

Original article

Interaction among Stakeholder Representatives and Their Stakes in Participatory Forest Resources Management

Pasuta Sunthornhao

Faculty of Forestry, Kasetsart University, Chatuchak, Bangkok, 10900, Thailand

E-mail: fforpts@ku.ac.th

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ABSTRACT

A study on the selection of stakeholder representatives for participatory forest resource management (PFRM) and their stake interaction was carried out during 2007 in the Huai Dau watershed (HDW) in Roi Et province, northeast Thailand. The HDW represented a land-use system unit, which combined agricultural and forestry activities. The research objectives were to determine and identify the major stakeholders (MaSTs) in PFRM who were in charge of stakeholder representation. The methodology began with a consideration of the biophysical, socio-economic and institutional situation. Data gathering and analysis were carried out in order to classify households and categorize stakeholders employing a partial process of participatory landscape lifescape appraisal (PLLA). Stakeholder analysis was based on the determination and identification of MaSTs who were the decision makers in PFRM based on four criteria: number of stakes (NS), duration of stakeholding (DS), degree of dependency (DD) and degree of accountability (DA). Moreover, the final analysis of interaction between stakeholders and stakes ranked the stakes based on the frequency of whole stakes. The study found eight MaSTs from the twelve stakeholders; two were individual stakeholders (ISTs), from a resident business (RB) and resident farm (RFa), while the other six were organization/institutional stakeholders (OSTs), being government organizations - forestry office (GOs-FO), government organizations - school (GOs-S), local government units - subdistrict administrative organization (LGUs-SAO), local government units - subdistrict leading office (LGUs-SLO), local government units - village leading office (LGUs-VLO) and people organizations - arts and craft center (POs-AC). The GOs-S was a highly effective MaST because this stakeholder achieved the highest total weighted mean score (TWMS). In addition, water was the most common stake followed by abundant soil, amenity, fuelwood and non wood forest products (NWFPs).

Keywords: participatory forest resources management, stakeholder analysis, major stakeholder, decision maker, participatory landscape lifescape appraisal

INTRODUCTION

Participatory forest resource management (PFRM) is different from other programs

as its focus involves: upland areas of forest land and forest buffer zones; the implementation of a long-term process; high diversity of species, techniques and instruments; and a

variety of stakeholders such as local residents, local leaders, local government units and non government units. On the other hand, PFRM is similar to social forestry, while a few things are different, with the objectives being to use and maintain forested land for biodiversity, productivity, regeneration and vitality. PFRM requires that people, particularly local people, are involved in the process. Some participatory dimensions include: planning, decision making, implementation, benefit sharing or harmful consequences and monitoring and evaluation (Uphoff, 1981). PFRM should allow people to join in every stage, but in reality, most people are not interested in a forestry program or only some of them are influential with regard to forest resources. Thus, it requires insight to identify people that are suitable to be involved in participatory management, who can support the initiating stage of the program, push forward the implementation and then extend the successful output to others with less interest in the process. Therefore, the objective of this study was stakeholder analysis to select the representatives who were the major stakeholders in PFRM. The data gathering process used participatory landscape lifescape appraisal (PLLA). The stakeholder analysis used criteria and indicators including: the number of stakes, duration of stakeholding, degree of dependency and degree of accountability (Sargento, 1995), so that all stakeholders were considered, both internal and external. It was then possible to analyze major and minor stakeholders who had greater or lesser interest in PFRM, respectively. Moreover, another objective was the analysis of common interests or stakes, by stake-interaction analysis based on the principal benefit obtained from the natural forest, which could then be used as an incentive when approaching prospective stakeholders.

The principal benefit of such an approach was to enhance the relationships among project organizers and stakeholders involved in a case study in the Huai Dau watershed (HDW) in Nongphok district, Roi Et province, northeast Thailand. The HDW contains 2004 hectares or 12 525 rai, covering two sub-districts namely, Bung Ngam and Pha Nam Yoi. The HDW contains three villages namely, Nong Kae Dong, Nong Kae and Nong Kae Patana. The area has a combination of upland and lowland, which consists of diverse land uses such as forest reserve, paddy field, cropping, reservoirs and village communities.

MATERIALS AND METHODS

The study began by considering the biophysical, socio-economic and institutional situation through a preliminary survey. The data gathering and analysis to classify households and categorize stakeholders was carried out using a partial process of participatory landscape lifescape appraisal (PLLA). PLLA embodies a major concept that distinguishes this approach from other resource appraisal methodologies (Espaldon and Baltazar, 2004). It hinges on an interacting landscape lifescape unit as the focus of analysis of the forest resources. çLandscapeé is defined as ça mosaic of interacting components with both commonalities and differencesé (SANREM, 1991). Consequently, élifescapeé refers to çthe imposition of human intents, purposes, and viewpoints, over environmental features, consisting of patterns of production, consumption, and distributioné. The çlifescapeé refers to the human dimension of the forest resources. Therefore, in this research, PLLA was used for data gathering. The partial process of PLLA used for selection of the stakeholder representatives is shown in Table 1.

Table 1. The partial process of PLLA conducted for the selection of stakeholder representatives

Activities	Method of Collection	Data / Outputs
Initial visits and field interviews at different agro-ecological zones	Meeting, rural mapping and aerial photograph interpretation (API)	Basic data of landscape and lifescape
PLLA team meeting	Group meeting and discussion of summary data, and develop preliminary research plan	Research plan and interview schedule establishment of characterization of stakeholder
Continuation of the PLLA meeting and discussion	Analysis of the secondary data and critique methodology. specifically, using cluster sampling method	Accuracy of secondary data and interview schedule
Field data collection	Group discussion, participatory mapping, rapid rural appraisal, participatory rural appraisal, etc	Primary data of stakeholder
Data analysis and validation/verification meeting	Analysis of interview schedule stakeholder	Type of stakeholder
Meeting of the PLLA team after the validation for discussion	Summary of information and identification of output	Major stakeholder and common stakes

Results of PLLA served as supplemental characterization of the stakeholders in selecting their representative. This determined and identified the major stakeholders (MaSTs) who were the decision makers in PFRM. The MaST representatives were individuals and/or organizations/institutions or groups of people who had a close relationship with forestry activities and an effective stake. A cluster sampling method was applied in data collection, which classified the household as the smallest sample unit and involved the categorization of the total population of stakeholders. Stakeholders were then classified into two types: individual stakeholders (ISTs) and organization/institutional stakeholders (OSTs). This was followed by a random sample being taken of each stakeholder group, for example residents and key informants (KIs) as samples of IST and OST, respectively, for interview and was complemented by field

observation. The cluster method process is shown in Figure 1.

Selecting and identifying MaSTs to be the representatives of stakeholders used four criteria: number of stakes (NS), duration of stakeholding (DS), degree of dependency or seriousness of stake (DD), and degree of accountability or involvement/contribution (DA). These criteria were presented as statistical values, such as frequency and weighted mean score (WMS). The MaST representative for each group was identified by total WMS, to be the decision maker in the implementation of PFRM. The sum of their respective weighted mean scores (WMS) equal to or higher than 2/3 of the sum of their highest equivalent scores was calculated using a five-point scale. Thus, a MaST had a total weighted mean score (TWMS) of at least 13.33, i.e. 2/3 of 20. The details of the calculating method for each criterion are shown in Table 2.

Table 2. The calculating method of four criteria to determine and identify MaST

Item	NS	DS		DD		DA	
		DS _i (years)	PS _i	DD _i	PS _i	DA _i	PS _i
Score Arrangement	PS _i ≤ 5	1-5	1	Very low	1	No plan and no action	1
		6-10	2	Low	2	Have plan but not documented	2
		11-15	3	Moderate	3	Documented plan but not action	3
		16-20	4	High	4	Not documented plan but action	4
		> 20	5	Very high	5	Documented plan and action	5
Formula	$WMS_{NS} = \frac{\sum FSt * 5}{n_i * TNSt} \quad WMS_{DS} = \sum_{i=1}^5 \left[\frac{FDS_i * PS_i}{n_i} \right] \quad WMS_{DD} = \sum_{i=1}^5 \left[\frac{FDD_i * PS_i}{n_i} \right] \quad WMS_{DA} = \sum_{i=1}^5 \left[\frac{FDA_i * PS_i}{n_i} \right]$						
Identify MaST	TWMS = WMS _{NS} + WMS _{DS} + WMS _{DD} + WMS _{DA} ≥ 13.33 = Major stakeholder (MaST)						

Remarks: NS = Number of Stake
 DD = Degree of Dependency
 FSt = Frequency of Stake
 FDS_i = Frequency of Duration of Stakeholding
 FDA_i = Frequency of Degree of Accountability
 n = Number of Respondents/Key informants
 WMS = Weighted Mean Score

DS = Duration of Stakeholding
 DA = Degree of Accountability
 TNSt = Total Number of Stake
 FDD_i = Frequency of Degree of Dependency
 PS_i = Point-scale
 i = 1, 2, 3, ..., 5
 TWMS = Total Weighted Mean Score

RESULTS AND DISCUSSION

Selection of Stakeholder Representatives

A stakeholder representative refers to the major stakeholder (MaST) who will become the decision maker in the implementation of PFRM. The study determined the MaST that categorized the residents and organizations/institutions into twelve stakeholders. The first three were individual stakeholders (ISTs) and the other nine were organization/ institutional stakeholders (OSTs), namely: resident business (RB), resident employment (RE), resident farming (RFa), GOs-forestry office (GOs-FO), GOs-school (GOs-S), LGUs-subdistrict administrative organization (LGUs-SAO), LGU-subdistrict leading office (LGUs-SLO), LGUs-village leading office (LGUs-VLO), POs-arts and craft center (POs-AC), POs-forest protection (POs-FP), private sector-Company (PS-C), and temple, respectively. Figure 1 shows the results of

the cluster sampling method and the number of residents and key informants in each stakeholder group. The complete group of stakeholders was identified by major stakeholder analysis based on the four criteria mentioned above.

Criteria for Determining Major Stakeholder

(1) *Number of stakes (NS)*: The study revealed 18 stakes, which people sourced from the forest area (Table 3.). The highest frequency of a stake chosen made it the first priority for both ISTs and OSTs. For the ISTs, the most frequent stake was water followed by abundant soil, agricultural crops, fuel wood, NWFPs. For the OSTs, the stakes prioritized were amenity, abundant soil, aesthetics and cited forest plantation. A comparison between the ISTs and the OSTs showed that ISTs considered direct benefits, while the OSTs concentrated more on indirect benefits. Research activity was the

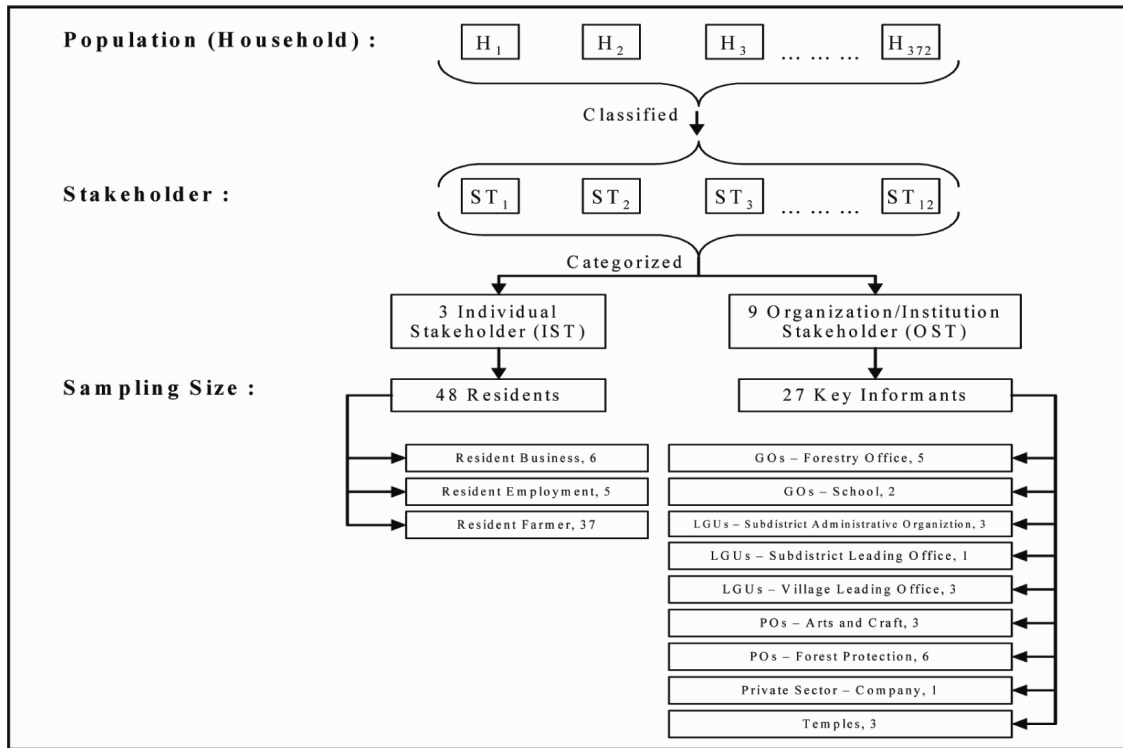


Figure 1. The result of cluster sampling for stakeholder analysis in HDW, 2007.

last stake cited in the HDW. However, the weighted mean score of NS (WMS_{NS}) resulted in LGUs-SLO and RE having the highest and lowest scores of 4.44 and 1.72, respectively while the general weighted mean score (GWMS) of NS was 2.79.

(2) *Duration of stakeholding (DS).* The DS was categorized into five ranges of duration of involvement (Table 4.). A high score indicated a long period of involvement in natural resources. The results showed that most of the stakeholders had been involved for 20 years or more. GOs-S had the highest WMSDS, followed by RB, RFa, with PS-C having the lowest WMS. The computed value of the GWMS for the DS was 3.26.

(3) *Degree of dependency (DD).* The DD determined what effect the degradation of the natural forest area would have in relation to people's awareness. The

study found that most of the stakeholders rated DD as very high, resulting in a GWMS of 4.15 (Table 5). The DD had the greatest value in terms of GWMS, compared to NS and DS and was also the highest when compared among the four criteria.

(4) *Degree of accountability (DA).* The DA of the stakeholders addressed the people's involvement in terms of their contribution to planning, activities and recommendations, which would be useful to community development including natural resources. The study found that LGUs-VLO and PS-C contained the highest cooperation, while temple showed the lowest involvement with WMSDA values of 5.00, 5.00 and 2.33, respectively (Table 6.). The GWMS of DA was 3.25 although some of the stakeholders had involvement but no documentation or action.

Table 3. Frequency and number of stakes in each group of stakeholders

Stakeholder	No. of respondents	Frequency and number of stakes																		Mean score	WMS _{Ss}	
		Water	Abuns	NWFPS	Wildlife	Construc	FuelW	Emp	Aest	Amen	Recre	G&S	Forplan	Agri	Forpro	Conserv	Protrain	Resea	Partic			
A. Individual																						
1. RB	6	6	6	3	3	4	3	3	6	6	5	3	5	4	4	5	2	1	4	11.67	3.24	
2. RE	5	5	5	4	3	1	4	1	1	2		2	3							6.20	1.72	
3. RF	37	36	34	30	16	23	34	6	18	20	11	3	11	36	3	8	1	6		8.00	2.22	
Sub-total	48	47	45	37	19	27	42	10	25	28	16	6	18	43	7	13	3	1	10	25.87	7.19	
OWMS																					8.62	2.40
B. Institutions / Organizations																						
1. GOs-FO	5	5	4	4	4	4	3	3	5	5	4	1	2		4	5	5	4	2	12.80	3.56	
2. GOs-S	2	2	2	2	2	2	2	2	2	2	2		1	2		1		1	1	13.00	3.61	
3. LGUs-SAO	3	3	3	3	2	1	3	1	2	2	2	2	2	3	2	3		2	2	12.00	3.33	
4. LGUs-SLO	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		1	16.00	4.44	
5. LGUs-VLO	3	3	3	3	3	2	3	2	2	2	3	2	2	2	2	2	1	1	2	13.33	3.70	
6. POs-AC	3	3	3	3	1	1	3	1	2	3	2	1	1	2	2	2	1	1	1	11.00	3.06	
7. POs-FP	6	6	5	4	1	4	5		5	5	3	1	4	5	4	4		3		9.83	2.73	
8. PS-C	1	1	1				1	1	1	1			1							6.00	1.67	
9. Temple	3	3	2	1	2	1	1	1	3	3	2		2		3	3	1			9.00	2.50	
Sub-total	27	27	24	21	16	16	20	12	23	24	19	8	15	15	18	21	9	7	12	102.97	28.60	
OWMS																					11.44	3.18
GWMS																					10.03	2.79

Remarks: AbunS=Abundant Soil, Construc=Construction Wood, Emp = Employment, Aest=Aesthetic, Amen=Amenity, Recre=Recreation, G&S=Goods and Services, Forplan=Forest Plantation, Agri=Agriculture Crops, Forpro=Forest Protection, Conserv=Conservation, Protrain=Provide Training, Resea=Research, Partic=Participants, WMS=Weighted Mean Score, OWMS=Overall Weighted Mean Score, GWMS=General Weighted Mean Score, RB=Resident Business, RE=Resident Employment, RFa=Resident Farmer, GOs-FO=Government Organizations-Forestry Office, GOs-S=Government Organizations-School, LGUs-SAO=Local Government Units-Subdistrict Administrative Organization, LGUs-SLO= Local Government Units -Subdistrict Leading Office, LGUs-VLO= Local Government Units-Village Leading Office, POs-AC=People Organizations-Arts and Craft, POs-FP=People Organizations-Forest Protection, PS-C=Private Sector-Company.

Table 4. Duration of stakeholding in each group of stakeholders

Stakeholder	No. of Respondents	Duration Range (Years)					WMS _{DS}
		1-5	6-10	11-15	16-20	Above 20 years	
A. Individual							
1. RB	6		1 <i>0.33</i>			5 <i>4.17</i>	4.50
2. RE	5	1 <i>0.20</i>	3 <i>1.20</i>			1 <i>1.00</i>	2.40
3. RFa	37	3 <i>0.08</i>	4 <i>0.22</i>	3 <i>0.24</i>	5 <i>0.54</i>	22 <i>2.97</i>	4.05
Sub-Total	48	4	8	3	5	28	10.95
OWMS							3.65
B. Organizations / Institutions							
1. GOs-FO	5	2 <i>0.40</i>			2 <i>1.60</i>	1 <i>1.00</i>	3.00
2. GOs-S	2					2 <i>5.00</i>	5.00
3. LGUs-SAO	3	1 <i>0.33</i>		1 <i>1.00</i>		1 <i>1.67</i>	3.00
4. LGUs-SLO	1			1 <i>3.00</i>			3.00
5. LGUs-VLO	3	2 <i>0.67</i>	1 <i>0.67</i>				1.33
6. POs-AC	3		2 <i>1.33</i>			1 <i>1.67</i>	3.00
7. POs-FP	6	1 <i>0.17</i>		1 <i>0.50</i>	1 <i>0.67</i>	3 <i>2.50</i>	3.83
8. PS-C	1	1 <i>1.00</i>					1.00
9. Temples	3	1 <i>0.33</i>		1 <i>1.00</i>	1 <i>1.33</i>		2.67
Sub-Total	27	8	3	4	4	8	25.83
OWMS							2.87
GWMS							3.26

Table 5. Degree of dependency in each group of stakeholders

Stakeholder	No. of Respondents	Degree of Dependency				WMS _{DD}	
		Very low Or None	Low	Moderate	High		Very high
A. Individual							
1. RB	6					6 <i>5.00</i>	5.00
2. RE	5	1 <i>0.20</i>		1 <i>0.60</i>	2 <i>1.60</i>	1 <i>1.00</i>	3.40
3. RFa	37	2 <i>0.05</i>		6 <i>0.49</i>	12 <i>1.30</i>	17 <i>2.30</i>	4.14
Sub-Total	48	3	0	7	14	24	12.54
OWMS							4.18
B. Organizations / Institutions							
1. GOs-FO	5	1 <i>0.20</i>		1 <i>0.60</i>		3 <i>3.00</i>	3.80
2. GOs-S	2				1 <i>2.00</i>	1 <i>2.50</i>	4.50
3. LGUs- SAO	3	1 <i>0.33</i>			1 <i>1.33</i>	1 <i>1.67</i>	3.33
4. LGUs-SLO	1				1 <i>4.00</i>		4.00
5. LGUs-VLO	3				2 <i>2.67</i>	1 <i>1.67</i>	4.33
6. POs-AC	3				2 <i>2.67</i>	1 <i>1.67</i>	4.33
7. POs-FP	6	1 <i>0.17</i>			1 <i>0.67</i>	4 <i>3.33</i>	4.17
8. PS-C	1					1 <i>5.00</i>	5.00
9. Temples	3			1 <i>1.00</i>	2 <i>2.67</i>		3.67
Sub-Total	27	3	0	2	10	12	37.13
OWMS							4.13
GWMS							4.15

Table 6. Degree of accountability in each various type of stakeholder

Stakeholder	No. of Respondents	Degree of Accountability (Plan/, Activities, Recommence, Involvement)					WMS _{DA}
		None	Plan in mind but not documented	Documented but no action	Not Documented but action	Docu-mented and action	
A. Individual							
1. RB	6		3 <i>1.00</i>	2 <i>1.00</i>	1 <i>0.67</i>		2.67
2. RE	5		2 <i>0.80</i>		2 <i>1.60</i>	1 <i>1.00</i>	3.40
3. RFa	37	4 <i>0.11</i>	15 <i>0.81</i>		16 <i>1.73</i>	2 <i>0.27</i>	2.92
Sub-Total	48	4	20	2	19	3	8.99
OWMS							3.00
B. Organizations / Institutions							
1. GOs-FO	5		2 <i>0.80</i>		1 <i>0.80</i>	2 <i>2.00</i>	3.60
2. GOs-S	2		1 <i>1.00</i>			1 <i>2.50</i>	3.50
3. LGUs- SAO	3		1 <i>0.67</i>		1 <i>1.33</i>	1 <i>1.67</i>	3.67
4. LGUs-SLO	1			1 <i>3.00</i>			3.00
5. LGUs-VLO	3					3 <i>5.00</i>	5.00
6. POs-AC	3		2 <i>1.33</i>			1 <i>1.67</i>	3.00
7. POs-FP	6	1 <i>0.17</i>	3 <i>1.00</i>	0.00	2 <i>1.33</i>	0.00	2.50
8. PS-C	1	0.00	0.00	0.00	0.00	1 <i>5.00</i>	5.00
9. Temples	3	1 <i>0.33</i>	1 <i>0.67</i>	0.00	1 <i>1.33</i>	0.00	2.33
Sub-Total	27	2	10	1	5	9	31.60
OWMS							3.51
GWMS							3.25

Identification of Major Stakeholders

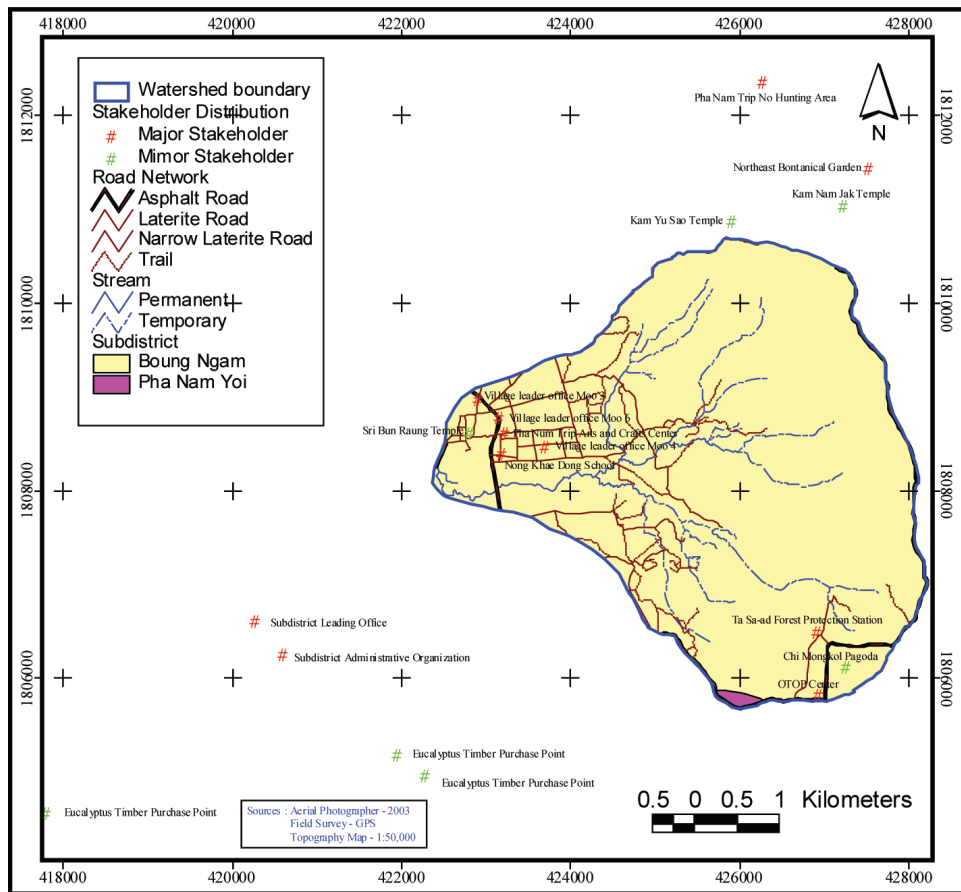
The study identified eight MaSTs and four minor stakeholders (MiSTs) from the twelve stakeholders. This was categorized according to the name and number of members of each stakeholder group. The identification started by considering the value of TWMS for each stakeholder that had reached 13.33 or above (2/3 of 20 as the total score). Of the eight MaSTs, two came from the ISTs (RB and RFa), while others six came from the OSTs (GOs-FO, GOs-S, LGUs-SAO, LGUs-SLO, LGUs-VLO and POs-AC). The RE, POs-FP, PS-C, and temples were MiSTs who were not selected as decision makers (Table 7.). A comparison of the MaSTs, showed GOs-S had the highest effective MaST (TWMS = 16.68), followed by RB (TWMS = 15.46), LGUs-SLO

(TWMS = 14.47) and LGUs-SAO (TWMS = 13.33). Figure 2 shows the distribution of MaSTs and MiSTs.

This finding indicates that the output of the study supported the assumption that everyone in the community cannot be a decision maker, rather only people or organizations conducting activities that are significantly related to natural forest resources. These were interpreted to be the MaSTs who were the decision makers in PFRM implementation. The result supported the need for stakeholder analysis to determine those who were capable of being decision makers and should be included in PFRM. The MaST representatives were considered to represent the entire stakeholder group and some members of each MaST were invited to participate by the research team.

Table 7. TWMS of each criterion and stakeholder in determining MaST

Stakeholder	No. of respondents	WMS of Each Criteria				
		NS	DS	DD	DA	TWMS
A. Individual						
1. RB	6	3.29	4.50	5.00	2.67	15.46
2. RE	5	1.74	2.40	3.40	3.40	10.94
3. RFa	37	2.25	4.05	4.14	2.92	13.36
Sub-Total	48	7.28	10.95	12.54	8.99	39.76
OWMS		2.43	3.65	4.18	3.00	13.25
B. Organizations / Institutions						
1. GOs-FO	5	3.63	3.00	3.80	3.60	14.03
2. GOs-S	2	3.68	5.00	4.50	3.50	16.68
3. LGUs-SAO	3	3.33	3.00	3.33	3.67	13.33
4. LGUs-SLO	1	4.47	3.00	4.00	3.00	14.47
5. LGUs-VLO	3	3.68	1.33	4.33	5.00	14.35
6. POs-AC	3	3.16	3.00	4.33	3.00	13.49
7. POs-FP	6	2.81	3.83	4.17	2.50	13.31
8. PS-C	1	1.84	1.00	5.00	5.00	12.84
9. Temples	3	2.63	2.67	3.67	2.33	11.30
Sub-Total	27	29.25	25.83	37.13	31.60	123.81
OWMS		3.25	2.87	4.13	3.51	13.76
GWMS		2.84	3.26	4.15	3.25	13.50

**Figure 2.** Distribution of MaST in both of internal and external stakeholder.

Interaction between Stakeholder and Stakes

Another consideration in the stakeholder analysis was the interaction between stakeholders and stakes as a whole. The purpose of this study was to determine the most important stake or common stakes, based on consensus agreement by the

stakeholders in the HDW. This was a vital issue of discussion and an interesting point to motivate MaST representatives to join the PFRM process. The analysis started by categorizing all the stakeholders by type and after that ranking the important stakes depending on frequency (Table 8.).

Table 8. Frequency and ranking of stake of each stakeholder group in HDW, 2007

NO.	Stakes	Frequency of stake					Ranking of stake					Summation of ranking	Final ranking
		Resi-dents	GOs	LGUs	POs	NGOs	Resi-Dents	GOs	LGUs	POs	NGOs		
1	Water	47	7	7	9	4	1	1	1	1	1	5	1
2	AbunS	45	6	7	8	3	2	2	1	2	2	9	2
3	Amen	28	7	5	8	4	6	1	3	2	1	13	3
4	Fuel Wood	42	5	7	8	0	4	3	1	2	5	15	4
5	NWFPs	37	6	7	7	1	5	2	1	3	4	15	4
6	Aest	25	7	5	7	4	8	1	3	3	1	16	5
7	Agri	43	2	6	7	0	3	6	2	3	5	19	6
8	Construc	27	6	4	5	1	7	2	4	5	4	22	7
9	Conserv	13	6	6	6	3	12	2	2	4	2	22	7
10	Wildlife	19	6	6	2	2	9	2	2	7	3	23	8
11	Recre	16	6	6	5	2	11	2	2	5	3	23	8
12	Forplan	18	3	4	5	3	10	5	4	5	2	26	9
13	Forpro	7	4	5	6	3	14	4	3	4	2	27	10
14	Emp	10	5	4	1	2	13	3	4	8	3	31	11
15	Partic	10	3	5	4	0	13	5	3	6	5	32	12
16	Protrain	3	5	2	1	1	16	3	5	8	4	36	13
17	G&S	6	1	5	2	0	15	7	3	7	5	37	14
18	Resea	1	5	1	1	0	17	3	6	8	5	39	15

Remarks: AbunS=Abundant Soil
Construc=Construction Wood
Forplan=Forest Plantation
Partic=Participants
Resea=Research

Amen=Amenity
Conserv=Conservation
Forpro=Forest Protection
Protrain=Provide Training

Aest=Aesthetic Agri=Agriculture Crops
Recre=Recreation
Emp=Employment
G&S=Goods and Services

The study revealed five groups of stakeholders: residents, GOs, LGUs, POs and NGOs. The ranking was based on counting the frequency of stakes. As a result, water was ranked as the most important stake followed by abundant soil, amenity, fuelwood and NWFPs. Each of the five stakeholder groups indicated in decreasing order of preference the top five stakes mentioned above. More than one stakeholder group cited one stake at a specific level of preference. For example, in the first ranking level, water was the first priority of the residents and POs. Similarly, more than one stake was mentioned by the stakeholders in a level. Besides water, the

GOs, LGUs and NGOs cited amenity, aesthetics, abundant soil, fuelwood and NWFPs as stakes. A deeper understanding of the interaction between stakeholders and stake ranking can be obtained from Figure 3, which shows five symmetrical interacting rings wherein each ring represents each group of stakeholder arranged in the five levels of ranking. As shown, water was the most important stake or common stake that all of them agreed upon followed by abundant soil. However, there was no agreement on the third and fourth rankings. For the last ranking, they all cited different stakes of interest (Figure 3.).

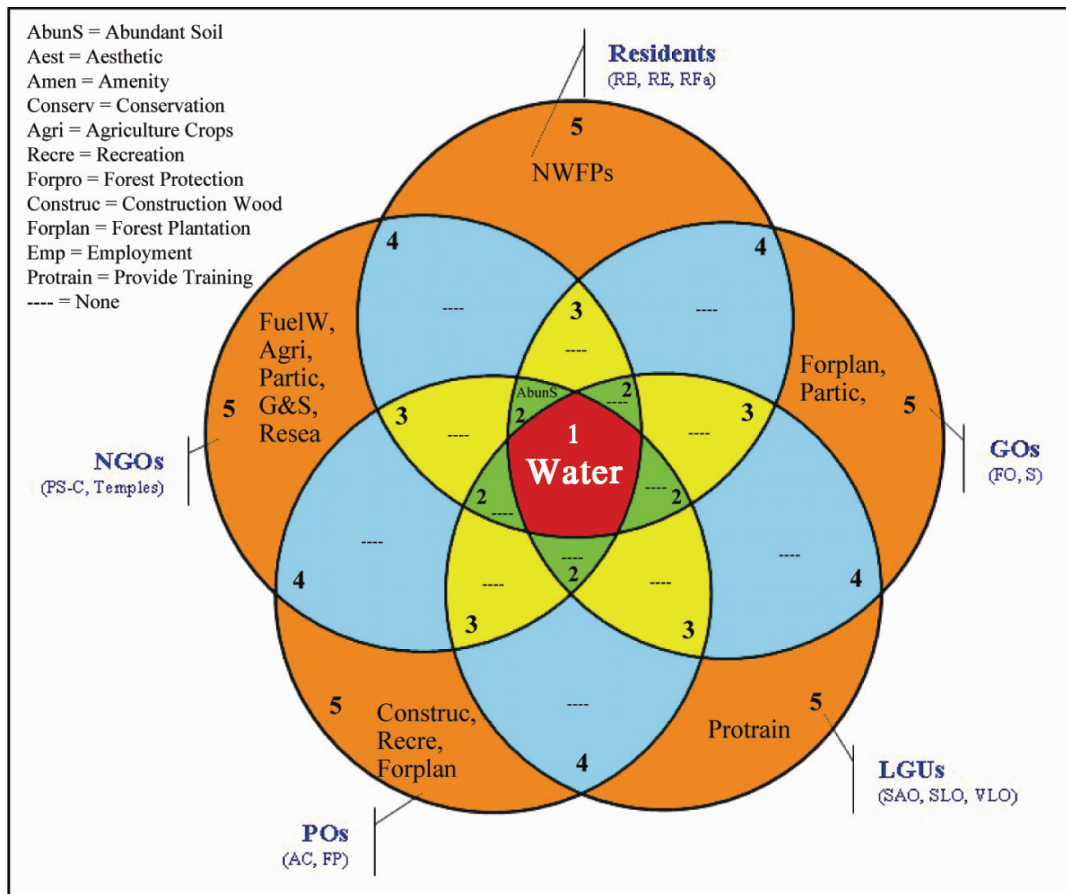
Table 9. Interaction between stakeholders and stake ranking in HDW, 2007

Stake holder	Ranking of each stakeholder				
	1	2	3	4	5
Residents	Water	AbunS	Agri	Fuel wood	NWFPs
GOs	Water, Amen, Aest	AbunS, NWFPs, Construc, onserv, Wildlife, Recrea	Fuelwood, Emp, Protrain, Resea	Forpro	Forplan, Partic
LGUs	Water, AbunS, Fuelwood, WFPs	Agri, Conserv, Wildlife, Recrea	Amen, Aest, Forpro, Partic, &S	Construc, Forplan, Emp	Protrain
POs	Water	AbunS, Amen, Fuel wood	NWFPs, Aest, Agri	Conserv, Forpro	Construc, Recre, Forplan
NGOs	Water, Amen, Aest	AbunS, Conserv, For, Forpro	Wildlife, Recre, Emp	NWFPs, Construc, Protrain	Fuel wood, Agri, Partic, G&S, Resea

Remarks: AbunS=Abundant Soil
 Agri=Agriculture Crops
 Recre=Recreation
 Emp = Employment
 G&S=Goods and Services

Amen=Amenity
 Construc=Construction Wood
 Forplan=Forest Plantation
 Partic=Participants
 Resea=Research

Aest=Aesthetic
 Conserv=Conservation
 Forpro=Forest Protection
 Protrain=Provide Training

**Figure 3.** Interaction between the stakeholder and stakes in HDW, 2007.

The entire study employed four criteria to identify MaSTs, which were mentioned previously and found there were several types of stakeholder. In particular, the research objective focused on the determination of the stakeholder representatives. Therefore, the four criteria emerged as the optimal conditions for selection, completely covering all dimensions, through: benefit and/or affect (number of stakes, NS), period of time (duration of stakeholding, DS), dimension of dependence (degree of dependency, DD) and dimension accountability (degree of accountability, DA). Several stakeholder analysis processes have been developed, justified on the basis of the limitations and weaknesses of conventional methods used in policy and project assessment and design to deal with stakeholder interest (Grimble and Chan, 1995), or to find out institutional alliances and conflict (Pulhin, 2005). However, stakeholder analysis has taken place in the field of natural resources management using the approaches and supporting methodology from the field of management science that had already been established by the beginning of the 1980s. This study also attempted to improve and develop a methodology for effective PFRM. Ordinarily, the decision on who will be the community decision makers often results in community leaders such as the village chief or subdistrict chief being selected, because of a lack of supporting research information relating to the selection of stakeholder representatives. While the current study provides insight, the selection of the decision makers should be made depending on each community's situation and behavior obtained through the involvement of community members. For example, in the case of the HDW, most MaSTs came from community leaders such as LGUs-SAO,

LGUs-SLO, LGUs-VLO, similar to the traditional selection process mentioned above. Although in this case they did not stay in top ranking based on TWMS but they still are MaST who are next from teacher. Therefore, this study provides a means of stakeholder analysis that explores who are the right stakeholders to invite to become involved in PFRM at the beginning of a project, moreover, it could help decreasing confusing of implementation stage. Thus, organizers of forestry projects should be able to gradually extend collaboration to other stakeholders, particularly MiSTs. Moreover, it will ensure successful PFRM development.

The comprehensive interaction among stakeholders and stakes illustrates the priority each stakeholder group places on gains from the natural forest. Figure 5 shows five levels of interaction. Level 1 involved the entire stakeholder group interacting and was the most important level compared to other levels, with water, in this case, considered as the common stake or first priority. Level 2 had each of the four groups of stakeholder interaction and the case study found abundant soil as the second priority, except for LGUs. Levels 3 and 4 showed the third and fourth groups of stakeholders had no interaction with each other. Level 5 showed each stakeholder group had no interest in the different stakes of other groups. Levels 2 to 4 had rotating interaction with each stakeholder group. Hence, whenever participation of the whole stakeholders is required, forest extension staff should bring up the issue of the common stake of water. This result is similar to the research results of Sargento (1995) in the Makilling Forest Reserve, Laguna Philippines. That research determined that the different stakeholders had commonalities and differences in stakeholder

preference that definitely affected PFRM in the decision-making process. Furthermore, this interaction can be very complex considering the relationships among human and natural forest resources. The stakeholder analysis in the current study indicated that the distribution of MaSTs did not depend on the distance between their locations and the natural forest area. Their role and function influenced natural forest resources, as was shown by the fact that MaSTs consisted of both internal and external stakeholders distributed throughout the surrounding watershed area. In this regard, applying this approach will help to address the survival of natural forest resources, as it could be said that the upstream watershed area has to listen to the downstream community's voice.

CONCLUSION AND RECOMMENDATION

The major stakeholders (MaSTs) were determined to identify who should be decision makers among the stakeholders in the HDW. Stakeholders were categorized from the entire population by the application of cluster sampling in order to determine the basis for four criteria: NS, DS, DD and DA. The first three of the twelve stakeholders identified were ISTs (RB, RE and RFa) and the other nine were OSTs (GOs-FO, GOs-S, LGUs-SAO, LGUs-SLO, LGUs-VLO, POs-AC, POs-FP, PS-C and temple). MaSTs were then identified using the four criteria and the value of TWMS of each stakeholder was calculated. MaSTs should have an accepted score equal to or more than $\frac{2}{3}$ or 13.33 of 20 as the total score. The study identified eight MaSTs from the twelve, two from the ISTs (RB and RFa) and six from the OSTs (GOs-FO, GOs-S, LGUs-SAO, LGUs-SLO, LGUs-VLO and POs-

AC). The MiSTs were RE, POs-FP, PS-C and temples. GOs-S was the highest ranking MaST (TWMS = 16.68) followed by RB (TWMS = 15.46) and LGUs-SLO (TWMS = 14.47). The lowest ranking MaST was LGUs-SAO (TWMS = 13.33). The interaction between stakeholders and stakes was employed to determine the most important stake where all stakeholders agreed on a single stake. The stakeholders were categorized into five types: resident, GOs, LGUs, POs and NGOs. The analysis by stake frequency ranking indicated that water was the most important stake followed by abundant soil, amenity, fuelwood and NWFPs.

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REFERENCES

- Espaldon, V.O. and R.M. Baltazar, 2004. **Participatory Natural Resource Management for Sustainable Agriculture**. Department of Geography, College of Social Sciences and Philosophy. University of the Philippines Diliman, Quezon City, Philippines.
- Pulhin, J. M. 2005. Stakeholder analysis. SFFG 152: **Classroom Exercise on Stakeholder Identification and Analysis**. College of Forestry and Natural Resources, University of the Philippines Los Banos. Laguna 4031.
- Grimble, R. and M.K. Chan. 1995. Stakeholder analysis for natural resource management in developing countries. **Natural Resources Forum**, Volume 19 Number 2.
- SANREM. 1991. **Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program**, Vietnam.
- Sargento, O. J. 1995. **Participatory of Major Stakeholders in the Conservation of the Makilling Forest Reserve**, Unpublished Ph.D. Dissertation. University of the Philippines Los Banos, 134 pages.
- Uphoff, N. 1981. Farmer's participation in project formulation, pp. 231-290. *In Design and Operation*. Second Annual Agricultural Sector Symposium. Washington, D.C.
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