

## SETTING UP AN APPROPRIATE SET OF ECONOMIC CRITERIA AND INDICATORS FOR EVALUATING SUSTAINABLE FOREST MANAGEMENT IN DINH HOA DISTRICT

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### SUMMARY

Criteria and indicator frameworks have grown as tools for improving the sustainable forest management since the last two decades. The top-down approaches has been mainly used to determine critical measures for the success of forest management. Criteria and indicator sets are mainly developed for the national level to describe and monitor status and trends in forest management and fail to capture many criteria and indicator of critical importance to local populations who experience forest management strategies first hand and who have their own definitions of sustainability. The concept of criteria and indicator for sustainable forest management requires further development at the local level. This research was conducted in Dinh Hoa district, Thai Nguyen province. Using participatory and bottom-up approaches, the research aims to set up and develop an appropriate set of economic criteria and indicators for sustainable forest management at local level, which shows applicability for the sustainable forest management of tropical forests locally. The final set of economic criteria and indicators consists of seven criteria and twenty four indicators should be used as a suggestion for policy makers to build up the criteria and indicators for sustainable forest management in Vietnam including the voice and the choice of local people.

**Keywords:** *Sustainability; forest management; economic criteria and indicators; participatory approach; tropical forest.*

### INTRODUCTION

Criteria and indicator (C&I) frameworks have grown as tools for improving the sustainable forest management since the last two decades [1]. The top-down approaches has been mainly used to determine critical measures for the success of forest management. C&I sets are mainly developed for the national level to describe and monitor status and trends in forest management [2] and fail to capture many C&I of critical importance to local populations who experience forest management strategies first hand and who have their own definitions of sustainability [1]. The concept of C&I for sustainable forest management (SFM) requires further development at the local level.

C&I, developed locally by the principal stakeholders in a participatory and collaborative way, can be a valuable tool for mutual learning between the community and partners, sharing local and scientific and other external knowledge and guiding action towards the sustainable management of forests [3]. The resulting C&I can be used by the community as a tool for setting goals for

sustainable forest management, guiding actions, monitoring and assessing and learning from the process. Using the C&I in an iterative process can help adapt management towards sustainability [3].

Vietnam has a natural area of over 33.1 million hectares, including 14.4 million ha of forests of which about 10.2 million ha are naturally regenerated forest and 4.2 million ha are planted forest with forest coverage ratio of 41.45% [4]. In total, the forest sector in Vietnam contributes 0,67% to the country's GDP, excluding significant contributions of forest product processing industry, exports, and environmental values [5]. In 2016, total number of forestry households in Viet Nam is 114.5 thousand households [6]. 2.9 million people have income from forests less than 25% of the total income, 1.2 million people from 25 to 50%, and 0.57 million people over 50% [7].

Although the forest area is increasing, the quality and biodiversity of the natural forests in many locations have been continuously reduced. In some locations, the forest is being destroyed due to changes of land use purposes, illegal logging, slash-and-burn agriculture. To ensure the forest will be

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managed in a sustainable way, C&I assing SFM should be built up.

Applying an available generic set of C&I for SFM of some international organizations International Tropical Timber organization (ITTO) applying for 150 countries tropical forest countries, focusing on Africa and Latin America [8], Center of International Forestry Research (CIFOR), Forest Steward Council (FSC) applying for 80 countries [9], or Vietnam’s set in line with FSC (still not announced formally) has some obstacles because these don’t involve the specific local context with various characteristics of forests which are directly related to local people’s lives, manners and customs, traditions and cultures. Therefore, it is imperative to include local forest conditions, local people’s voice and choice while developing such instruments. The task proposed in this research is motivated by this challenge.

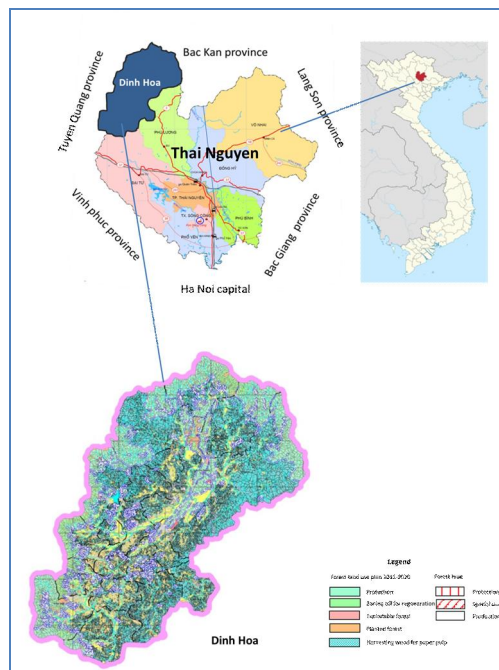
The objective of the study is to set up an appropriate set of economic C&I to evaluate SFM with the active involvement of local stakeholders.

**METHODOLOGY**

The study was conducted in Dinh Hoa district, Thai Nguyen province, Northern Vietnam. Dinh Hoa has an area of 51,35 thousand ha with a population of about 88,43 thousand people in which 92,5% live in rural areas [10]. Forest area is about 34,36 thousand ha representing 66,92% of the total area, of which special use forest, protection forest, and production forest comprise at 24%, 20%, and 56% respectively. The forest land is allocated to households, village community, and social organization of which household allocation comprises at about 60% of the total. Dinh Hoa district is characterized by biophysical, social and cultural diversity as well as its important role in the regional economy’s development [11]. Dinh Hoa was chosen due to the geographic representatives, the presence of three forest functions, i.e., protection, production, and special-use forests, the presence of natural and planted forest and the willingness of local paper to participate in the survey.

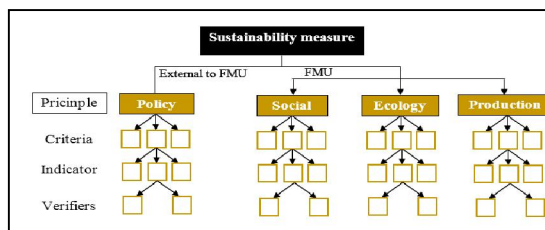
The research was carried out at 12 hamlets in five communes Phu Tien, Quy Ky, Lam Vi, Diem Mac, Phu Dinh. Additionally, Bao

Cuong commune was chosen to pretest. The criteria to select participants were differences in ages, ethnic groups, well-being, gender, education levels, experience in farming and forest use. Several participants are representative of chief of hamlet, war veteran union, farmer association, women association, youth union and forest guard.



**Figure 1.** Map of Dinh Hoa district

The research applied C&I hierarchy framework. This C&I hierarchy is described in the following manner: The overall purpose of the hierarchical structure is to create strong links between the upper-level ideals (Principles) and the “signs” (Criteria and Indicators) right down to the small pieces of information (Verifiers) so that the picture created is meaningful and coherent [12]. There is no difficulty with adapting this framework, or any other C&I framework, to meet local needs, as long as this basic function and logic remains intact.



**Figure 2.** Hierarchy Structure of C&I

To collect data, the research used the Participatory Rural Appraisal (PRA) method. 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” [13]. PRA has also been called “an approach and method for learning about rural life and conditions from, with and by rural people” [13]. Using PRA method, the survey conducted including two steps: preliminary visits and group discussion.

Firstly, personal contacts with local staff working in forestry organizations such as the Department of Agriculture Development were made. Those people were requested to advice as in which communes and hamlets meeting the above criteria were existed. 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.

Secondly, group discussion was taken place. The approach of the study started from a blank sheet of paper and draw up an economic set of C&I from scratch with the local stakeholders, by building a shared local vision of sustainable management of the forest focusing on the economical aspect and drawing from local knowledge and insights. A set C&I is built by local people through group discussions. After 12 discussions in 12 hamlets, if the frequency of C&I presents equal or larger than 50%, this C&I will be kept in the final C&I.

**RESULTS AND DISCUSSION**

The final economic set of C&I built up by local people in Dinh Hoa district is presented in Table 1.

**Table 1. Final Economic set of C&I**

ECONOMIC BENEFITS ARE SUSTAINABLY MANAGED	
C	I
<b>1.1</b>	<b>Economic benefits derived from forests are compatible with the sustainable capacity of the resource</b>
1.1.1	Annually allowable volume and value of timber extracted
1.1.2	Annually allowable volume and value of non-timber forest products (NTFPs), including fuel wood for subsistence use
1.1.3	Value derived from forest recreation sites and tourism increases annually
<b>1.2</b>	<b>The price of timber and NTFPs are effectively valued</b>
1.2.1	The price system is clearly prescribed and appropriate with the forest products' quality.
1.2.2	Forest products are sold in current price
1.2.3	The stable price of forest products is yearly maintained
1.2.4	The price forest products is enough to fulfil costs and keep their family
<b>1.3</b>	<b>Life quality of forest dependent people are gradually improved</b>
1.3.1	Income of local and forest dependent people steadily increases and matches the demand of subsistence expense, education and health care service
1.3.2	Number of direct and indirect employments in the forestry and related sectors
1.3.3	There are opportunities for local & forest dependent people to receive technology training
<b>1.4</b>	<b>Sharing of economic benefits is fair and equitable by the stakeholders involved</b>
1.4.1	All stakeholders are able to participate in forest resources, independently of gender age group, education and job characteristics
1.4.2	Mechanisms for the equitable sharing of the costs and benefits between local people and forest managers.
1.4.3	Forest resource exploiting tax system is reasonable
<b>1.5</b>	<b>Efficient investment in forest</b>
1.5.1	Appropriate amount of money invested in diversity of plant species adapted to local conditions (soil, climate, water, etc) to enhance productivity and economic value.
1.5.2	Suitable amount of money invested in logging equipments (saw, pulley, etc) to match forest conditions in order to reduce damage

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ECONOMIC BENEFITS ARE SUSTAINABLY MANAGED

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C	I
1.5.3	Suitable amount of money invested in roads and log transportation means to cut down transporting costs and time and reduce impacts to other forests
1.5.4	Proper amount of money to the cover cost of maintaining the land as forest.
1.5.5	Appropriate amount of money invested in replanting after harvesting
<b>1.6</b>	<b>The harvesting plan and process are compatible with sustainable forest management</b>
1.6.1	Harvesting system and equipment are prescribed to match forest conditions in order to reduce impact
1.6.2	The harvesting plan must specify areas, species, tree sizes, limits and volumes, frequency of extraction, spacing and location.
1.6.3	Minimize waste associated with harvesting and reduce damage to other forests
<b>1.7</b>	<b>Existence of effective monitoring mechanisms</b>
1.7.1	Illegal logging, hunting, grazing and clearing for farming are cut down and controlled
1.7.2	Silviculture prescriptions (pre-, during, and post-harvest) are being adhered to
1.7.3	Existence and implementation of conflict-resolution mechanisms for resolving economic disputes among forest stakeholders.

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The type of forest allocation leads to different rights to exploit economic benefits from forests. Households having allocated production and protection forests are allowed to harvest the timber and NTFPs for sale and expenditure under the permission of the commune and district committee while households with allocated special use forests are not allowed to derive anything from the forests. They receive 100,000 VND/ha/year for preserving the forest only [14], [15]. This amount of money seems too low to meet their subsistence expenses. The different rights to exploit economic benefits from forests bring to significantly different opinion during the discussions.

Economics benefit derived from forests is the most important benefit that the local people care for. According to their opinions, the volume and value of timber and NTFPs should be allowably and reasonably extracted to make sure that these benefits will be retained for their future generations. People who owning production and protection forests emphasize these three indicators while people own special use forests don't mention about indicator 1.1.1 and 1.1.2 because they are not allowed to derive anything from the forests. The aim of special use forest preservation is for landscape protection, scientific research, biodiversity conservation and historical monument sites protection. Therefore, people owning special use forest choose only indicator 1.1.3 for these reasons.

In terms of pricing, local people complain that the true value of forest was underestimated

because only parts of the use value were taken into account. Some statements came out of the PRA discussions stated that in the past decades forests were considered as an 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 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 the 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. Once more, the same assessments of local people with indicators 1.2.1 to 1.2.4 are repeated again. Local people in special use forest don't mention about the price while almost people in the others consider these indicators as very important to include in the C&I set.

Criterion 1.3 is the only one where all indicators receive the high consensus of all participants. In fact, it is difficult for local people who have low education and professional skills to enjoy an official labor market. Moreover, aboriginal people living in remote regions are quite familiar with traditional customs. It is not easy to go to other regions to get a good job in another sector to earn money. Hence, job in the forest sector can help them to earn money to live and improve their life quality, so that it at

least matches the demand of subsistence expense, education and health care service. Only when they have enough money to feed their family, they will stop illegal logging. Local people in special use forest areas also hope that they will be paid a reasonable compensation as well as get stable jobs in the future that encourage them to preserve the natural forests.

While the local people in production and protection forest focus on the indicator 1.4.2 and 1.4.3, the other ones in special use forest emphasize indicator 1.4.1. This assessment is entirely compatible with the currently practical conditions. The local people in production and protection forest have the right to make use of the timber and NTFPs. Therefore, they care for the mechanism of sharing costs and benefits as well as for the resource tax system. The local people criticize that facing to high fees, high tax and low price is an actual challenge to improve life quality. They pointed out that these indicators highly relate to the indicators belonging to criteria 1.2 and 1.3. Nevertheless, the local people in special use forests call attention to the equitability in forest resource access. Therefore, they mention indicator 1.4.3 only.

Criteria 1.5 "Efficient investment in forest" is the second criteria where almost indicators receive high consensus. More than half of the participants were from poor households. They could not invest themselves in seed planting, harvesting tools and equipments, transportation means, road construction, etc themselves. Financial support from the government is expected in the near future.

Criteria 1.6 is highly assessed by local people in protection and production forest while people in special use forest have no ideas about this criterion. Two third of participants imply that without a sustainable harvest plan and process, the forest resource couldn't avoid the negative impacts from exploiting activities.

The monitoring mechanism is considered as a weak point of forest management in Dinh Hoa because of the lack of local participation in decision-making. The 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. This has resulted in conflicts in resource use among local stakeholders. Consequently, forests have been destroyed by illegal logging, hunting and grazing 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.

#### CONCLUSION

The findings from this study confirms that economic set of C&I for SFM suggested by local forest users are detailed and specific which are relevant to the local context and conditions. Overall, the final C&I practically reflect changes of local forest users from perception to action. Hence, they not only focus on the economic benefits derived from the forest but also concern about how to reduce the harmful impacts to the forest during harvesting and exploiting forest resources. Reasonable harvesting, equitable sharing and suitable process are considered as criteria for SFM. However, the lack of local people voice in forest management process for a long time leads to the lack of management aspects reflected in final economic set of C&I. There is not any criterion or indicator representing for forest comprehensive management plan, management objective, the effective monitoring and control systems related to economic aspects. In addition, the different types of forest allocated to local people lead them to the different perceptions of SFM. This is the right time for this suggestion to be integrated in the policy decision making.

This research demonstrates the necessity of the local people's involvement in attempts to develop more sustainable approaches to forest management. Results show that a 'bottom-up' approach of local-level C&I development increases relevance compared to FSC set of C&I applying as national set of C&I in Viet Nam because communities define sustainability

differently from each other and from experts, requiring an unique set of progress measures. Increased relevance may lead to increased interest and motivation of local people to become involved in research, management, and monitoring. The study also demonstrates that a C&I strategy can be applied in aboriginal communities to give expression to local knowledge, practices and beliefs, and to assess forest management as it relates to culture, land use and community development.

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#### TÓM TẮT

#### XÂY DỰNG BỘ TIÊU CHÍ VÀ CHỈ SỐ KINH TẾ PHÙ HỢP ĐỂ ĐÁNH GIÁ QUẢN LÝ RỪNG BỀN VỮNG Ở HUYỆN ĐỊNH HOÁ

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Trong hai thập kỷ qua, các bộ tiêu chí và chỉ tiêu được xây dựng đã trở thành những công cụ để nâng cao công tác quản lý rừng bền vững. Các phương pháp tiếp cận từ trên xuống được sử dụng chủ yếu để đo lường sự thành công của quản lý rừng. Các bộ tiêu chí và chỉ số chủ yếu được xây dựng ở cấp quốc gia để mô tả và giám sát tình trạng và xu thế quản lý rừng nên không nắm bắt được nhiều tiêu chí và chỉ số quan trọng đối với người dân địa phương, những người có kinh nghiệm trong quản lý rừng đầu tiên và có những định nghĩa về sự bền vững theo cách của riêng họ. Khái niệm tiêu chí và chỉ số về quản lý rừng bền vững đòi hỏi phải phù hợp với các cấp địa phương. Nghiên cứu này được thực hiện tại huyện Định Hoá, tỉnh Thái Nguyên. Sử dụng phương pháp tiếp cận từ dưới lên có sự tham gia của người dân địa phương, nghiên cứu này nhằm mục đích xây dựng một bộ các tiêu chí và chỉ số kinh tế phù hợp để quản lý rừng bền vững ở cấp địa phương áp dụng cho việc quản lý bền vững rừng nhiệt đới. Bộ tiêu chí và chỉ số kinh tế xây dựng được bao gồm bảy tiêu chí và 24 chỉ số, được sử dụng như là một gợi ý cho các nhà hoạch định chính sách trong việc xây dựng các tiêu chí và chỉ số cho quản lý rừng bền vững ở Việt Nam có tính đến tiếng nói và sự lựa chọn của người dân địa phương.

**Từ khóa:** *Tính bền vững; quản lý rừng; tiêu chí và chỉ số kinh tế; cách tiếp cận tham dự; rừng nhiệt đới.*

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