district. It is easily accessible during dry season. However during the rainy season, bad road surface and landslides isolate the area, with only motorbikes able to pass through. In such circumstances, the water lines seem more appropriate in connecting Moi Hamlet to the outside world.



Source: <http://home.vnn.vn/english/map/>

Figure 8. Map of HoaBinh Province

Topography is diverse, comprising a *below-115-meter elevation flooded area* and *above-115-meter elevation lime mountains*. About 913.2 ha of natural forests cover the lime mountains. Moi Hamlet has a tiny paddy field measuring 3,000 m². Geographically, Moi Hamlet is located within a 2-km-wide belt surrounding HoaBinh Reservoir, which is considered a strictly protected area. However, all types of intensive resource use such as swidden farming, forest cutting and hunting are still practiced.

The temperature averages about 20-25°C, with a minimum of as low as 7°C and a maximum of 39-40°C. The average humidity fluctuates from 69% to 86%. The rainy season lasts from April to October with a peak in July and August. This makes the forests here extremely important in regulating the water level of HoaBinh Reservoir throughout the year.

Currently, there are 56 households found in Moi Hamlet. Of this number, 14 households have settled around Den Bo (Temple Bo) - a well-known spiritual site - and survive by providing services to religious visitors. Majority of the villagers belongs to the Muong ethnic group. Historically, these people are closely related to the ancient Vietnamese who migrated from somewhere in HaTinh province (the Central Vietnam) more than 4,000 years ago. Thus, their language is much similar to Vietnamese except for a different sounding accent. Exceptionally, many words sound and mean absolutely the same as those currently used in Central Vietnam like *doi* (bow), *tru* (buffalo), and others. Although the villagers no longer till paddy fields at such high elevations, they still possess good wet-rice farming experience and skills as the lowland Kinhs.

The demographic dynamics is shown in Figure 9. The present population totals 257 people. The labour force constitutes 40%, while school-age young people comprises 34%. Before 1983, villagers lived in the low valley, which is currently under water, and practiced wet-rice cultivation. After moving uphill, the new environment does not suit them in terms of livelihood. The main source of income from wet rice has been lost since then, and the people have to look for other income sources such as natural forests and swidden farming. Due to lack of experience in upland farming, dry hill rice yield is quite low at only 600-700 kg per ha. Low productivity and small cultivated lands cannot provide enough food for the new settlers. The villagers, therefore, grow other crops such as maize and cassava, wherever possible, along the reservoir's bank during the dry season as well as on sloping forestlands. These crops are exchanged for rice brought by outsiders/traders because the Muongs mostly eat rice.

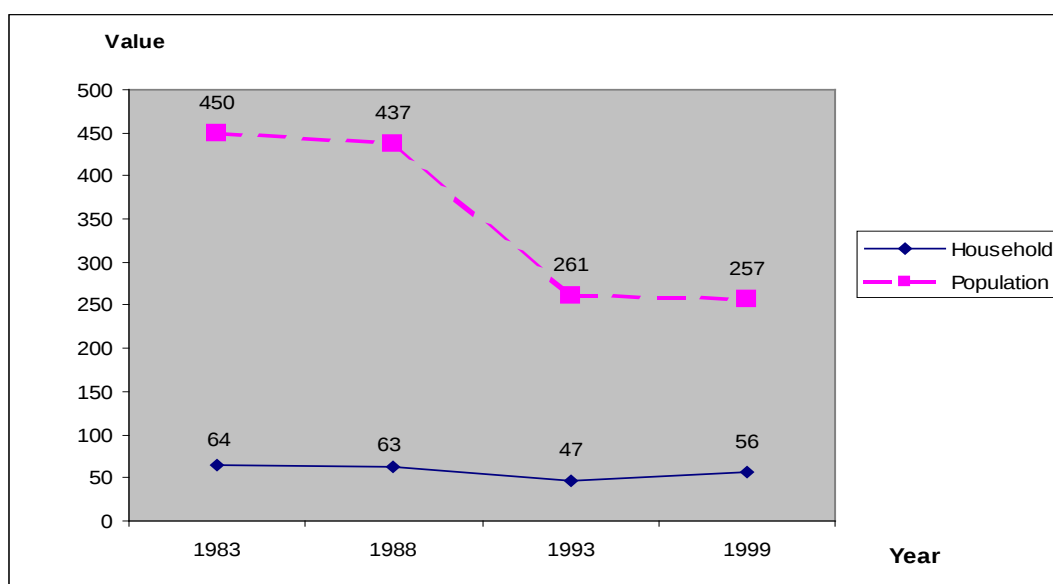


Figure 9. Population trend in Moi Hamlet

In fact, food security is one of the major problems facing Moi Hamlet in particular and ThungNai in general. It is reported that only 12% (Group I) of households had enough food in an entire year. But 29% (Group II) lack food for 2-3 months, 26% (Group III), for 4-5 months and 33% (Group IV), for 6 months or more (Table 5). Level of income is less than 1 million dongs per person annually, of which a major share is from farming production on limited land resources as mentioned above. As a result, population size in Moi Hamlet has been reduced from 269 in 1995 to 257 in 1999 because a number of people have left the village to seek better life in the Central Highland or elsewhere.

Table 5. Wealth ranking in Moi Hamlet

Household Sub-groups	Number of Households	Percentage
I (better-off)	5	12%
II	12	29%
III	11	26%
IV (worse-off)	14	33%
Total	42	100%

4.1.2 Site 2. Village 7, YenThai Commune, VanYen District, YenBai Province

Village 7, originally called Trang Village, has changed names several times since its establishment during the French occupation (before 1950). In the Tay dialect, Trang means elephant because it was rumoured that some elephants' footprints were seen at the site long ago. Interestingly, the current Village 7 is located within Nui Con Voi (Elephant Mountain) Protection Belt. It is quite easy to imagine a link between the former legend and the current reality.

Village 7 is located 250 km from Hanoi (Figure 10). Like other remote, mountainous areas in the North Upland, it is easily accessible during the dry season but not in the rainy period. The narrow road connecting VanYen district capital and Village 7 is badly damaged that only Land Cruisers or Russian "Uaz" cars can reach the village. Alternative transport include bicycles and motorbikes, which are used mostly by local people.



Source: <http://home.vnn.vn/english/map/>

Figure 10. Map of YenBai Province

Village 7 belongs to Sub-region II of Southern VanYen District whose topography is characterized by valleys and low hills. The hot and humid micro-climatic sub-region experiences temperature of 26°C in summer and 12°C in winter, or an average of 22.6°C throughout the year. There are two significantly different seasons: the dry season from November to April of the next year and the rainy period from May until October. Rainfall reaches as high as 1,700 mm, concentrated in approximately 110 days during the rainy season. The rainfall partly contributes to the high humidity (88%) in the area. Soils are mostly yellow ferrallite, rarely mixed with rocks. The topsoil is thick and spongy humus, which is suitable for growing and regenerating species such as *Cinnamon* and *Styrax*.

There are currently 68 households in Village 7, 95% of which belong to the Tay ethnic group and the rest to the Kinh. The whole population is not original residents. The people have come from different parts of Northern Vietnam over many decades. For instance, the Tay people are from further north, while the Kinh people are mainly from lowland ThaiBinh as a result of the government-sponsored “land-reclaiming” programs. The population rate is increasing (Figure 11), though it changed before and after 1979 because of the border conflict with China in 1979. The conflict led to the migration of a number of H'Mong people living along the borders. The current population stands at 301 individuals living on 17.58 ha of rice paddy, i.e., each person has a share of 572 m² (or 1.6 *sao*). The main activities in Village 7 include agriculture, animal husbandry, gardening and forestry.

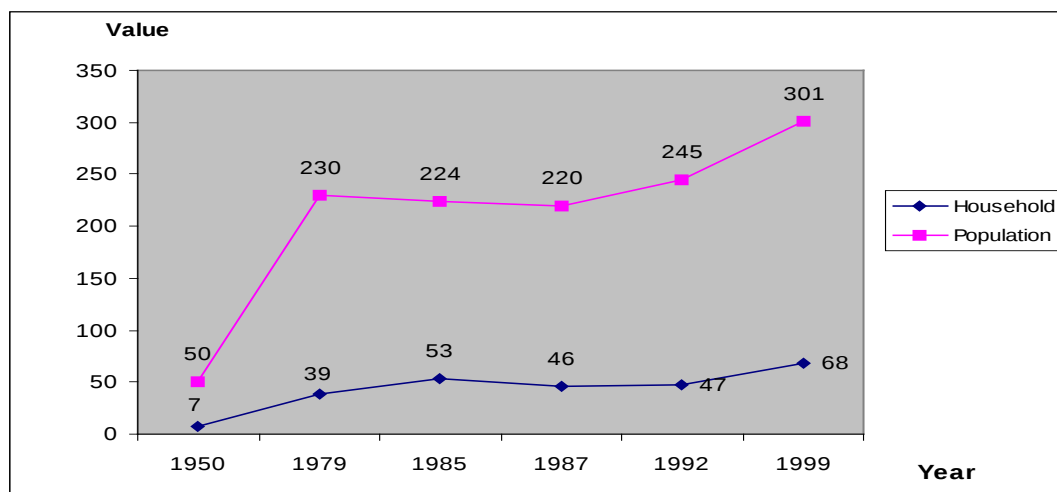


Figure 11. Population trend in Village 7

Agriculture. This is the most important farming activity in the village. The Tays have good farming experience and skills as the Kinh, particularly in intensive farming that uses animal dung to fertilize paddy fields. Therefore, the

production yields of both rice and cassava are high at 10 tons and 12 tons per ha, respectively. Farming activities have been maintained through a well-developed irrigation system and a sufficient water source from surrounding regenerated natural forests. Food security, as a result, is not a serious problem in Village 7, with each person enjoying an annual average share of at least 500 kg food.

Animal husbandry. This activity is well-developed partly because of the availability of feeds. It is diverse in terms of cattle, pig, fish and poultry. On the average, each household raises 4 buffaloes, at least 4 pigs, hundreds of chicken and ducks, and one *sao* (360 m²) fish pond. Except in fishery, animal species have not suffered from any disease. The occurrence of fish diseases can probably be explained by the fact that fishing has not been a traditional activity of the Tays. The well-performed animal husbandry provides plenty of organic fertilizers used for agriculture.

Gardening. This is a future source of income because many households have planted cinnamon trees in their gardens. This species grows quite well under local conditions and gives high economic value. It is estimated that a 15-year-old cinnamon tree can wholly be sold for 2 million dongs (US\$ 150) at any time. According to local people, there are 4 ha of cinnamon area existing in their village. However, local staff who have known the area well estimate that the area can be as large as 20 ha. With an optimal density of 400 trees per ha, the income from cinnamon can be as high as a billion dongs per hectare in 5-10 years.

Forestry. About half a century ago the entire area was covered with virgin forests and many precious timber species such as tau (*Vatica tonkinesis*) and cho chi (*Parashorea stellata*), and wild animals that include tiger, bear, deer, etc. The rich forests remained until 1974, the same year that the VanYen Forest Enterprise (VYFE) was established. The deforestation process began since then and intensified in 1976 when VYFE cleared the natural forests to plant the softwood *Styrax* instead with which to supply BaiBang Paper Mill. Deforestation was accelerated by 1979-1980 through Resolution 6 allowing local people to clear forests for growing hill rice. By 1985, the natural forests almost disappeared. The existing forests are just the result of demarcation and protection for regeneration. They include 500 ha of natural forests regenerated since 1993 and 474 ha of recently regenerated forests. Although *Styrax* remains a dominant species, the regenerated forests are still rich in species diversity as seen in the existence of cinnamon, palm, hu day (*Trema angustifolia*), vau (*Phyllostachys pubescens*), *Styrax*, *Manglietia*, cho chi and sau (*Dracontomelum duperreanum*).

Table 6 presents the result of wealth ranking of households in Village 7. Although there are still 25% of households (Group V) lacking food for 1-2 months a year, food security in Village 7 is not a major problem. The livelihood in Village 7 appears better than that in Moi Hamlet because the former is secured by a stable income from rice production and animal husbandry. Even more income from forestry is expected in the near future which will further improve the situation.

Table 6. Wealth ranking in Village 7

Household Sub-groups	Number of Households	Percentage
I (better-off)	14	21.9%
II	8	12.5%
III	13	20.3%
IV	13	20.3%
V (worse-off)	16	25.0%
Total	64	100.0%

In the process of development, the social aspects have changed dramatically. Like in the other study sites, it is now difficult to distinguish between the Tay and the Kinh in terms of dressing, cooking, speaking and farming. The only traditional thing that remains is the *nha san* or the wooden-pillar houses constructed long ago when big, precious timber was still available. However, there is a tendency to live in lowland-style houses (the Kinhs) because, according to local people, good timber is no longer available for maintaining and repairing houses, and living in new style houses is more comfortable. It is anticipated that in 10 years nothing traditionally attributed to the Tays will be left.

4.1.3. Site 3. DongVanh Village, LucSon Commune, LucNam District, BacGiang

DongVanh village is located about 60 km east of BacGiang town (Figure 12). The first half of the road connecting BacGiang to DongVanh is in good state. The other half is just earth-surface road which is in bad condition and very difficult to travel by ordinary cars except Land Cruisers. In rainy conditions, even a Land Cruiser can only hit 20 km per hour. This stretch of road ends at the LucNam River where an old ferry waits for enough vehicles and passengers to carry towards DongVanh in one load. Before reaching DongVanh, however, another big stream must be crossed, whose water level can rise so high any time during the rainy season, even a Land Cruiser must wait until the water has receded to continue the travel. This situation makes DongVanh quite isolated and its economy difficult to develop.

Geographically, DongVanh is located on the west side of DongTrieu Arc. The average temperature is 22°C, with a range of 10°C (min) to 35°C (max). Rainfall averages 1,327 mm and is concentrated during the rainy season from April to September. This rainfall level results in high humidity (81% average) in the area. Soils are mostly *ferrallite*. The topsoil layer in the forest is as deep as 30-70 cm. Physically and chemically, the soil is considered quite good, making it suitable for forest vegetation development.



Source: <http://home.vnn.vn/english/map/>

Figure 12. Map of BacGiang Province

The climatic and soil conditions make the forests in DongVanh rich in species diversity with more than 200 species present including rare and precious ones such as *lim* (*Erythrophloeum fordii*), *sen* (*Madhuca pasquieri*), *tau* (*Vatica tonkinesis*), *gioi* (*Talauma gioi*), *re* (*Actinodaphne cochinchinensis*) and *de* (*Pasania bacgiangensis*). However, continuous exploitation of the forests since 1962, has led to gradual replacement of the species by various types of bamboo and forests vines. Fortunately, the vegetation cover can be quickly restored. Transformation of post-swidden fields and poor forests into regenerated forests takes only 8-10 years with *tram* (*Canarium album*) and *de* as the dominant species. Recently found are 134.56 ha of such forests surrounding the village and which have all been allocated to village households for long-term management after being released from MaiSon Forest Enterprise.

In DongVanh there is a 25-ha paddy field, of which 60% can be cultivated with two rice crops per year and the other 40% for only one rice crop and another food crop. Rice productivity is low at 100 kg per *sao*-crop (1 *sao* equals 360 m²), i.e., 5.5 tons per ha-year despite sufficient water supply from the existing forests. Apparently, the soil is not fertile enough, and low-yielding species such as *bao thai* are used. At present, food security is generally guaranteed but it is not known whether it can be maintained in the near future

because constant agricultural lands have all been allocated to households without considering newborn villagers.

About 67 households with 345 inhabitants currently live in DongVanh 1 compared to the initial 7 households and 21 inhabitants in 1928 (Figure 13). This is a result of migration from South China and lowlands as well as high population growth rates. Of the total population, 92% belong to the Dzao ethnic group, 7% to the Kinhs and about 1% to the Chinese minority. Genderwise, men and women are nearly equal in number (50.3% and 49.7%, respectively). Children (aged under 18), labourers (between 18-55 years old) and old people (over 55 years old) constitute 46%, 43% and 11% of the total population, respectively. Literacy level is generally low in the village with only 1% either having completed or finishing upper secondary school. The rest attend primary and lower secondary schools. None has finished college or university education. Meanwhile, a high annual population growth rate of 3% helps explain the predominance of young people under 18 years old (46%) in DongVanh Village.

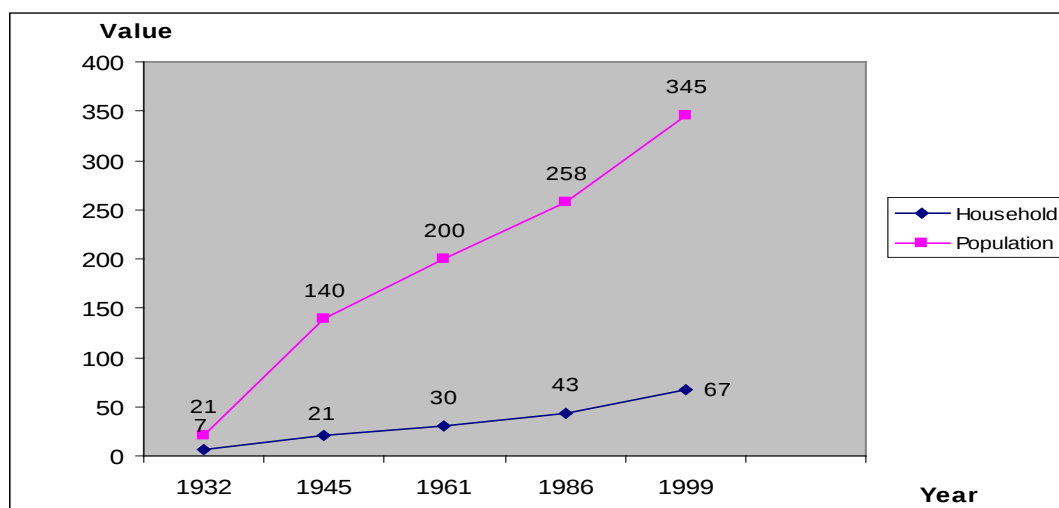


Figure 13. Population trend in DongVanh Village

Although the majority of DongVanh's population belong to the Dzao group whose ancestors migrated from Canton (Southern China) in 1928, it is difficult to distinguish between the Dzaos and the Kinhs in terms of farming, housing, dressing, cooking and language. The process of integration has been so strong that even for only several decades the Dzaos have almost lost their customs and traditions except a little evidence of recent use of a Chinese-based lunar calendar by some of the old people. Not surprisingly, the Dzao dialect is spoken only by the old people, while the children are more familiar with the Vietnamese (the Kinh language) tongue.

A previous statement on food security does not mean that all households in DongVanh have enough food to eat. Of 67 households, about 40% (Groups III & IV) still lack food for 2-6 months (Table 7). Interestingly, most of these households have been unsuccessful in agriculture compared with the other groups. Food shortage is addressed mainly by exploiting forest products such as bamboo shoots, mushrooms and *Canarium* resin or using income from fruit gardens to buy food. This problem undoubtedly is a threat to the existing forests.

Table 7. Wealth ranking in DongVanh Village

Household Sub-groups	Number of Households	Percentage
I (better-off)	8	12%
II	31	46%
III	10	15%
IV (worse-off)	18	27%
Total	67	100%

4.2 Land uses and forest management

4.2.1 Moi Hamlet

Regarding Decree 64/CP, agricultural lands allocated to households include residence and garden areas, wet rice paddy (total 3,000 m²), and flat agricultural lands with a norm of 1000 m² per person. Although these areas have been legalized with land use titles, their use is questionable. Everywhere, the hamlet gardens are unproductive and planted with low-value fruit trees such as papaya, orange and vegetable. Gardens have not been intensively farmed or adequately invested as soil is mixed with rocks. Allocated flat lands are rarely cultivated by the holders themselves, even if these have been leased for at least 3 years to sugarcane growers. Meanwhile, local residents continue farming on sloping forestland under management of either the commune or the forest enterprise. Without sloping land techniques, they let cassava and maize grow on clear sloping grounds. Cattle dung is not used to fertilize their own gardens or sloping areas, but instead sold to sugarcane growers. It is, therefore, asserted that soil will be seriously degraded if this farming style is continued.

In terms of forestland classification, ThungNai relates to a strictly protected area. However, almost all households (HHs) in Moi Village have received forestland for management based on Decree 02/CP which stipulates that protection/watershed forests should not be allocated to HHs for long-term management. Basically, these forests can only be contracted to HHs according to Decree 01/CP. The misallocation of forestlands is being reconsidered by the

provincial authority and the forest department. In fact, all related forestlands are managed by the following bodies:

- 913.2 ha of lime stone forests by the ThungNai People Committee which maintains a guard team of 13 members receiving protection payment of 50,000 dongs per ha from the State budget to cover honoraria;
- 1,300 ha by the SongDa FE for business enterprises and 24,000 ha by Project 327 and 5 million ha by the Watershed Management Board;
- areas temporarily managed by households after allocation according to Decree 02/CP.

Several big programs and projects are being implemented in the area. For instance, Project 747 aims to stabilize livelihoods for people who have migrated uphill from lowlands that are under water. One of the main objectives of the Project is to support local inhabitants in planting *luong* (*Dendrocalamus membranaceus*) and growing fruit trees for income generation, thereby reducing pressure on the existing forests. However, the issue on where to plant forests is emerging. It appears that local inhabitants have illegally cultivated areas managed by the SongDa FE or the Watershed Management Board (WMB) to plant forests with support from Project 747. Meanwhile, Program 327 and its successor, the Five-million-hectare Program, are mainly geared towards planting new protection forests and protecting the existing ones. These programs have been implemented by households based on the contracts signed with SongDa FE-cum-Watershed Management Board. The investment received by the households from the SongDa FE in three years for developing one hectare of forest was 2.5 million dongs, or 50,000 dongs for protecting of a hectare per year. Nonetheless, the quality of contracted plantation proved inadequate, partly because many fast-growing species were used and partly because households were concerned only with the payment from planting rather than the mature forests on which they could depend on the future.

The complexity of land and forest management in Moi Hamlet is expressed even more in terms of conflicts over resource use. The conflicts usually involve the use of irrigation water, land for swidden farming, grazing land and exploitation of forest products. They occur between households and FE/WMB, between the guard team and local inhabitants, and between households. Despite the commune's efforts, rare timber, non-timber products and wild animals continue to be exploited for various reasons, but the driving force is food shortage. People clear forests because they have to produce enough food to eat. People also exploit forest products to sell or exchange for food. Therefore, there is a proposal to allocate each household 1-2 ha of forestland to use as permanent swidden field for food production.

4.2.2 Village 7

The situation in Village 7 indicates that well-performed agriculture usually facilitates maintenance of forest resources which, in turn, ensures water supply and controls flood and/or drought that can heavily affect agriculture. More attention is paid to forestry, with the following parties involved in forest management in Village 7:

- 500 ha of regenerated forests (since 1993) allocated for long-term protection to 12 households, of which 5 households are from Village 7 with an annual payment of 30,000 dongs per ha. However, the nature of this allocation is unclear. VanYen Forest Protection admits that the 500 ha have been allocated based on Decree 02/CP. In fact, households have received only "green books" (temporary land use titles) without knowing the duration of the term. Meanwhile, VanYen Forest Enterprise (VYFE) states that the 500 ha will be transformed into production forests in year 2000 because the budget given to demarcation for regeneration of such forests is only for 5 or 6 years. It is, therefore, not clear who will take responsibility for managing the 500 ha in the future and whether this area is truly allocated in accordance with Decree 02/CP.
- 474 ha of newly regenerated forests allocated to 18 households, of which 6 households come from Village 7. The difference is the absence of budget to cover protection payment unlike in the previous 500 ha. Therefore, the quality of these forests is low because people have no incentive to manage them. It is evident that some households have received 40 ha but do not know what is going on in their forests because they never take patrol or look around.
- 800 ha of forestland allocated to households in YenThai Commune, of which 15 households are from Village 7. Among the latter, 3 households jointly manage plantation forests with VYFE.
- Forest gardens managed by households. Because they still do not have land use titles, most of the people do not want to plant slow-growing indigenous species in their gardens. They fear the nationalization or possible transfer of these properties to users other than themselves.

Some of the emerging issues are as follows:

- Responsibility in terms of state management of forestlands is not clearly divided among CPC, VYFE and VYFP.
- Land allocation does not meet actual requirements due to: i) forestland has not been accurately measured for issuance of the "red book"; ii) forest

inventory and planning institution and cadastral have yet to reach a consensus on inventory figures.

- Governmental and local interests are not harmonized: i) raw material timber planted on the land allocated to households needs approval by the provincial authority before cutting; ii) the roadside price of 80,000 dongs per m³ is not enough to cover all expenses, while the monopolistic buyer-BaiBang Paper Mill takes control of pricing.
- Inventory of land resources is not accurate. VYFE states that Village 7 has 20 ha of cinnamon area, but the local authority reports only 4 ha or five times smaller. One reason for this is that people do not want to pay the land use tax of 300,000 dongs/ha imposed after year 7. Thus, they try to minimize the area reported. Another reason is that the methods for accounting the cinnamon area are divergent. Farmers measure the area based on geographical boundary, while VYFE counts the number of cinnamon trees and convert them into area using a conversion of 400 trees as equivalent to a hectare.

4.2.3 DongVanh Village

All agricultural lands have been allocated to households in the village and land use rights have already been legalized, i.e., all households have each received a *red book* (land use certificate). However, land becomes fragmented under household management because each family is given a different piece of varying land category which are small and located at a distance from one another. Soil quality is generally poor and sandy due to lack of improvement measures. Although the source of organic manure (pig and buffalo dung) is enormous, it has not been used to fertilize paddy fields. The combined use of low-yielding rice variety and poor soil makes productivity pretty low. The only advantage in rice farming is an assurance of sufficient water supply, which is well-maintained through the surrounding forests.

Forestlands are almost covered with regenerated vegetation. This process of natural regeneration is happening actively only three or four years after *bare land*³ has been left intact. Dominant tree species are *de* and *Canarium*, the two most valuable species in economic terms. *De* provides a yearly yield of 20 kg of seeds per tree on the average. Its nuts are highly in-demand and command a high price of 5,000 dongs per kilo. *Canarium* has diverse uses in terms of timber,

³ The so-called "bare lands" according to land classification by government's institutions like FIPI or GDLA are in fact areas that are left under fallow. They are not "bare", but rather covered with grass or shrubs or sometimes with small timber trees. They are able to regenerate rapidly after only few years under protection. Therefore, clearing these areas before new planting, as what has happened in many places, needs to be reconsidered.

resin and fruit. However, the ground vegetation under *de* forests is usually cleared every year to facilitate nut collection. Moreover, the highest yield can only be secured under a low density of about 200 *de* trees per hectare. Therefore, soil is probably eroded under these circumstances.

Almost all forestlands within DongVanh have been allocated to two-thirds of households in the village with land use titles. The other third or 23 households have not received any parcel for a number of reasons. First, they have not foreseen the benefits of receiving forestlands for management since the process of land allocation has began. Second, though they have been offered some areas later, these are located quite far and are hard to protect. As a result, many households are currently managing 10 or more hectares, while others have no plots at all. Therefore, conflicts over forest resources are unavoidable.

Meanwhile, MaiSon Forest Enterprise currently manages 5,529 ha of natural and plantation forests, most of which are adjacent to DongVanh in LucSon commune. Besides timber, FE's forests are rich in non-timber products including *de* nuts, *Canarium* resin and fruits, mushrooms, wild animals, bamboo and bamboo shoots. It appears that all households of DongVanh have exploited and used timber and non-timber forest products (NTFPs) from these forests. Nevertheless, households currently manage allocated forestlands originally belonging to the 3,070 ha that the FE transferred to the CPC in 1991.

In addition, *litchi* is a fruit tree of high economic value. It grows well under the soil and climatic conditions of BacGiang in general and DongVanh in particular. Its return is huge and estimated at 50-100 million dongs (US\$ 3,500-7,000) per hectare. Hence, there is a massive movement to establish litchi plantations. Generally, areas on the foot of the hill, which are under households management, are cleared and planted with litchi. However, in some places litchi is planted uphill to high-slope elevations. In forest areas managed by the FE, it is reported that at least 20 ha (though this figure is far lower than in reality) have been cleared and replaced with litchi by local people. Low density litchi plantation on the high slopes may cause large scale soil erosion if this process is not halted. It also threatens the existing forest cover managed by households as well as by the FE.

Also, about 500 ha are jointly managed by FE and households, of which 13 ha is located within DongVanh. This undertaking began in 1989 when the FE and households agreed to cultivate new timber species to be used as poles for coal mining. The FE provides the households with seedlings, fertilizers, technical assistance and 200,000 dong per ha for a 10-year period. Households, which are usually the better-off ones, contribute only labour for planting, tending and protection for the entire business cycle (10 years). Due to administrative

rearrangements, the management of these areas was transferred from the FE to the local authority in 1991. After clearfelling, the FE gets 15 m³ per ha. The rest belongs to the involved households aside from other benefits such as intercropping products, thinning cut and fuelwood. The popular dominant species are the fast-growing ones such as *Eucalypts* which perform badly at the age of 10 compared to the 4-year-old *gie* which regenerates naturally. *Eucalyptus* has also made the soil poorer, as classified by local people.

4.3 Stakeholders and Management Schemes

Due to the complexity of forest use and management in each study site, one of the first steps of the survey process was to identify potential stakeholders. A method developed by Colfer (1995) was used to identify relevant stakeholders on each study site. Table 8 consolidates the most important stakeholders in all three sites. It is clearly seen that households, forest enterprises and commune's authority are common among these sites. In addition, village [authority] is an important stakeholder in Moi Hamlet and Village 7, while Forest Protection plays an influential role only in Village 7.

Table 8. Institutional issues in forest management.

Category	Moi Hamlet	Village 7	DongVanh Village
Forest & land Pattern	Natural forests Plantation forests Paddy land Garden Flooded land	Allocated forests Forest enterprise Communal forests Forest garden Paddy	Allocated forests Forest enterprise Forest garden Paddy
Major stakeholders	Household Forest Enterprise Commune Village	Household Forest Enterprise Commune Village Forest Protection	Household Forest Enterprise Commune
Forest management schemes	Household Forest Enterprise Communal Contract-based	Household Forest Enterprise Communal Contract-based Village-based	Household Forest Enterprise Joint management

Forest management schemes vary from site to site. Some are common while others are distinctive in the study sites. The key players in all three sites are the households (private management) and forest enterprises (state management) (Figure 14). Although the commune's authority is getting more involved in forest management, it concerns only the territorial management aspect. These three management schemes are *de jure* under the recent legislation

and institutional arrangements. Contract-based and joint management, are *de facto* and regarded as a continuum between the first two (private and state management) schemes. Village-based scheme, although related mainly to community-based management, is not clearly and widely recognized and supported, partly because village is not a formal administrative level in the Vietnamese context, and partly because the true concept of community domain has deteriorated in people's perception.

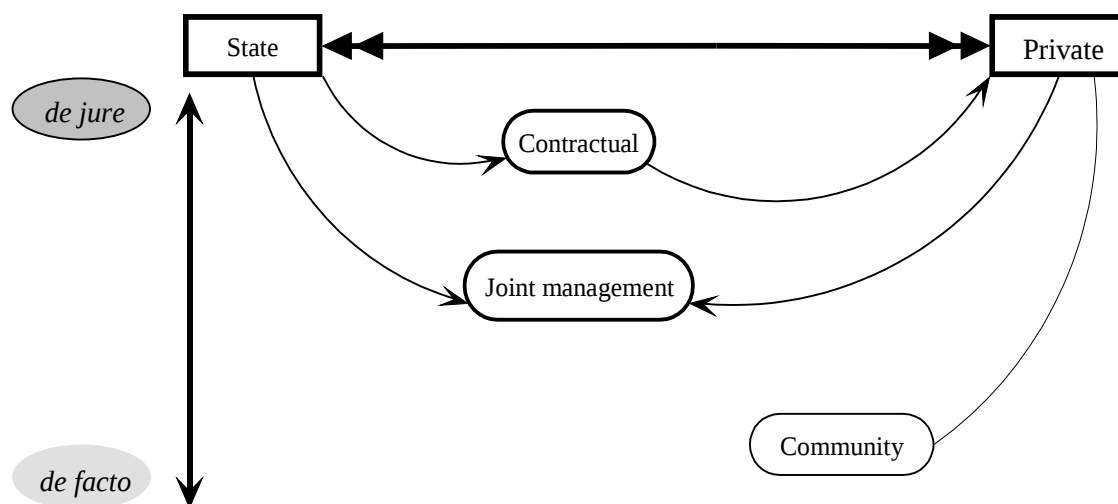


Figure 14. Forest management regime continuum.

Primary generalizations:

- Relationship between agriculture and forestry is mutually direct. The more food is secured, the less the pressure on the forests and the better conserved they are. This implies that people living in forest areas do not necessarily depend merely on forests for subsistence. In fact, people living in Moi Hamlet overexploit forests partly because they do not have the same conditions as in Village 7 or DongVanh Village to practice their traditional farming activity, i.e., wet rice production, after abandoning their own paddies and heading for the HoaBinh Reservoir.
- Income from agriculture contributes a major share in the total household income, while income from forestry is negligible. It does not mean that people have given up using forests. Whereas, it addresses the uncertainty of local livelihoods if income sources would be changed. Agriculture itself strongly relies on climatic and environmental conditions. Evidence suggests that agriculture in two study sites (Village 7 and DongVanh) can be performed well with support from the existing forests. A loss of food

productivity may again encourage local people to become forest exploiters to overcome hunger.

- Deforestation is increasing in remote areas rather than those close to the village. Lack of enforcement or conflict resolution measures as well as low payment for protection mean people have little incentive to receive remote areas for management.
- Low level of people's participation may be attributed to lack of access to information and infrastructure and existing institutional structure.
- Land tenure remains a key factor influencing sustainable forest management. Poor implementation of land allocation, slow process of issuing land title certificates, inadequate legal documents and their improper interpretation and so on all result in complex and unclear land tenure issues in forest management.
- Diversity and complexity of forest stakeholders and management schemes have been observed in all study sites. Each stakeholder can be associated with one or several forest (land) categories and management schemes. Frankly, it is hard to tell which management scheme is better in a particular site without taking into account all influencing factors.
- Lack of land use planning prevents local people from sustaining their income and improving their livelihoods. Although land-use planning must be done before land allocation as per regulations, in reality land is usually allocated without any land-use planning. Complexity of forest/land types/categories under management of different stakeholders makes it difficult to apply land-use planning and to define a better management regime for the entire area.

4.4 Data Analysis (The C&Is)

The analytical process includes assessment of information gathered during and after field surveys, as well as assessment of criteria and indicators for sustainable forest management and their treatment using a multicriteria decision-making approach.

Prior to being used to compare different forest management regimes within a sustainability context, C&Is were subjected to a series of assessment revision and purification. The number of C&Is finally selected dropped from the initial 113 to 52 and finally to 10 (Table 9). The previous 52 C&Is were assessed based on a range of rankings from 1 to 10, with 1 as the least sustainable and 10 as the most sustainable. Each criterion or indicator was assigned different values in the different management systems. These values were decided based on information obtained during discussions with the different stakeholders such as

local communities, forest enterprises and local authorities. Hence, one criterion might bear different values in regard to different management systems.

The information that is used to assess each criterion is usually obtained with help from a particular tool or a combination of tools. However it appears that a number of recently developed multi-criteria analysis devices sometimes give 'better' (less ambiguous) optimal solutions if the number of rankings is narrowed down⁴. Therefore, the final 10 C&Is (Table 9) chosen from five domains (Environment, Institution/Policy, Social, Economics and Production & Service) were reassessed based on rankings of 1 to 5 before going through further treatment.

Table 9. Final selection of C&Is

No	Criteria/Indicators	Source
<i>Ecology and Environment</i>		
E6	The capacity of the forest to regenerate naturally is ensured	CIFOR
E8	Conservation and maintenance of soil and water resources	Montreal-S
<i>Institution and Policy</i>		
P2	Security of long-term use rights for all stakeholders	Proposal ⁵
P9	Adequacy of legal, institutional and policy frameworks for sustainable forest management	Sub-Sahara
<i>Social Environment</i>		
S3	Improvement in the quality of life of local people: access to opportunities, health care, education and information	Proposal
S4	Tenure/use rights are well defined and upheld	CIFOR
<i>Economics and Finance</i>		
F1	Increase in productivity or yield of land	Proposal
F3	Increase in household income	Proposal
<i>Sustainable Production</i>		
M3	Worked coupes are protected (e.g., from fire, encroachment and premature re-entry)	CIFOR
M4	Maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies	Montreal-S

Comparing the different forest management schemes against these C&Is using TopDec, two scenarios were considered (Table 10). The first one assumed that all criteria had the same (even) rating, meaning they were all equally important. In the other scenario, these C&Is would have varying ratings in different study sites due to the fact that the criteria might have different levels of

⁴ (Jack Ruitenbeek and David James 1999, per.com.)

⁵ "Proposal" means these C&I were proposed in the project proposal (author).

importance (i.e., 10 = most important, 1 = least important). The rating for each criterion in regard to particular sites was translated from discussions with local people and other stakeholders (e.g., forest enterprise and forest protection). For instance, information gathered in the study sites indicated that the criterion "*Increase in household income*" was more important in Moi Hamlet than in the other two sites. The purpose of this simulation was to see how the level of importance of C&Is affected the choice for a better management regime. The final scores were, therefore, generated from two sources of data: ranking values and weights of criteria (Table 10).

Table 10. Two scenarios of ratings.

No	Criteria	Moi Village		Village 7		DongVanh Village	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2	Scenario 1	Scenario 2
1	E6	10	8	10	6	10	6
2	E8	10	10	10	10	10	10
3	P2	10	7	10	10	10	9
4	P9	10	10	10	8	10	10
5	S3	10	10	10	9	10	8
6	S4	10	9	10	10	10	10
7	F1	10	7	10	8	10	8
8	F3	10	10	10	9	10	8
9	M3	10	9	10	7	10	8
10	M4	10	7	10	6	10	7

4.5 Output and Conclusions

4.5.1 Moi Hamlet

Scenario 1. Even rating

Table 11 shows the total final score of rankings of four forest management systems using 10 criteria with equal rating. The "household" option got the highest score of 85.5, followed closely by the forest enterprise (85). The "commune" and "contract" options held the third and fourth positions with total scores of 73.5 and 65.5, respectively. Apparently, household and FE options were the two most preferred management systems while "commune" and "contract" were less preferred.

Table 11. Total final score (even-rating) for Moi Hamlet.

No	Criteria	Household	Forest Enterprise	Commune	Contract
1	E6	5.0	10.0	10.0	7.5
2	E8	5.0	10.0	7.5	7.5
3	P2	7.5	10.0	5.0	7.5
4	P9	8.0	10.0	4.0	4.0
5	S3	10.0	8.0	8.0	8.0
6	S4	10.0	8.0	8.0	6.0
7	F1	10.0	7.5	7.5	5.0
8	F3	10.0	8.0	8.0	4.0
9	M3	10.0	6.0	8.0	6.0
10	M4	10.0	7.5	7.5	10.0
	Total	85.5	85.0	73.5	65.5

Scenario 2. Uneven rating

Different ratings were used to reflect the importance of each criterion regarding the reality in Moi Hamlet. Another purpose was to see how different ratings affected the choice of a better management scheme. The result of the analysis is demonstrated in Table 12.

Table 12. Total final score (uneven-rating) for Moi Hamlet.

No	Criteria	Household	Forest Enterprise	Commune	Contract
1	E6	4.60	9.20	9.20	6.90
2	E8	5.75	11.49	8.62	8.62
3	P2	6.03	8.05	4.02	6.03
4	P9	9.20	11.49	4.60	4.60
5	S3	11.49	9.20	9.20	9.20
6	S4	10.34	8.28	8.28	6.21
7	F1	8.05	6.03	6.03	4.02
8	F3	11.49	9.20	9.20	4.60
9	M3	10.34	6.21	8.28	6.21
10	M4	8.05	6.03	6.03	8.05
	Total	85.34	85.17	73.45	64.43

It was clearly indicated that a change in ratings of the 10 criteria had negligible effect on the final total scores, but no effect on ranking order of options. This means that “household “and “FE” options still held first equally important positions with almost similar total final scores. The third and fourth priorities were given to commune and contract options as in the previous scenario.

As earlier discussed, a negligible difference between “household” and “forest enterprise” does not tell which option is overwhelming. This result is very closely related to the fact that in protection forest areas, forest enterprises still play a significant role in managing these forest resources, and the policy on protection forests to be drawn, therefore, should address the interest of both state and local communities.

4.5.2 Village 7

Scenario 1. Even rating

There was a slight difference in the results from Village 7 compared with Moi Hamlet (Table 13). “Household” option was still given the first priority with the highest score (93.5). The second preference, however, was the “contract” option, closely followed by “FE” (81 and 80.17, respectively). Unlike the contracting system in Moi Hamlet, the contracting system in Village 7 is built on trust and mutual interest, and local population can benefit from it as much as from the household option. Not surprisingly, “FE” was given only the third priority. This could be explained by the fact that VanYen FE is losing its role in forest management due to its long history of deforestation and recent commercialization orientation. “Commune” option was preferred over “village” because of the farmers' increasing involvement and enforcement in forest management according to Decision 245/TTg. “Village” lacked the requisite conditions for forest management such as legality, authority and self-determination.

Table 13. Total final score (even-rating) for Village 7.

No	Criteria	Household	Contract	Forest Enterprise	Commune	Village
1	E6	10.0	10.0	6.67	6.67	6.67
2	E8	10.0	7.5	7.50	5.00	5.00
3	P2	7.5	10.0	10.00	7.50	5.00
4	P9	10.0	7.5	10.00	5.00	5.00
5	S3	10.0	8.0	4.00	6.00	8.00
6	S4	8.0	8.0	10.00	10.00	4.00
7	F1	10.0	8.0	8.00	6.00	6.00
8	F3	10.0	6.0	8.00	4.00	4.00
9	M3	10.0	10.0	6.00	6.00	6.00
10	M4	8.0	6.0	10.00	8.00	8.00
	Total	93.5	81.0	80.17	64.17	57.67

Scenario 2. Uneven rating

Again, there was no change in order of priority of the four management systems compared to the previous scenario, although the final scores changed a little (Table 14). “Household” still got very high final scores because the criteria were given high values. In fact, household management in Village 7 proves better than FE because it secures livelihoods for local people and improves the quality and quantity of forest resources only after a short period of forest and land allocation.

Table 14. Total final score (uneven-rating) for Village 7.

No	Criteria	Household	Contract	Forest Enterprise	Commune	Village
1	E6	10.0	10.0	6.67	6.67	6.67
2	E8	10.0	7.5	7.50	5.00	5.00
3	P2	7.5	10.0	10.00	7.50	5.00
4	P9	10.0	7.5	10.00	5.00	5.00
5	S3	10.0	8.0	4.00	6.00	8.00
6	S4	8.0	8.0	10.00	10.00	4.00
7	F1	10.0	8.0	8.00	6.00	6.00
8	F3	10.0	6.0	8.00	4.00	4.00
9	M3	10.0	10.0	6.00	6.00	6.00
10	M4	8.0	6.0	10.00	8.00	8.00
	Total	93.5	81.0	80.17	64.17	57.67

4.5.3 DongVanh Village

Scenario 1. Even rating

“Household” option, like in the previous study sites, ranked as the top priority (Table 15). Its total final score of 97.50 was far ahead of the “FE” and “Joint management” options (85.50 and 76.00, respectively). It reflects the fact that a large area of forest and forestlands handed over by MaiSon FE to households in DongVanh Village for long-term management has been improved in both quantity (area) and quality (species diversity and ecological functions). Even MaiSon FE suggests that those areas, which are under its management but are illegally used by local people for litchi growing, can be transferred to local households for long-term management if the provincial authority approves. Otherwise, FE cannot manage these areas sustainably due to lack of human resources and funding, and fear of losing a good relationship with the local community which has been nurtured for a long time.

Table 15. Total final score (even-rating) for DongVanh Village.

No	Criteria	Household	Forest Enterprise	Joint Management
1	E6	10.0	7.5	2.5
2	E8	10.0	10.0	7.5
3	P2	7.5	10.0	10.0
4	P9	10.0	10.0	8.0
5	S3	10.0	8.0	8.0
6	S4	10.0	10.0	10.0
7	F1	10.0	6.0	6.0
8	F3	10.0	6.0	8.0
9	M3	10.0	8.0	6.0
10	M4	10.0	10.0	10.0
	Total	97.5	85.5	76.0

“Joint management” option was not given high priority because of its low environmental concern as seen in the use of fast-growing tree species like *eucalyptus camaldulensis* to get quick and high economic return for both parties involved. Even in economic terms, it does not secure benefits to both parties because the returns from eucalyptus plantations are under-expected. In fact the 10-year-old eucalyptus trees are performing worse than the 4-year-old regenerated *Styrax*. Moreover, this “joint management” was not built on a firm legal basis, and participation of local population in developing this collaboration was limited and passive. "Joint management" was initiated and operated mainly by the FE. HHs were therefore merely interested in economic benefits from this kind of management scheme.

Scenario 2. Uneven rating

Like the other two study sites, a change in rating of criteria did not affect the overall picture (Table 16). “Household” option remained the first priority though its total final score negligibly decreased from 97.50 to 97.32. In contrast, the “FE” and “Joint management” options slightly increased from 85.50 to 86.79 and from 76.00 to 77.86, respectively. However, these changes did not influence the priority order.

Table 16. Total final score (uneven-rating) for DongVanh Village.

No	Criteria	Household	Forest Enterprise	Joint Management
1	E6	7.14	5.36	1.79
2	E8	11.90	11.90	8.93
3	P2	8.04	10.71	10.71
4	P9	11.90	11.90	9.52
5	S3	9.52	7.62	7.62
6	S4	11.9	11.90	11.90
7	F1	9.52	5.71	5.71
8	F3	9.52	5.71	7.62
9	M3	9.52	7.62	5.71
10	M4	8.33	8.33	8.33
	Total	97.32	86.79	77.86

From the multi-criteria analysis of different forest management schemes in the three study sites, some generalisations were derived as follows:

1. *Effect of rating*: Rating of C&Is does not affect the preference order for forest management systems. The results indicate that the same rank/priority order is generated regardless of whether even or uneven rating is applied. It therefore appears that all C&Is used in multi-criteria analysis are equally important in identifying a better forest management system.

2. *Household option*: Household-based option appears a preferable management option in all study sites, even in Moi Hamlet where most watershed protection forests are existing. The state-owned FE also has an important position similar to the household-based option. It can be explained by the fact that household is a vital entity with many advantages over other management systems. In fact, forest cover and quality have improved much a few years after implementing land allocation to local farmers for long-term management. Also, individual households have been increasingly involved in government-sponsored rehabilitation initiatives such as the Program 327 and Five-million-hectare Program. It also tells that the local population is still dependent on forests and key players in forest management, thereby strongly affecting the sustainability of forest resources.

On the other hand, farmers in Vietnam have instinctively been attributed to individuality. They actively participated in the 1945 revolution because their dream of holding their own pieces of land could come true. The difference in the performance of agricultural production before and after *Doi moi* has proved that private households can manage agricultural land better than the state-driven cooperatives. The same thing can happen in the forestry sector though it may take longer to make the final conclusions. Farmers' own interests, whenever

clearly defined and upheld, become a major incentive that drives them to manage and use forest resources. There is no difference between local farmers and the state in terms of managing the sustainability of forest resources. The only problem is that their concerns and interests have either been ignored or undervalued.

3. Forest Enterprise Option: In general, forest enterprises are given second preference due to their changing roles and positions in the locations while they are still backstopped by the State. It, however, does not mean that FEs are no longer important in forest management. Results have shown that FEs and HHs have equally important roles in Moi Hamlet which is located in the strictly protected forest area. But the results do not show which is more preferable – HHs or FEs and vice versa. Compared with other management systems, FEs still have the advantages in technological level, skilled human resources, financial availability and legislation environment. Therefore, it is still early to suggest that the FE option be replaced by HH option in areas like Moi Hamlet where national interests are as important as the local ones.

4. Commune Option: Commune option is different from community-based management. The former is the lowest level of the contemporary Vietnamese administrative hierarchy. The increasing role of communes in forest management reflects decentralization of forest management functions to local authorities. It also complies with Decision 245/TTg, which confirms the increasing role and more responsibility of commune authority in forest management. By its very nature, commune management is also state management at the local level. However, the question of how forests will be managed by commune authority in a sustainable way has been recently addressed. It appears in all study sites that communes usually lack professional human resources, financial resources and relevant information for managing local forest resources which have been handed over by forest enterprises. The forest resources under these circumstances may easily be turned into open-access again.

5. Contractual, Joint Management and Village Options: Unlike what has been going on around the world and what has recently been conceptualized in resource literature, contract-based, joint management and village-based options are given low preference. It can be explained by the fact that contract and joint management options are still weak in legal recognition. They lack sufficient conditions to be more effective and sustainable such as legal environment, mutual understanding and trust between relevant parties, accountability and enforcement for such cooperation and collaboration.

Village- or community-based management is weakly recognized because it does not have the conditions that a commune does, such as assigned authority and power. Moreover, a community living within a village boundary no longer has indigenous institutions based on traditions, customs, beliefs, norms and so on as before. These attributes have been worn away in the past decades. On the other hand, village-based management can easily be misunderstood and referred to as the failed cooperative system in the past. Psychologically, people are not likely to have this and it may take a while for them to adopt the concept of village-based management.

The results need to be discussed in regard to their strengths, weaknesses and reliability before making policy implications. The strengths are indicated as follows:

- The research is highly appreciated by policy makers, academic researchers, local authority, local staff and local community in all the study sites. In particular, the research has employed two new approaches - the CIFOR approach to assess C&Is for sustainable forest management and the participatory approach which has become increasingly important to move toward a more sustainable forestry.
- Criteria & indicators for assessing different forest management systems have been assessed, verified and filtered through many steps: short-listing, preliminary field trip, official field trip, seminars at the local and the central levels. This process allows the selection of the most appropriate, locally adaptable C&Is to use in the multi-criteria analysis while the principles of sustainability are retained.
- Results are generated from simultaneous treatment and simulation of multiple criteria. Criteria belonging to different domain of sustainable forestry including social, economic, environmental, institutional and sustainable production have been equally treated and analyzed to define a better forest management system. Simultaneous treatment of all criteria ensures that the choice of a better management system is not biased by individual C&I, i.e., neither economic, social nor environmental alone.
- Preference order of forest management options is consistent with what is really happening. The consistency is seen from two perspectives. First, it is in line with contemporary government policy on small-holder land management since the start of *Doi moi* in 1986 through the promulgation of a series of legal documents (i.e., land law, Decree 64, Decree 01, Decree 02 and others), and implementation of different development programs (such as Program 327 and Five-million-hectare Program). The new policy allows households to be legally equal with

other sectors in managing natural resources (including forest and forestlands). Second, not only do local people want to manage forest resources on a privatized basis. Other stakeholders such as the local authority and local forest departments have also realized that forests can be better protected if given to households for long-term management.

- The results are highly practical. They may be used for drawing relevant policies for three particular study sites, or as reference for formulating general policies on forest management.

However, the research results also have some weaknesses, such as the following:

- There is limited understanding of the nature of C&Is by the research team members and other people involved when translated from English to Vietnamese and *vice versa*. This may affect the process of selecting and ranking C&Is, that is, it may indirectly affect the final conclusions for a better management option.
- It does not indicate which management scheme is the best if a bigger number of C&Is (up to 20, for instance) will be treated using TopDec. Moreover, none of the recent studies on MCDA suggests what number of C&Is is appropriate for choosing the best among a number of options.
- The results of MCDA using TopDec only give preference ranking of the different management systems (e.g., household is preferred to forest enterprise and so on). Also, no explanation is given on how one option is much preferred over the others.
- Lateral spread of the results is uncertain. The results are likely to be locally focused and site-specific. It is uncertain if these results can simply be adopted in other locations with similar conditions, or if they require some field study before spreading.

In terms of reliability of the research results, some remarks can be made as follows:

- There are no problems with C&Is that have finally been selected for further treatment because they have gone through the whole process of thorough filtering and assessing.
- There are minor problems with preference ranking, i.e., putting value on each C&I under different management options. First, C&Is are valued within a range of 1 to 10. They then are valued using a narrower range

of 1 to 5. Some authors⁶ use an even narrower range of 1 to 3. Inappropriate ranking of C&Is may affect the choice for a better management option.

- There are no problems with rating of C&Is because, as mentioned above, it has no effect on the overall results.
- The results are consistent with the different stakeholders' views and desires as perceived during discussions and working with local communities, local authorities and forest departments.

5.0 SUMMARY AND RECOMMENDATIONS

For many decades, forest resources in Northern Vietnam have been misused and overexploited, resulting in serious environmental problems such as soil erosion, land degradation, loss of biodiversity as well as destruction of livelihoods for millions of forest-dependent inhabitants. The process of *Doi moi* that begun in the late 1980s has provided a new legal environment for changing land tenure and management. Forest and forestlands are no longer managed solely by the State institutions such as cooperatives and forest enterprises. Households become a key legal player in land and forest management. Besides, there are other *de facto* management schemes such as joint management, contract-based, interest groups that co-exist with the two *de jure*, which are forest enterprises and households.

Managing forest resources in a sustainable way, however, is a big challenge. Although a number of studies relating to the issues of changing forest management have recently been conducted in the North Upland, they have not addressed the links between the existing management structures and the sustainability of forest resources. Nor have they clarified what factors and how these factors affect the choice of an appropriate management regime within a sustainability framework. The purpose of this research was, therefore, to assess and compare various forest management regimes against socio-economic, environmental and institutional variables to find out what is the better management regime within a local sustainability context. In operational terms, this research tested three hypotheses listed in page 17. Testing these hypotheses using the main findings of the research resulted in the following judgements:

Hypothesis 1. It appears that the level of deforestation does not depend on proximity to forests or infrastructure. In fact, deforestation is increasing in remote areas rather than in those areas close to the village. Lack of enforcement or conflict resolution measures and low payment for protection mean people

⁶ David James and Jack Ruitenbeek , 1999(per.com)

have little incentive to receive remote areas for management. As a result these remote areas are likely to be open-access for everyone. In DongVanh Village, for instance, forests surrounding the village are well-protected by households, while forest resources in the area far away from the village are exploited and cleared or converted to fruit gardens by the villagers themselves.

The relationship between agriculture and forestry is mutually direct. The more food is secured, the less the pressure on the forests and the better conserved they are. For instance, forests in Village 7 and DongVanh Village are protected quite well because of well-performed rice production, and people are aware of the role of forests in ensuring irrigation water and flood/drought control. Whereas in Moi Hamlet, forests are more severely destroyed because local people overuse them to address food shortage.

There is no evidence of relationship between level of deforestation and household income because in all the study sites income from agriculture (food production and animal husbandry) contributes the major share of total household income, while income from forestry is negligible. It does not mean that people no longer depend on forests, but they anticipate the uncertainty of livelihood from them. Agriculture itself strongly relies on climatic and environmental conditions. Loss of food productivity may turn local people into forest exploiters to overcome hunger.

Hypothesis 2. It is clear that local participation depends on existing institutional structures, particularly on mutual communication and information. It does not rely on the level of local people's literacy, or perception of role, functions and sustainability of forest resources, or local customs, values and attitudes and so on. In all the study sites, people participate actively once they are well informed, or feel interested or are encouraged to participate.

Hypothesis 3. Better forest management of forest resources should depend on:

- security of long-term livelihoods for local inhabitants and improvement of the quality of life for local people.
- adequacy of legal, institutional and policy frameworks for sustainable forest management, particularly security of long-term use rights for all stakeholders.
- increase in productivity or yield of land, and therefore, increase in household income.
- conservation and maintenance of forest, soil and water resources for long-term use.

- maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies, particularly protection of existing forested areas (e.g., from fire, encroachment and premature re-entry).

The results of hypotheses testing have further led to a number of *policy recommendations* presented as follows:

1. Food security is not only the responsibility of local authority and inhabitants themselves, but also of the central government. It is evident that forests are protected well in areas where people produce enough food for their demand. It is also obvious that the cost (or opportunity cost) of producing a unit of food in forest areas is much higher than in the lowland. Meanwhile, Vietnam has become one of the biggest rice exporters in the world, exporting around 4 million tonnes of rice every year. About less than a billion US dollars per annum is earned from rice export. However, this amount is paltry compared to the environmental cost lost every year due to destruction of forests by local inhabitants for food production or income generation for food consumption.

It is, therefore, suggested that the demand for food by local inhabitants in forest areas be secured by any means through government intervention. For areas like Village 7 and DongVanh Village with large paddy fields, the government can give support in the form of low or non-interest loan, technical assistance such as training on IPM or application of high-yielding varieties, and control over agricultural input market. For areas with no paddies like Moi Village, the government should apply a subsidized system for rice price, or encourage the exchange of locally produced commodities for food. Moreover, training on sloping land techniques is needed by the local Muong people who are used to lowland farming but are now living in high elevations.

2. One of the shortcomings of recent government development programs is that local people are encouraged to establish large fruit tree or commercial timber plantations but they are not sure on how to commercialize the products. Lack of information, market and price control do not stimulate the local people's interest in the current plantations. As a result, they have a tendency to clear the areas and replace the plantings with new species. For instance, in Village 7 the roadside price for one cubic metre of *Manglietia glauca* is 80,000 dong (nearly US\$ 6) which is lower than the total production cost per cubic meter. Villagers are hesitating whether to cut down the species for firewood and replace it with *Cinnamomum cassia*, or retain the present set-up.

It is, therefore, recommended that in this first stage of market-oriented economy in Vietnam, the Government should have a good incentive system and mechanism to stimulate local farmers to sustain their production through the creation of markets for local produce, and intervene on market prices whenever necessary. It will also help to avoid dependence on imported products that can otherwise be produced locally. Once the people have stable income from selling their products, this will undoubtedly put less pressure on the forests.

3. Although household-based management option is preferable, it has some disadvantages compared with forest enterprises. First, households do not have as good human resources as FEs do. People who work in FEs are usually graduates of universities or technical schools, or have attended different training courses. They are also provided with sufficient information while local farmers mostly depend on their experience. Second, households have to concern themselves with investment capital and are responsible for the ultimate results. It is not easy for them to get loans as needed and on time, and normally have to pay back before they can have a harvest. FEs, in contrast, are usually backstopped by the Government and the Government policy is to continue maintaining the existence of forest enterprises with some reformation. FEs are usually allocated budget for implementing projects/programs or approved plans.

It is, therefore, recommended that the Government should pay more attention to human resources development with focus on technical education and training and provision of relevant information for local farmers based on a demand-driven basis. The Government should also improve the existing regulations on giving loans to local farmers on an incentive basis, that is, use of low and appropriate interest rate, adequate length of time and simple loan procedure.

4. In many cases local people dare not invest in developing slow-growing, indigenous species on forest gardens or areas inherited from their ancestors because they are afraid of being collectivized, which happened in the past. These areas, unfortunately, are still without land titles. Hence, only low value and fast-growing species are observed on these locations. Even local farmers who have forestland allocation must wait long to change from green books (temporary land titles) to red books (official land titles). This can be explained by the lack of human resources and budget, and inadequate information for (top-down) land use planning because in a normal procedure land use planning should be done prior to land allocation.

It is, therefore, recommended that the Government should ensure enough resources to speed up the process of land allocation and granting of land titles to all categories of land including ancestral domains, which are actually under household management. Adequate human and financial resources must also be mobilized to precede land use planning and involve the local population in a more participatory way. This can help ensure that local and national interests are harmonized. Moreover, the concept of community should be rebuilt and recognized. Community arrangements for resource management such as community organizations, rules, customs and indigenous knowledge should also be resumed and documented.

5. In relation to locations such as Moi Hamlet where household-based and FE options play equally important roles, it is suggested that representatives of local communities be involved in the Watershed Management Board (WMB) as partners of FE. The master plan of WMB, therefore, should be revised to cover a component related to ensuring sustainable livelihoods for local communities. To do that, more efforts should be made to encourage local participation and enhance collaboration with local communities in managing protection forests. The definition of forest as well as mandate of state forest enterprises should also be redefined to meet new requirements of sustainable forest management. Allocation of certain areas to local farmers for practicing permanent swidden agriculture by which pressure on the existing forest can be reduced should not remain just an idea, but must be immediately effected.
6. In this research the use of C&I framework is very new in the Vietnamese context. An outstanding conclusion drawn here is that C&I for SFM can be generated and/or verified by local people. However, there are limitations in terms of geographical boundary and consideration of forest categories. Indeed, the results of the research conducted in three small villages seem difficult to disseminate to the whole North region, and the exclusion of special use forests in the research does not help to understand how C&I framework can work with this forest category. It is, therefore, suggested that more thorough studies using C&I framework be conducted in other locations in North Vietnam involving local communities. These studies should also include areas with special use forests such as national parks and natural reserves to develop: (i) separate sets of C&Is for particular forest categories, and (ii) a broad framework for sustainable forest management in the North Upland. It would be great if a fund would be granted to pursue and monitor a trial model of sustainable forest management based on the results of this research.

On the other hand, MCDA using TopDec also offers a new way of analysing and comparing different management systems in the Vietnamese context. It has a number of strengths that have been realised in this research. First, it can work with both quantitative data and qualitative values assigned to different criteria. In fact, assessment criteria or variables, in particular environmental and social, cannot always be easily quantified. However, they can be assigned qualitative values even by local people who do not necessarily know valuation techniques. Second, MCDA can easily take into consideration the weight of different variables, which appear as trade-offs for one another. All factors or variables are simultaneously treated to generate a sum of weighted scores that indicate which option is preferable. Finally, MCDA can help make a choice amongst various alternatives or options which a decision maker cannot do himself.

However, one weakness of MCDA is the difficulty in assigning different weights to various stakeholder interests. It is not easy to decide which criteria or variables – economic, social and ecological - have bigger or smaller weights. In this research change in weighting has a negligible effect on the final score. In other studies, however, a big effect on the final result can be observed. Another weakness is that MCDA does not indicate how much one option is preferred over the others. In particular, a decision-maker hardly makes a choice between two options with almost similar sums of weighted scores. It is therefore recommended that the inputs as well as outputs of MCDA be validated.

The results of this research, unfortunately, have not been validated on all parties involved. Nevertheless, these can be disseminated to promote sustainable forest management through different ways such as: i) EEPSEA publication and distribution to concerned people including members of the Vietnamese Environmental Economics Association; ii) organization of a national workshop on alternative forest management systems involving different people and organizations working in the area of forestry, including local community representatives; and iii) bringing these issues to meeting or discussions with different stakeholders involved in the future although this is very time-consuming and costly.

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LIST OF ACRONYMS

US\$	US dollar (US\$ 1 = 13,900 dong)
C&I	Criteria and Indicators
CIFOR	Center of International Forestry Research
dong	Vietnamese currency unit
EEPSEA	Economy and Environment Program for Southeast Asia
FAO	Food and Agriculture Organization
FE	Forest Enterprise
FIPI	Forest Inventory and Planning Institute
FP	Forest Protection (ranger)
GDLA	General Department of Land Administration
GO	Government Organization
ha	Hectare
HH	household
km ²	square kilometer
MCA	Multi-criteria Analysis
MCDM	Multi-criteria Decision Making
NGO	Non-government Organization
NTFP	non-timber forest product
PC	People Committee
PRA	Participatory Rural Appraisal
sao	360 square meters
WMB	Watershed Management Board