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Levels of People Participation in Community Based Forest Management of the Dry Zone Area in Myanmar: A Case Study of Chaung U, Nyaung U and Taungdwingyi Townships

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Abstract

The objectives of the study are to determine levels of participation in community based forests of three different management regimes and to explore the influences of social, economical, institutional and forest resource factors on the levels of participation of user groups in the Dry Zone area of Myanmar. Three community forest user groups (CFUGs) of Nwegawe, Nyaunggyi and Thebyu villages represent different management projects operated by UNDP/ FAO, JICA and local people of self reliance program. The total members of the three CFUGs are 385 households, and are the population of the study. The sample size of 196 households was calculated by using Taro Yamane's formula with 5% error, 95% confidence coefficient and 50% degree of variability. Distribution of samples among the three CFUGs is 119, 55 and 22 for Nwegawe, Nyaunggyi and Thebyu villages, respectively. Questionnaire survey was conducted and head of household who was also members of three user groups were interviewed. Stepwise Multiple Regression Analysis was used to analyze the relationship between levels of participation and social, economical, institutional and forest resource factors. In-depth interview with 15 key informants was carried out to gain more details on levels of participation. The results of Stepwise Multiple Regression Analysis revealed a score of 4.227 (high level of participation) for the Thebyu project, 3.163 (moderate level of participation) for the Nyaunggyi project and 2.487 (low level of participation) for the Nwegawe project. Findings showed that level of education, forest income, attendance of meeting, labor sharing and collection of fodder and grass and amount of fuelwood collection positively and significantly influenced levels of participation in the three projects with the statistical significance at 0.05. From the study it was concluded that apart from the Thebyu project (self reliance program), levels of participation in community forest plantation in the Nwegawe and Nyaunggyi projects were low and moderate, respectively and those levels suggested the failure after termination of the projects. The findings of the research can be used for further revision of the Community Forest Instruction-1995 and enhancement of community involvement in forest management in the Dry Zone area of Myanmar.

Key words: Levels of Participation / Community Based Forest Management / Dry Zone Area of Myanmar

1. Introduction

The Dry Zone area in the central part of Myanmar covers about 8.7 million ha (17% of the total land area). It includes most part of Magway Division, the

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southern part of Sagaing Division, and the western and middle parts of Mandalay Division. Due to its location in the rain shadow affected area of the Rakhine Yoma, the rainfall is less than 1000 mm with uneven distribution and 50 rainy days per year. Average temperature is 26.7ºC with a range from 10ºC to 43.3ºC. Evaporation is higher than precipitation. The existing tropical dry forests sparsely occupy about 19.7% of its area. Major vegetation is xerophytes with very slow average growth rate owing to poor sandy soil with high deficiency of nutrients. Deforestation rate is about 800 ha per year in the area due to fuelwood collection and shifting cultivation (Ministry of Forestry, 2008).

Population in the Dry Zone area is about 18 million inhabitants or 34% of the total population and density is about 1,165 inhabitants per sq. km with growth rate of 2.7%. Local people, being lagged behind compared to those of the other parts of the country, are still struggling with poverty due to the infertile soil and adverse climate conditions, low production of agricultural crops, insufficient water availability and degradation of the natural forests. Since the 1950s forest resources were depleted rapidly, therefore forest plantations were established and undertaken by Agricultural and Rural Development Cooperation (ARDC). Moreover, Forest Department (FD) implemented reforestation activities from 1963 to 1982 and afforestation activities from 1994-95 to 1996-97 (Ministry of Forestry, 2008). However, the extent of reforestation and afforestation could not replace the extent of deforestation in this area.

With an alarming rate of deforestation, the FD issued a significant statement of Community Forestry Instructions 1995 (CFI-1995) in line with Myanmar Forest Policy in 1995 to promote not only forest restoration but also people participation in forest management (Forest Department, 1995). The FD as a counterpart established Community Based Forest Management (CBFM) in the Dry Zone area with the cooperation of UNDP/ FAO in Chaung U Township in 1996 (Thaung, 2003) and with Japan International Cooperation Agency (JICA) in Nyaung U Township in 2003 (Kaung, 2006). In 2005, CBFM projects initiated by local people in an area of 5404.12 ha were established in Sagaing, Mandalay and Magway. Among those, the Thebyu community based natural forest was established under a program of Bago Yoma greening project in Taungdwingyi Township in 2007 by encouragement and initiative of villagers without subsidies from any sources (Ministry of Forestry, 2008).

Nowadays, the 28,216 members are involving in about 270 user groups and they are still participating in CBFM projects. However, there is less participation shown in management activities after terminating the UNDP/FAO and JICA projects. These could be due to lack of financial and technical assistance (Kaung, 2006). Meanwhile, the FD with full responsibility to inspect and to review the status of all CBFM projects does not take any action upon the failure of these CBFM projects.

Owing to the different implementing methods with different financial support among the three CBFM projects, participation takes place at different levels and the types of participation vary from place to place. Even though local people are possessing 3 to 14 years' experience of CBFM projects, they are still facing with the problem of participation (Oo, 2007). Therefore, this study aimed to determine levels of participation and factors that influenced level of participation in three different CBFM projects. Moreover, the findings of study are expected to provide useful recommendations for the further improvement of CBFM in the Dry Zone area of Myanmar in future.

2. Methodology

Three community forest user groups (CFUGs) of Nwegawe, Nyaunggyi and Thebyu villages represent different management projects operated by UNDP/ FAO, JICA and local people (self reliance), respectively. The research methodology consists of three main steps, i.e., calculating sample size and collecting data, measuring levels of participation and determining factors influencing level of participation. Each step is described in details as follows.

2.1 Calculating sample size and collecting data

Population of the study including members of the three CFUGs are 385 households. Sample size was calculated by using Taro Yamane's formula (Yamane, 1967). From the calculation, with 5% error, 95% confidence coefficient and 50% degree of variability, the sample size was 196 households. Distribution of samples among the three CFUGs was 119, 55 and 22 for Nwegawe, Nyaunggyi and Thebyu villages, respectively. Questionnaire survey was conducted with heads of household who were also member of CFUGs. To gain more details in management process, in-depth interview with 15 informants, i.e., three heads of Village Peace and Development Council, three heads of villages, three chairs of CFUGs, three Township Forest Officers and three District Forest Officers was carried out. Forest resource data such as major forest products and Non Timber Forest Products (NTFPs) were collected as secondary data from relevant departments and organizations. The study was done during November to December 2009.

2.2 Measuring of levels of participation

Classification of the levels of participation, divided into five levels and five scores, was modified from Pretty et al. (1995) and Leksakundilok (2006), as shown in Table 1. Questionnaires were used to identify levels of participation of the samples. Each questionnaire consists of 25 questions (fix-response of Yes/ No) involving five stages of the forest management activities (five questions for each stage), i.e., (1) Negotiation stage for establishment between project organizer and community; (2) Planning or formulation stage for establishment; (3) Surveying and preparing stage for proposal and establishment; (4) Implementation stage for CF plantation activities or remaining natural forest; and (5) Monitoring and evaluation, benefit sharing, self mobilization stage. From the 25 questions, Score 1 (No participation) is assigned to a member of CFUGs who participated in 1 or 5 involvements (an answer as "Yes" to a question) in any stage. Therefore Scores of 2, 3, 4, and 5 are for 6 to 10, 11 to 15, 16 to 20 and 21 to 25 involvements, respectively. These scores are used to describe the level of participation as showed in Table1. Stepwise Multiple Regressions Analysis (SMRA) was applied to analyze level of participation using Statistical Package for the Social Sciences version 15 (SPSS-15).

2.3 Determining factors influencing level of participation

A questionnaire with both fix-response and open-ended questions was used to analyze 31 independent variables based on social, economical, forest resource and institutional factors. Similar to the levels of participation, the Stepwise Multiple Regressions Analysis (SMRA) was than applied to analyze the relationship among factors using Statistical Package for the Social Sciences version 15 (SPSS-15).

Table 1: Dependent and independent variables and their units of measurement

Score	Level of participation	Type of participation
5	Very High	Self mobilization
4	High	Interactive participation
		Functional participation
3	Moderate	Participation for material incentives
		Participation by consultation
2	Low	Participation in information giving
1	No	Passive participation

3. Results and discussions

3.1 Levels of participation

The "Yes" answers from the series of questions are listed as presented in Table 2. It is obvious that the responses concerning Negotiation and Planning/ Formulation stages of Nwegawe respondents (prior UNDP/ FAO project) or the questions No. 1 to 10 were much higher than those of other stages especially Monitoring and evaluation stage. For the Nyaunggyi village (former JICA project), the responses gradually decreased from the questions concerning Negotiation stage to Monitoring and evaluation stage. On the other hand, the responses of the Thebyu village (self reliance project) are not much different.

Table 2: Number of respondents of three CBFM projects to the answer of "Yes" for questionnaires

Stage	Question no.	Respondents in a village of		
		Nwegawe	Nyaunggyi	Thebyu
Negotiation stage for establishment between project organizer and community **(Negotiation stage)**	1	119	55	22
	2	116	50	21
	3	115	53	22
	4	110	51	21
	5	112	59	22
Planning or formulation stage for establishment **(Planning/ formulation stage)**	6	100	43	21
	7	96	40	20
	8	108	51	19
	9	93	38	22
	10	104	44	21
Surveying and preparing stage for proposal and establishment **(Surveying and preparing stage)**	11	68	36	20
	12	70	40	22
	13	63	33	18
	14	56	29	17
	15	84	41	22
Implementation stage for CF plantation activities or remaining natural forest **(Implementation stage)**	16	7	30	18
	17	10	34	20
	18	6	27	19
	19	8	32	15
	20	4	26	19
Monitoring and evaluation, benefit sharing, self mobilization stage **(Monitoring and evaluation stage)**	21	1	9	12
	22	1	7	11
	23	1	11	13
	24	1	10	14
	25	1	8	10

However, it is shown little responses for Monitoring and evaluation stage because they seldom propose monthly and annually progressive report to forest staff from FD. The respondents who did not respond to questions concerning from Negotiation stage to Monitoring and evaluation stages were lack of cooperation.

With respect to the level of participation for three CBFM projects, Table 3 shows that overall level of participation is moderate (35.2% of the respondents). For the Nwegawe village (former UNDP/ FAO project), the level of participation was moderate (Score of 3) with the highest number of respondents of 61 or 51.2%. From the interviews, there were some incentives i.e. some CFUGs were paid for participating in tree plantation along the road side as a green wall or shelter belt by UNDP/ FAO. However, about 16% of respondents did not involve in any activities after the project was terminated.

In case of the Nyaunggyi village (former JICA project), level of participation is high (Score of 4) with the highest number of respondents of 21 or 38.1%. For this CBFM project, JICA supported fuel wood supply plantation. This not only helps ecological restoration but also provides subsidies or income to the CFUG. However, there are some members unemployed after the projects was finished which means no level of participation (21.8% of the respondents). On the other hand, the level of participation of the Thebyu village (self reliance project) is very high (Score of 5) with the highest number of respondents of 12 or 54.5%. It was found that members of this CFUG involved in all activities including teak plantation.

Finally, levels of participation as presented in Table 3 were compared using SMRA and the results are presented in Table 4.

Table 3: Levels of participation in three CBFM projects

Levels of participation	**Respondents in a village of**		
	Nwegawe	**Nyaunggyi**	**Thebyu**
No (Score 1)	19 (15.96%)	12 (21.81%)	1 (4.54%)
Low (Score 2)	32 (26.90%)	7 (12.72%)	1 (4.54%)
Moderate (Score 3)	61 (51.26%)	6 (10.90%)	2 (9.09%)
High (Score 4)	6 (5.04%)	21 (38.18%)	6 (27.27%)
Very high (Score 5)	1 (0.84%)	9 (16.36%)	12(54.54%)
Total	**119 (100%)**	**55 (100%)**	**22 (100%)**

Table 4: Comparison of levels of participation in three CBFM projects

Model (Independent variables)	**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Sig.**
	B	**Std. error**	**Beta**		
Thebyu	4.227	.229		18.441	.000
Nwegawe	-1.740	.250	-.704	-6.973	.000
Nyaunggyi	-1.064	.271	-.396	-3.921	.000

Dependent variable: levels of participation

Parameters from Table 4 are used to calculate level of participation as shown the following equations.

Thebyu village's level of participation

= 4.227 (High level of participation)

Overall level of participation
= 4.227 – 1.740 (Nwegawe) – 1.064 (Nyanuggyi)

Nwegawe village's level of participation

= 4.227 – 1.740 (1) – 1.064 (0)
= 4.227 – 1.740 – 0
= 2.487 (Low level of participation)

Nyaunggyi village's level of participation

= 4.227 – 1.740 (0) – 1.064 (1)
= 4.227 – 0 – 1.064
= 3.163 (Moderate level of participation)

From the calculation, it can be explained as if Thebyu village's level of participation is 4.227 (high level of participation), the level of participation of the Nwegawe village (former UNDP/ FAO project) and that of the Nyaunggyi village (former JICA project) will be 2.487 (low participation) and 3.163 (moderate participation), respectively. To sum up, from both methods, the Thebyu village (self reliance project) has the highest level of participation among three projects while participation in the Nwegawe village was found lower than that of the Nyaunggyi village.

As shown in Table 5, for example, B value of the amount of fuelwood of 0.137 means 0.137 unit of level of participation will be increased for every one ton collection of fuelwood. The relationship between level of participation and all relevant factors can be illustrated as the following equation.

Table 5: Results of SMRA of factors influencing levels of participation

Model (Independent variables)	**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Sig.**
	B	**Std. error**	**Beta**		
(Constant)	-.290	.086		-3.370	.001
Amount of fuelwood	.137	.012	.410	11.473	.000
Household size	.127	.020	.184	6.399	.000
Level of education	.219	.029	.211	7.449	.000
Attendance of meeting	.225	.038	.212	5.934	.000
Annual saving	-9.94E-007	.000	-.110	-5.652	.000
Labor sharing	.076	.017	.101	4.340	.000
Fodder and grass collection	.027	.006	.092	4.416	.000
Mushroom collection	-.268	.082	-.071	-3.255	.001

Dependent variable: levels of participation

Level of participation

= -0.290 (Constant) + 0.137 (Fuelwood) + 0.127 (Household size) + 0.219 (Level of education) + 0.225 (Attendance of meeting) – 9.94E-007 (Annual saving) + 0.76 (Labor sharing) + 0.027 (Fodder and grass collection) – 0.268 (Mushroom collection)

According to this analysis, fuelwood, household size, level of education, attendance of meeting, labor sharing and fodder and grass collection positively influence the level of participation while annual saving and mushroom collection negatively influence the level of participation.

Regarding fodder and grass collection, the result agreed on Maskey et al. (2005). The present study found that an increase of 0.137 unit of level of participation with every increase of one ton collection of fuelwood. All respondents collected fuelwood from community forests for both household consumptions and market sale. The fuelwood provides high extra income for the Nwegawe villagers. Thus, the result showed positive relationship between fuelwood consumption and level of participation

Agreeing with Gladwin et al. (2010), the results show positive relationship between household size and level of participation. It is expected that the larger households are, the more participate will obtain in CBFM activities. The findings of the study show an increase of 0.127 unit of level of participation with every increase of one member in household size. In the study area, the typical households consist of about six members i.e. three adults and three children. In addition, education level is another crucial variable influencing levels of participation. As Dolisca et al. (2006) suggested that education was the most fundamental component to strengthen participation in CBFM. Higman et al. (1999) also described that level of education was a significant instrument to stimulate local participation in a variety of development as well as natural resource management initiatives. Napier and Napier (1991) noted that the better educated people would be more aware of the benefits gained from the forest than the individuals who are illiterate. The findings of the study show an increase of 0.219 unit of level of participation with an increase of one level of education.

With respect to the attendance of meeting, the result of the present study agreed on Moe (2006) findings that suggested the strong influence of the attendance of meeting on level of participation. The findings of the study show an increase of 0.027 unit of level of participation with every increase of one time of the attendance of meeting. The study showed that all respondents of Thebyu village (very high level of participation) involved in teak plantation and conserving remaining natural forest by totally self reliance. On the other hand, only one respondent of the Nwegawe village (low level of participation) and 9 respondents of the Nyaunggyi village (moderate level of participation) involved in forest establishment activities. A number of 74 respondents or 37.75% of the respondents of the Nyaunggyi village attended only one meeting in one year. Furthermore, 116 respondents or 59.2% of the respondents of the Nwegawe village did not involve in neither planning nor decision making process of CBFM meetings. Moreover, the findings from the study found that a decrease of 9.94E-007 unit of level of participation with every increase of 10,000 Kyats of annual saving. Additionally, the result also showed that an increase of 0.76 unit of level of participation with every increase of one time of labor sharing in CBFM activities.

The present results regarding fodder and grass collection factor agreed on Maskey et al. (2006). It was found that an increase of 0.027 unit of level of participation with every increase of one kilogram of fodder and grass collection. This is because fodder and grass are very important for cattle feeding.

Moreover, the finding of the study also found that a decrease of 0.268 unit of level of participation with every increase of one kilogram of mushroom collection. The relationships between factors influencing levels of participation and degrees of participation of each CBFM project can be illustrated as the following equations.

Table 6: Comparison of factors influencing on levels of participation of three CBFM projects

Models	Predictors	Unstandardized Coefficients		t	Sig.
		B	Std. Error	B	Std. Error
Nwegawe	(Constant)	-.645	.216	-2.980	.004
	Amount of fuelwood	.279	.023	11.921	.000
	Level of education	.182	.026	6.970	.000
	Household size	.098	.026	3.790	.000
	Fodder and grass	.017	.006	2.879	.005
	Gender	.231	.103	2.246	.027
Nyaunggyi	(Constant)	-.341	.169	-2.021	.049
	Attendance of meeting	.565	.069	8.148	.000
	Household size	.111	.040	2.764	.008
	Amount of fuelwood	.065	.020	3.316	.002
	Annual saving	-8.75E-007	.000	-3.492	.001
	Level of education	.243	.074	3.270	.002
Thebyu	(Constant)	5.16E-017	.000	.	.
	Income from forest	6.67E-005	.000	.	.

Dependent variable: levels of participation

3.3 Factors influencing level of participation of three CBFM projects

SMRA was also used to analyze the degrees of influence of factors on level of participation in each CBFM project. For both models of the Nwegawe and Nyaunggyi villages, most factors influencing the participation are similar as shown in Table 6. It is interesting to find only one factor of income from forest influencing level of participation for the Thebyu village.

1) Factors influencing level of participation in the Nwegawe village (former UNDP/ FAO project)

Level of participation of the project of the Nwegawe village

= - 0.645 + 0. 279 (Fuelwood) + 0.182 (Level of education) + 0.098 (Household size) + 0.17 (Fodder and grass collection) + 0.231 (Gender)

For the Nwegawe village, the finding can be concluded that 0.279 unit of amount of fuelwood, 0.182 unit of level of education, 0.098 unit of

household size, 0.17 unit of fodder and grass collection and 0.231 unit of gender are positively influencing levels of participation.

2) Factors influencing level of participation in the Nyaunggyi village (former JICA project)

Level of participation of the Nyaunggyi village

= - 0.341 + 0. 565 (Attendance of meeting) + 0.111 (Household size) + 0.065 (Fuelwood) – 8.75 E-007 (Annual saving) + 0.243 (Level of education)

For the Nyaungyi village, the finding can be concluded that 0.565 unit of time of attendance of meeting , 0.111 unit of household size, 0.065 unit of amount of fuelwood, 0.243 unit of level of education are positively influencing levels of participation while 8.75 E-007 unit of annual saving amount is negatively influencing levels of participation.

3) Factors influencing level of participation in the Thebyu village (self reliance project)

Level of participation of the Thebyu village

= 5.16 E-017 + 6. 67 E-005 (Income from forest)

For the Thebyu village, the finding can be concluded that 6. 67 E-005 unit of amount of income from forest is strongly and positively influencing level of participation.

4. Conclusion

From the study, it can be concluded that the level of participation after termination of the international supports of the Nyaunggyi village (former JICA project) is higher than that of the Nwegawe village (former UNDP/ FAO project). However, the levels of participation of both villages are still lower than that in the Thebyu village where the project was established by self reliance of local people.

According to the results from Stepwise Multiple Regression Analysis, this study also illustrated that the social factors that positively influenced the levels of participation involved gender, household size and level of education while the important institutional factors were attendance of meeting and labor sharing. In addition, forest resource utilization factors that positively influenced the levels of participation included amount of fuelwood and fodder and grass collection. On the other hand, economic factor as annual saving and forest resource utilization factors as mushroom collection negatively influenced the levels of participation.

5. Recommendations

CFUGs should be formed by members of household who should be young, active and willing to work and have real interests rather than be a head of household. Therefore it is recommended that every youth should get involved as a member of CFUG. However, all management committees in CFUGs should be formed with educated and mature man and woman in order to conduct CBFM activities in accordance with management plan. That is how to build up self reliance spirit among of local people from the international organization's projects that these organizations can help enhancing capacity building especially in forestry management knowledge, awareness and typology of participation not only during project period but also after terminating the project.

From the present study, it is necessary for the FD and DZGD to promote higher participation in CFUGs of the Nwegawe village of former UNDP/

FAO project which were established for more than 14 years. The level of participation has been decreasing after termination of project and most members of these CFUGs only involved as daily labor in this CBFM project. On other hand, the FD and DZGD should provide technical knowledge to CFUGs of the Thebyu village of former JICA project in order to maintain long-term CBFM with sustainable manner and way. The remnant natural CBFM is more suitable than community based plantation in the Dry Zone area of Myanmar because forest products from natural forest can be achieved more than plantation. Even though man always plays important role in all activities of CFUGs, however woman should be promoted to more important roles. The FD and Dry Zone Greening Department should consider real levels of local people participation before establishment of CBFM. The household size and education level, attendance of meeting and labor sharing and amount of fuelwood, fodder and grass collection from community forests should be considered as criteria before establishment of the CBFM programs. These findings can be used for new establishment of CBFM in the Dry Zone area and revision for participation sector in CFI-1995 in future.

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