

Discussion Paper No.364

Community Participation in Upstream Forest Management  
—A Case Study in Houaphan Province, Lao PDR—

Viseuy INDAVONG  
National University of Laos  
Tomoya MORI  
Yamaguchi University

February 2022



INSTITUTE OF ECONOMIC RESEARCH  
Chuo University  
Tokyo, Japan

# **Community Participation in Upstream Forest Management —A Case Study in Houaphan Province, Lao PDR—**

**Viseuy INDAVONG**

Lecturer

at Faculty of Forest Science, National University of Laos

E-mail: [v.indavong@nuol.edu.la](mailto:v.indavong@nuol.edu.la)

**Tomoya MORI**

Lecturer

at Faculty of Education, Yamaguchi University

E-mail: [moritomo@yamaguchi-u.ac.jp](mailto:moritomo@yamaguchi-u.ac.jp)

## **Abstract**

In this paper, community participation in the management of Namxam upstream forests was studied in terms of common pool resources (CPRs) by analyzing a case study involving three villages in Samnuea district, Houaphan province. The study aimed at exploring the socio-economic factors affecting forest management and evaluating the management and rules by referring to the study of CPRs. An attempt was made to collect information from interviews and a questionnaire survey. Three villages with 318 households were selected for field surveying. All households were interviewed. It was found that community participation in upstream forest management activities consists of eight main activities: forest monitoring, wildlife management, aquatic animals forbidden management areas, regulation-making on upstream forest management, dissemination campaigns, forest restoration and maintenance, and raising awareness. It was also demonstrated that these activities can be evaluated from the perspective of CPRs.

## **Keywords**

community participation, upstream forest management, common pool resources, Laos

## 1. Introduction

The Lao People's Democratic Republic (Laos) is a landlocked South Asian country that shares borders with China to the north (505 km), Cambodia to the south (435 km), Vietnam to the east (2,069 km), Thailand to the west (1,835 km), and Myanmar to the northwest (236 km).

A forest cover assessment of Laos, carried out in 2010, showed a forest cover rate of only 40.30%, that is ~9.55 million ha. This rate was approximately 70% in the 1940s (Forest Carbon Partnership Faculty, 2014). This important decrease in forest cover can be attributed to forest clearing and burning due to unsustainable shifting cultivation, forest fires, uncontrolled logging, and conversion to agriculture. Other underlying causes are the widespread hardship, rapid population increase, and unsatisfactory law enforcement (Phompila et al., 2017).

Forests establish an economic base for rural communities by providing food security, fuel, and construction materials. For instance, local people collect mushrooms, wild berries, fruits, nuts, honey, earthworms, and medicinal herbs, and sometimes hunt wild animals in forests. Non-timber forest products (NTFPs) and wildlife resources can significantly contribute to satisfying both subsistence and income requirements of villagers. While NTFPs are collected year-round, different types of forest products are available in each season. Many of the products collected for daily use and trade can only grow well when the forest cover is continuously maintained and the environment is sustainable.

Upstream forest areas are a source of rivers when the headwater is abundant. They are covered by dense forest, and supply water to an entire region throughout the year; shortages will disturb the water volume balance. Forests, land, and rivers are considered natural resources that need to be balanced, and are closely interrelated. When natural resources are destroyed, they change and may cause rapid degradation of upstream forest areas. Therefore, these areas should be managed and protected to enrich them and make river and aquatic resources sustainable.

Upstream forests and various resources formed by them can be regarded as common pool resources (CPRs). CPRs have been studied in many fields (Ostrom et al., 2002). Ostrom (1990) described the institutional conditions for appropriators to cooperate with the management of CPRs in the long term. In this study, an attempt was made to analyze upstream forest management by referring to these conditions.

Specifically, the aim of this research was to study the participation of villagers in upstream forest management, benefits, utilization of natural resources, and production of a forest management plan for relevant organizations in the conservation forest area. The research focused on three villages in the Samneau district, Houaphan province. The objectives were as follows: 1) to study the factors involved in community participation in upstream forest resource management; 2) to determine factors that enhance the local community benefits by participating in forest management activities and conserving natural forest resources; and 3) to evaluate the management in terms of the study of CPRs.

## 2. Materials and Methodology

### 2-1. Basic information on the research sites

Houaphan Province is located in eastern Laos. It covers an area of 16,500 sq km and its capital is located in Samneau district. The province is bordered by Vietnam to the northeast, the southeast Xiengkhouang province to the south and southwest, and the Luangprabang province to the west. The terrain is rugged and dense, and forested mountains form much of the province. Three villages in the Samneau district were selected for study and labelled as K, H, and T by taking the first letter of the name of each village. The villages were located in the northern Samneau district. The forest areas of villages K, H, and T are 6,807, 1,644, and 384 hectares, respectively.

The Namxam upstream forests can provide valuable resources to local people. The headwater of the Namxam River is located in village H in Samneua district and runs through the Samneua and Samtai districts to Vietnam. It covers a total distance of 245 km and flows into the rivers of Vietnam. The Namxam River is an upstream forest that is able to supply water throughout the year. It acts as natural reserves, maintains soil quality, preserves wildlife habitat, conserves natural ecological system, and is a source of numerous plant species. Therefore, such areas must be protected from natural disasters. However, deforestation and forest degradation in this region are key issues mainly caused by uncertain rotation slash and burn of forest land for agricultural practices, conversion of forest land to industrial tree species plantation and cultivation areas, illegal logging, hunting wild animals for food and trade, unsustainable harvesting of NTFPs, negligence in the management of natural resources, and lack of sustainable forest management plans, techniques, and participation from local and relevant agencies.

### 2-2. Data collection

Primary data were collected through interviews and questionnaire surveys in three villages in the Samneua district. The interview survey was implemented in a village meeting, by involving related administrations, and all households. Details of the interviewees are presented in table 2-1. The village meeting was organized during the field data collection, and we focused on interviewing each village authority at the village meeting. These data were collected through discussions with the villagers. The interviews for the related administrations were carried out for the forestry division (the provincial agriculture and forestry office) and the district agriculture and forestry office in the study area.

Table 2-1: Details of the interviewee

Interviewee	Details
Forestry Division	The head of forestry division conducted discussions on the boundary of national protection forest area in Namxam national protection forest and other information related to my research, with particular focus on forest resource use in the upstream forest area.

District Agriculture and Forestry	Head of agriculture and forestry was discussed, which is an agency responsible for forest preservation through regulations to forest management, allocation of management zones and use of forest resources, forestland, agriculture land and other types of land in Namxam National protection forest. Villager participation in upstream forest management and the benefits from forest resources use were also deliberated.
Village Authority	Head of the village was interviewed and the village organization focused on an overview of the village history, boundary of the village, population, socio-economic status, village forest, NTFPs harvesting, upstream forest management, forest land, forest types, forest resourced management, and utilization of forest resources was discussed.
Household (Head of the family)	Households were divided into three levels (rich family, medium family and poor family) and interviewed. The village household was selected at 100% within the village. Three village sites at Namxam national protection forest area in Samneua district, Houaphan province were selected as the research area.
Personal information of households	The general information acquired from each respondent was gender, religion, age, member of the household, ethnic group, education level, occupation, and economic status of household. The interview was carried out in 100% of households in the three villages.

Resource: Author's field survey

The first-hand experience of the respondents could be clearly recorded, and the demarcated interest could be identified based on age, style of living, gender, ethnicity, and other socioeconomic divisions of the three villages. A meeting with local people who were representatives of the households was carried out, and consultations with the village committee and head of the village were also conducted.

Interviews were conducted by the study team. Data collection began by working with local authorities to collect actual field data of each village. First, the team held a meeting for planning and material preparation. In this meeting, the researcher informed local people of the research objective, procedure, and schedule to familiarize them with the methods and techniques used for data gathering. Attempts to build trust-based relationships and human networks were done during this time. Several instruments were used, including an interview schedule, field survey, and a guide questionnaire for the focus group discussion.

### 2-3. Namxam upstream forest as CPRs

Resources such as an upstream forest that was appropriated by users can be regarded as common pool resources (CPRs). CPRs have two attributes: non-exclusion and rivalry. In terms of economics theory, the attributes of CPRs generate negative externalities among users; therefore, CPRs are appropriated beyond the Pareto equilibrium. This issue is regarded as a social dilemma (Ostrom et al., 1998).

Conventionally, the resolution of the common pool resources' dilemma is demonstrated either by a market mechanism or by government intervention based on the discussion by Hardin (1968),

which is called “*The Tragedy of the Commons*.” However, the study of CPRs, especially that based on field research, also suggests that the governance of CPRs can be managed by a local community composed of the appropriators for a long time without depending on these resolutions (e.g., McCay and Acheson, 1987; Ostrom, 1990; Ostrom et al., 2002).

Ostrom (1990) is known as one of the most remarkable studies on CPRs. Ostrom (1990) determined rules for the sustainable usage of CPRs. This study compared the implications of many field studies and showed institutional factors common to case studies in which the management of CPRs can be sustained for a long time.

Moreover, Mori (2015), Yabuta (2004), and Yabuta et al. (2014) summarized the stipulations shown by Ostrom (1990) into three rules: boundary rules, allocation rules, and sanction/monitoring rules. Boundary rules define the boundaries of CPRs and members who can appropriate CPRs. Next, allocation rules are established to regulate the way to use CPRs, for example, the type of resources available, the period and area accessible, technique, and tools to appropriate. Finally, sanction/monitoring rules are meant to monitor whether the members obey the regulations and punish those who violate them.

Furthermore, the management of CPRs is insufficient to maintain its efficiency and sustainability owing to the appearance of free riders. Free riders are those who receive the benefit from CPRs without paying the management cost and cooperating with or contributing to the management. The existence of these free riders prevents appropriators who co-manage resources from improving the efficiency and sustainability of the usage even if they attempt to do so; this is a problem of undermanagement.

Ostrom (1990) demonstrated that social capital can play a role in restraining the appearance of free riders and maintaining the management system for a long time. Social capital represents social relationships such as trust, reciprocity, and human networks, and is thought to be accumulated within a community for a long time. To evaluate the management of CPRs, it is necessary for investigators to pay attention to whether social capital is operating in a community and is encouraged to accumulate there.

Field research was conducted to collect data from the perspective described above. Based on these results, this study attempts to evaluate management. This method of field research refers to Mori (2015), who also conducted field surveys and data collection based on the study of CPRs.

### **3. Result of field survey**

#### **3-1. Socio-economic situations**

The Namxam National Protection Forest includes several villages. Since some villages are difficult to access, the research area was restricted to three villages: K, H, and T (refer to table 3-1). The three villages had 311 households, 1,745 inhabitants, of which 836 females. The ethnicity living

in village K is 100% Hmong, village H consists of 100% Laolum, and village T consists of 99% Laolum and 1% Hmong. Most of the villagers are employed in agriculture, raising livestock, with harvesting NTFPs as a second occupation.

Table 3-1: Basic information of three villages

Village	Household	Population	Female	Ethnic
Village K	130	854	411	Hmong
Village H	109	511	233	Laolum
Village T	72	380	192	Laolum and Hmong
Total	311	1,745	836	

Resource: Author's field survey

Table 3-2: Average annual income per household

Village	Average of income (LAK/ household/ year)						Total of village income per year
	Cultivate: Rice, bananas, pineapple, sugarcane, cassava	Livestock: Cows, goats, ducks, chickens and pigs	NTFPs: Resin, rattan, honey, bamboos, red crab	Dry shop: Utensil and dry foods	Wages: Repair house, plant the rice, clean garden, harvested rice	Handcrafts: Container for steamed rice, tray for meals, baskets	
Village K	6.700.000 LAK/ 716 USD	4.700.000 LAK/ 503 USD	3.850.000 LAK/ 412 USD	3.350.000 LAK/ 358 USD	2.500.000 LAK/ 267 USD	1.500.000 LAK/ 160 USD	22.600.000 LAK/ 2.416 USD
Village H	6.200.000 LAK/ 663 USD	4.200.000 LAK/ 450 USD	3.000.000 LAK/ 321 USD	2.400.000 LAK/ 256 USD	1.700.000 LAK/ 182 USD	1.100.000 LAK/ 117 USD	18.600.000 LAK/ 1.989 USD
Village T	5.600.000 LAK/ 560 USD	3.900.000 LAK/ 417 USD	3.000.000 LAK/ 289 USD	1.700.000 LAK/ 182 USD	1.200.000 LAK/ 128 USD	1.500.000 LAK/ 96 USD	16.000.000 LAK/ 1.672 USD
Total	18.500.000 LAK/ 1.939 USD	12.800.000 LAK/ 1.370 USD	9.550.000 LAK/ 1.022 USD	7.450.000 LAK/ 796 USD	5.400.000 LAK/ 577 USD	3.500.000 LAK/ 373 USD	57.200.000 LAK/ 6.077 USD

Resource: Author's field survey

Table 3-2 describes the average annual income of one household in each village. In village K, the income generated from cultivation is the highest and equals to 6,700,000 LAK (716 USD). The second highest income source is the revenue from livestock, which is 4,700,000 LAK (503 USD), and the lowest is the revenue from handicrafts, which is 1,500,000 (160 USD). In village H, the highest and lowest income is 6,200,000 LAK (663 USD) and 1,100,000 LAK (117 USD), respectively. In Village T, the highest and lowest income is 5,600,000 LAK (560 USD) and 3,500,000 LAK (373 USD), respectively. In addition, the main sources of income are cultivated, livestock, and non-timber forest products. The total average annual income per household in the three villages is approximately 57,200,000 LAK (6,077 US).

Table 3-3: Expenditures in the three villages

No	Familial expenditures		Average / year (USD)	Mark
1	Cultivation	Village K	380,000 LAK (41 USD)	Buying seeds, fertilizers, pesticides
		Village H	320,000 LAK (34 USD)	
		Village T	270,000 LAK (29 USD)	
2	Livestock	Village K	320,000 LAK (34 USD)	Rice bran, rice husk, animal feed
		Village H	310,000 LAK (33 USD)	
		Village T	290,000 LAK (31 USD)	
3	Foods	Village K	1,100,000 LAK (118 USD)	Buy, cooking machine, vegetables
		Village H	1,10,000 LAK (118 USD)	
		Village T	900,000 LAK (97 USD)	
4	Clothing	Village K	900,000 LAK (97 USD)	Blankets, chairs, pillows, panties, shirts
		Village H	800,000 LAK (86 USD)	
		Village T	700,000 LAK (75 USD)	
5	Medicine	Village K	300,000 LAK (32 USD)	Domestic service
		Village H	250,000 LAK (27 USD)	
		Village T	220,000 LAK (24 USD)	
6	Electric charge	Village K	300,000 LAK (32 USD)	
		Village H	250,000 LAK (27 USD)	
		Village T	200,000 LAK (22 USD)	
7	Education cost	Village K	600,000 LAK (65 USD)	Sent child attend another school
		Village H	800,000 LAK (86 USD)	
		Village T	550,000 LAK (59 USD)	
8	Production equipment	Village K	1,000,000 LAK (108 USD)	Knives, repair machines
		Village H	900,000 LAK (97 USD)	
		Village T	650,000 LAK (70 USD)	
9	Fuel	Village K	700,000 LAK (75 USD)	Car oil, petroleum production vehicles
		Village H	650,000 LAK (70 USD)	
		Village T	760,000 LAK (82 USD)	
10	Traditional festivals	Village K	300,000 LAK (32 USD)	
		Village H	250,000 LAK (27 USD)	
		Village T	360,000 LAK (39 USD)	
11	Learning materials of children	Village K	250,000 LAK (27 USD)	
		Village H	200,000 LAK (22 USD)	
		Village T	200,000 LAK (22 USD)	
12	Telephone charges	Village K	600,000 LAK (65 USD)	
		Village H	450,000 LAK (48 USD)	
		Village T	700,000 LAK (75 USD)	
Total expenditures		Village K	6,750,000 LAK (726 USD)	
		Village H	6,280,000 LAK (675 USD)	
		Village T	5,800,000 LAK (625 USD)	

Resource: Author's field survey

Villagers in the three villages receive many kinds of resources from the Namxam upstream forest for daily life. Table 3-4 demonstrates the forest resources they usually utilize in the three villages. These resources are utilized for living materials, such as food and buildings, and trade to compensate for a shortage or get something to need.



Table 3-4: Natural resources obtained from forest area

Resources		Quantity of use (household /year)	Utilizations
Bamboo	Village K	60 stems	Building, garden, fence
	Village H	40 stems	
	Village T	50 stems	
Vegetable	Village K	45 kg	Food, trade
	Village H	31 kg	
	Village T	35 kg	
Bamboo shoot	Village K	60 kg	Food
	Village H	36 kg	
	Village T	40 kg	
Banana flower/leaf	Village K	30 kg	Wrap the objects
	Village H	17 kg	
	Village T	20 kg	
Rattan	Village K	21 kg	Service equipment
	Village H	12 kg	
	Village T	15 kg	
Fruit	Village K	17 kg	Food, trade
	Village H	14 kg	
	Village T	17 kg	
Mushrooms	Village K	12 kg	Food, trade
	Village H	9 kg	
	Village T	9 kg	
Aquatic animals	Village K	35 kg	Food
	Village H	23 kg	
	Village T	32 kg	
Fire wood	Village K	3 cubic	Building
	Village H	2 cubic	
	Village T	2 cubic	
Wild animals (squirrels, bird, frog, crab etc.)	Village K	20 kg	Food
	Village H	13 kg	
	Village T	16 kg	

Resource: Author's field survey

### 3-2. Local participation of the upstream forest management

By field research, it was found that the tasks of local participation consisted of eight main activities: 1) participation in planning; 2) forest monitoring; 3) wildlife management in the protection area; 4) management of aquatic animals; 5) regulation of upstream forest management; 6) dissemination campaigns; 7) forest restoration and maintenance; and 8) raising awareness. The following section explains each activity in detail.

#### (1) Participation in planning

Villager participation in decisions related to forest planning is essential for obtaining permanent and viable solutions. Nowadays, the participation of villagers is necessary to reach consensus in natural resource management and in local governance for land and resources in the

Namxam conservation forest. This is a key element in forest planning. However, only the initial steps are being taken to include public participation in forest planning within the forestry sector, such as provincial agriculture and forestry, district agriculture and forestry, village forestry and relevant agencies, and NGOs to preserve forest resources.

- i. Allocating the boundary and setting up the boundary signage of the conservation area.
- ii. Making village regulations on forest management.
- iii. Selecting a village forestry officer.

After activities (i)–(iii) were conducted, local people could be involved in activities (iv)–(v) as follows. After drafting plans and regulations for forest management, local people can participate in the discussion. As a result, plans and regulations were adopted and proposed through village meetings so that villagers could understand the management and implement it accordingly.

- iv. Making the survey schedule to exploit timber, maintenance, and inspection patrol.
- v. Making plans for using the village fund for family economic development.

## (2) Forest monitoring

Further, forest management constitutes a major part of forest monitoring. Forest inspection is conducted monthly, and local people usually monitor the condition when harvesting NTFPs. However, activity against the laws and local regulations still occurs, such as illegal logging, forest fires, and excessive harvesting of NTFPs.

## (3) Wildlife management in the protection area

According to the interview, it can be concluded that wildlife management in the protection area arises from joint forest management between the government and local communities. National protection areas were established based on the laws, and then wildlife prohibitions were locally formed in these areas. For example, hunting is strictly prohibited during the wildlife breeding season, from June to October. In addition, hunting equipment such as firearms and hunting grenades and hunting activities for food or trade are prohibited in the protection areas and during the wildlife breeding season.

## (4) Management of aquatic animals

Each village will have conservation zones that restrict the utilization of aquatic animals. The village strictly bars people from fishing during the prohibited season. Most people live along rivers and natural forests and depend on them. To maintain the sustainability of aquatic animals, it is necessary for local people to understand the regulation and benefit from conservation, and be

voluntarily involved in this activity.

(5) Regulating upstream forest management

Villagers can participate in the process of regulating village forest management based on the national legal system. The objectives of the local regulation are to monitor, inspect, and quickly prohibit activities that may have detrimental effects on forests, NTFPs, watersheds, wildlife, aquatic wild animals, and the environment. Additionally, people who engage in illegal activities, including illegal logging, shifting cultivation, harvesting NTFPs, hunting protected animal and plant species that are close to extinction, burning forests, and actions that lead to deforestation should be punished.

(6) Dissemination campaign

The dissemination campaign is an important component of forest management. Village authorities make an effort to disseminate forestry regulations for their villages as a whole, and subsequently mobilize them to engage with this activity. The notification of village forest regulations is conducted in conjunction with district forestry staff and the division of the village. For example, they set the signboards to inform the categorization of forest land and prohibited items regarding utilization.

(7) Forest reforestation and maintenance

Local people participate in rehabilitation and maintenance to recover, conserve, and protect the natural conditions of forests and the environment that has been destroyed and degraded in the past. Typically, during the National Tree Planting Day, village authorities mobilize villagers to plant trees in different places with the support of the district forestry office as provision for seeds of *Azalia*, Teak, and *Pterocarpus*. In addition, there were some rubber plantations in these villages that started in 2007. Through these activities, village authorities also made an effort to raise the awareness of young villagers.

(8) Raising awareness

Villagers are engaged in raising their awareness. In this activity, they are gathered somewhere in the village or forest where discussions are conducted on the importance of natural protection. The ideas and opinions of other people are also shared with them. In addition, there were also some advertisements and disseminations to youth and children in the village. This will encourage them to be concerned about the importance and benefits of forests. These activities were carried out by using direct or indirect communication from advertising and dissemination activities such as writing slogans, distributing photos of forest protection, forest fire, conservation of aquatic-wild animals, etc.

The activities shown above can be thought of as the institutional factor to sustain resources and maintain management in terms of the study of CPRs. Regarding boundary rules, the boundary and member can be established in activity (1) in support of the district administration and NGOs. Allocation rules can be found in activities (3), (4), and (5). Activities (3) and (4) restrict the usage of a specific resource and the objective to harvest and hunt resources and regulate the season and technique for which they are available. Activity (2) is a monitoring rule. In addition, this activity is made by local people themselves in activity (5).

Moreover, activities (6), (7), and (8) are designed to raise the awareness of local people, share knowledge and information about forest management with members, and build the capacity to manage CPRs. The implications of these activities are interrupted by the enhancement and accumulation of social capital.

### 3-3. Benefits from local community participation

Basically, villagers which participate in Namxam upstream forest management gain significant income, although some activities do not generate any income. Table 3-5 demonstrates that the income of the village from participation in forest management can generate a revenue of 52,725,000 LAK (5,657,18USD). In the first year of the project, local people can receive some economic benefit by engaging in setting boundary poles and constructing infrastructure. After beginning this project, they can also get income by participating in the forest monitoring and the protection and conservation activity for upstream forest.

Table 3-5: Benefit of local participation

No	Activities	Total contribution	3 villages (Times)	Wage/unit	Total
1	Boundary poles	225 poles	3 times (only first year)	55,000 LAK (5.90USD)	37,125,000 kip (3,983.36.USD)
2	Infrastructure construction	8 people	21 days (only first year)	50,000 LAK (5.75USD)	5,400,000 LAK (901.28USD)
3	Forest monitoring	4 people	30 days per year	50,000 (5.75USD)	6,000,000 (643.77.USD)
4	Protection and conservation activity	4 people	21 days per year	50,000 (5.75USD)	4,200,000 (450.64USD)
	<b>Total</b>				<b>52,725,000 LAK (5,657.18USD)</b>

Resource: Author's field survey

Actually, local participation as shown in table 3-5 brings income to just a few of the local people. However, local communities can receive the following collective benefits by participating in upstream forest management: 1) improved village streets, 2) water enterprises, 3) primary schools, 4)

local health centers, 5) livestock funds, 6) irrigation, 7) capacity building for agricultural skills, and 8) funds for forest management and monitoring. Hence, local communities can obtain social infrastructure and socio-economic systems through forest management projects.

The above benefits system can provide an economic incentive to cooperate with the management of local people and their communities. It is also possible for them to raise their awareness of the sustainability of forest resources and the environment while being involved in management.

How do local people participate in upstream forest management? This research measures the degree of local participation in each activity using a Likert scale (5 = very good to 1 = very bad) and calculated the mean and standard deviation (SD). These results are shown in table 3-6. It is observed that each score is larger than the medium (= 3). This elucidates that local people are willing to participate in each activity to some extent.

Table 3-6: Significance of community participation

Activities		Mean	SD
Participation in planning	Village K	3.93	0.68
	Village H	3.99	0.65
	Village T	4.00	0.65
Forest monitoring	Village K	4.03	0.73
	Village H	3.97	0.78
	Village T	3.80	0.68
Wildlife management	Village K	4.23	0.76
	Village H	3.83	0.76
	Village T	3.85	0.72
The management of aquatic animals	Village K	3.91	0.78
	Village H	3.86	0.70
	Village T	3.97	0.71
Making the regulations on upstream forest management	Village K	4.13	0.74
	Village H	3.98	0.73
	Village T	4.01	0.75
Dissemination campaign	Village K	3.99	0.71
	Village H	3.95	0.73
	Village T	3.95	0.75
Forest restoration and maintenance	Village K	3.98	0.69
	Village H	4.07	0.72
	Village T	3.91	0.75
Raising awareness	Village K	3.97	0.66
	Village H	3.82	0.66
	Village T	3.97	0.72

Resource: Author's field survey

#### 4. Conclusion

Research on community participation in upstream forest management was conducted in three villages in the Samneua district, Houaphan province, Laos. The aim of the research was twofold: 1) to study the factors of community participation in upstream forest resource management, and 2) to

determine which benefit local communities that participate in forest management activities and conserving natural forest resources.

Eight main activities were shown, with which local people ought to be engaged in upstream forest management: 1) participation in planning; 2) forest monitoring; 3) wildlife management in the protection area; 4) management of aquatic animals; 5) regulation of upstream forest management; 6) dissemination campaigns; 7) forest restoration and maintenance; and 8) raising awareness. These activities were evaluated in terms of the study of CPRs. It was also found that community forest management can generate revenue for the three villages, in an amount of 52,725,000 LAK ( $\approx$  5,657,18 USD).

It is judged that this research can also contribute to the establishment of social infrastructure (e.g., primary school, irrigation and health centers), social-socio economic systems (e.g., village founts), and capacity building.

Future work is encouraged in terms of conducting a statistical analysis to demonstrate the benefit from upstream forest management. Such work could positively motivate local people to participate. Therefore, an additional questionnaire survey is expected by our research survey team.

### **Acknowledgement**

The authors highly appreciate the financial support from JSPS KAKENHI Grant Numbers 19K20525 and 21H03677.

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