

Willingness to Spend Labour Hour for Biodiversity Conservation: A Case Study with Special Reference to Village Forest Dwellers and Encroachers in Assam

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ABSTRACT Loss of biodiversity has been considered as a major threat for mankind and declining biodiversity is burning issue in the north-eastern region of India, especially in Assam. Some of the threats to biodiversity in the region are deforestation and forest degradation, expansion of agriculture and illegal extraction of forest. The *Forest Rights Act 2006* has been passed by the parliament of India with dual aims of protecting the right of forest dwellers and at the same time this *Act* tries to procure the involvement of forest dwellers to protect forest. The main objective of the paper is to determine the factors which affect willingness to pay in terms of labour hour for biodiversity conservation in Assam. 190 households were interviewed from two village forests and two encroached villages of *Sonitpur* and *Golaghat* districts of Assam during April and May of 2010. Respondents in village forest are more willing to pay than that of encroacher's village. Sex, age, literacy of the respondents and size of land holdings were found to be significantly related to spending labour hours for biodiversity conservation programme.

INTRODUCTION

The state of Assam in the north-eastern part of India is abundant of forest, flora and fauna. But it is facing an unthinkable situation owing to large scale extraction of forest products and simultaneous destruction of forests (Bora 2001). Encroachment is one of the main reasons of forests depletion in Assam (Mahanta and Das 2012). In order to curb the huge illegal extraction, many Forest Acts have been introduced from time to time in Assam (GOA 2008). But these Acts have been focusing mainly on 'policing' the forests without trying for the involvement of the common people around (Bora 2001; Tamuli and Choudhury 2009).

One such act designed for biodiversity conservation through conservation of forest is the *Forest Rights Act (FRA)*, known as the *Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*. This act has been passed by the parliament of India with dual aims of protecting the right of forest dwellers and at the same time this act tries to procure the involvement of forest dwellers to protect forest. The *FRA 2006* argues to provide ownership of land to forest dwellers, which could be a strong incentive to evolve sustainable land-use practices and con-

servation (Deacon 1999). Such incentive is necessary since biodiversity conservation is largely a public good and there is little incentive to promote it at its own cost (Matta et al. 2007).

Moreover, the *FRA 2006* empowers gram sabhas¹ and other village-level institutions to protect wildlife, forest and biodiversity and ensures that the habitat of forest dwelling Scheduled Tribes and other traditional forest-dwellers is preserved from any form of destructive practices because declining biodiversity is burning issue in the north eastern region of India, especially in Assam (Chatterjee et al. 2006).

The success of conservation programs mainly depends on the local factors which may be willingness to pay, willingness to participate and their attitudes towards such conservation programs. Support from local people is an important element for the success of any policy or programs whether it is biodiversity conservation or other environmental problems (Walpole and Goodwin 2001). Conservation policies that maintain or improve landholders' personal circumstances and that promote pro-environmental norms may result in increased participation and thereby conservation outcomes (Moon et al. 2012). Many times the effectiveness of such conservation policies may also depend on the attitude of foresters also. Primmer and Karpin-

en (2010) empirically examines the intentions of foresters to conserve habitats beyond what is the minimum legally defined requirement when planning forestry operations and finds that policy integration and voluntaries are among the mantra of modern environmental and natural resource conservation policy, understanding the normative foundation of operational actors is crucial for designing new instruments and their implementation.

Contribution for biodiversity conservation may come either in the form of cash or kind. But the villagers who have low per capita income (Mahanta 2010) can not be expected to contribute cash for biodiversity conservation. Rather they may be motivated to contribute labour hour. Willingness to spend labour hour may be affected by different factors like age, cash in hand, ownership of livestock etc. (Kamuanga et al. 2001). Ninan and Sathyapalan (2005) have found that land holdings, type of settler, educational level are significant variables to determine willingness to pay in terms of labour hour. Therefore, contribution from local people to conserve biodiversity is an important issue to address for successful working of the *FRA 2006* in Assam.

Objective

Taking into account the problem, the main objective of the paper is to determine the factors which affect willingness to pay in terms of labour hour for biodiversity conservation in Assam.

METHODOLOGY

Both primary and secondary data have been used in this study. Secondary data regarding geographical location and demographic pattern has been collected from the office of chief conservator of forest and other documents published by Government of Assam. Primary data has been collected from dwellers of village forest and forest encroachers. Multi-stage sampling has been applied in this study. In the first stage, two districts have been selected depending on some justification. In the second stage, four village forests and two villages created by encroachers have been selected from reserved forests under the jurisdiction of these two districts. In the third stage, a number of representative families, 10 % of total households have been

selected randomly from each village. The unit of survey is household and only one respondent has been taken from each family, preferably the head of the family. Data has been collected using a structured questionnaire. Before going to the field to collect primary information, a Focus Group Discussion (FGD) with villagers has also been conducted.

Sonitpur and *Golaghat* districts have been proposed as study area. Because these two districts have the highest forest coverage but at the same time these two districts have very high incidence of illegal extraction of forest. Especially after the declaration of *FRA 2006*, the situation has worsened. The situation has gone to such an extent that the encroachers had formed societies and organization and it will be really difficult to evict them in future. Out of four village forests (as discussed earlier in the sampling procedure), two villages have been selected from *Sonitpur* district (*Madhupur* and *Deepa Basti* under *Charduar* Reserved Forest) and the other two from *Golaghat* district (*Gamariguri* and *Kolaigaon* under *Doyang* Reserved Forest).

Questions have been asked about the socio-economic and demographic conditions and their willingness to pay towards biodiversity conservation. Before putting these questions, a brief idea about the environmental issue, its importance, link between loss of biodiversity and rural people's livelihood and *FRA2006* have also been placed before them. The survey was conducted during April and May of 2010 and altogether 190 households were interviewed from both these two districts. Interviews were conducted with household heads when available and otherwise with any other adult household member.

Six variables namely occupation, sex, age, family size, total land holdings and educational qualification have been selected to see willingness to pay in terms of labour hour of dwellers of village forest and encroachers towards biodiversity conservation. Out of six variables, three variables (family size, age of the respondent and total land holdings) have been captured in absolute figures in the survey. In the family size category, respondents have been divided into two categories-less than 5 and 5 or more (mean of family size is 4.92). To capture age, respondents have been divided into two classes-respondents less than 48 years and 48 years or more in age (mean of respondent age is 47.58).

years). The variable 'total land holdings' has been divided into two classes- less than 9 hectare and 9 hectare or more (mean of land holdings is 9.43). A literate respondent is defined as having at least one full year of schooling and illiteracy is defined as less than one full year (Shrivastava and Heinen 2007).

RESULTS AND DISCUSSION

It has been found from the field survey that more than 90 percent respondents are male in both village-types due to the fact that almost all households are headed by male. In some cases, though household heads have been found to female but they were reluctant to be interviewed. Therefore, the next senior male members were interviewed. Out of total land available, about 50 percent of total land has been used for agricultural activities in both village-types. It means that villagers were using the remaining land for other activities such as sericulture, horticulture or homestead farming. It has been observed from Table 1 that both types of villages were dominated by ST population. Whereas there were 33 percent general caste sample size inhibit

in village forest, the percentage of general caste sample was nil in encroached village. Villagers in and around the forest were predominantly the tribal people (Sonowal 2007).

Table 1: Caste wise distribution of sample size (in percentage)

Characteristics	Village forest	Encroached village
General	33.0	0.0
OBC	13.9	33.3
SC	7.8	0.0
ST	40.9	46.7
Adivasi ²	4.3	20.0

Source: Field survey

From Table 2 it has been found that around 15.7 percent of the respondents in village forests and 6.7 percent of respondents in encroached villages earned their livelihood as labourers in other farmer's paddy fields because they did not have any land for cultivation. Only 3.5 percent respondents in village forest were engaged in service while nobody was found to be engaged in service in encroached village. The same is also revealed by Figure 1. The possible

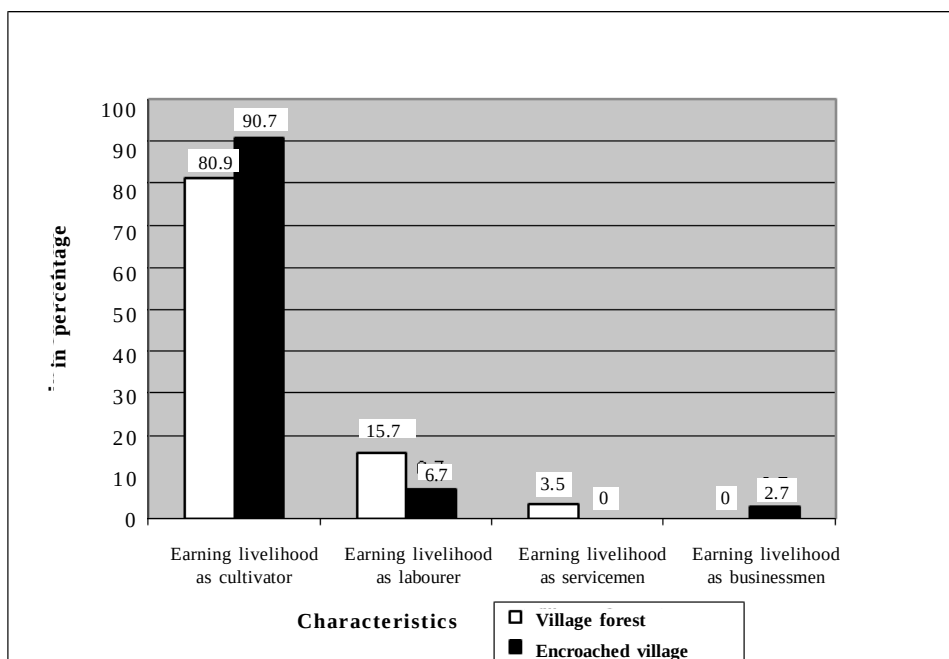


Fig. 1. Source of living in forest village and encroached village

Table 2: Source of livelihood (in percentage)

Characteristics	Village forest	Encroached village
Earning livelihood as cultivator	80.9	90.7
Earning livelihood as labourer	15.7	6.7
Earning livelihood as servicemen	3.5	0.0
Earning livelihood as businessmen	0.0	2.7

Source: Field survey

reason might be that there were more literate persons in village forest (60.9%) than encroached village (49.3%). On the other hand, 2.7 percent respondents of the encroached village were engaged in business while none of the respondents were found to be engaged in business in village forest. The business that the respondents were found to be associated with it was selling of timber though it is an illegal practice.

The socio-economic characteristics of both the two types of villages as represented in Table 3 reveals that the average age of the respondent was slightly higher in encroacher village so the family size also. The encroachers were 100% dependent on fuel wood for cooking but it was not so in forest village. In village forest people also used Liquefied gas (LPG) for cooking (13.9%).

It was observed that in village forest, 52 percent of total lands were titled land while it was only 4 percent in encroached village. It revealed that 48 percent of total lands in village forest and 96 percent of total lands in encroached villages were illegally occupied from forest area which was reflected through ratio of forest land to total land. The proportion of forest land to total size of land holding was two times higher than the proportion in encroached village. The reason was very clear. The encroachers occupied forest land and used it for own purpose.

The proportion of agricultural and to total land holding size was almost equal in both these two types of villages. It might happen because majority of the respondents in both these two types of villages were cultivators that were revealed by Table 3. It was interesting to note here that not even a single respondent were found to use irrigation facility for cultivation in both the two village-types.

Before assessing willingness for biodiversity conservation, it would be better to have an idea about attitude of these villagers towards the new *FRA 2006* since biodiversity conservation with the support of the people is an important pillar of the Act. Dwellers of village forest belonging to non-tribal community had expressed that they were interested in biodiversity conservation. They came to know about this Act from *Zila Panchayat* (ZP) representative who distributed booklet about this act among them. When asked about their possible benefits from this act they replied that this would immensely help them because then they could apply for bank loan, which was not possible for them, as they did not have permanent land papers before this. This showed that people were more concerned about their land and probably the likely benefit from this act made them interested in biodiversity conservation.

Household of tribal dominated village forests informed that they were made aware of the *FRA 2006* by members of the Integrated Tribal Development Programme and accordingly some of them constituted a Forest Rights Committee and arranged for an office in the villages. When asked about the likely benefits of the *FRA 2006*, they also replied the same answer that it would help them to get loans to start business. But household were not happy about the distinction made in the Act between tribal and non-

Table 3: Socio-economic characteristics of sample size (in percentage)

Variables	Class	Village forest	Encroached village	Variable	Village forest	Encroached village
Age (years)	Less than 48	58.3	52.0	Land with title	52.0	0.04
	48 or more	41.7	48.0	Forest Land/Total land	48.0	0.96
Family size	Less than 5	46.1	44.0	Used Land/Total Land	0.93	0.92
	5 or more	53.9	56.0	Agricultural land/Total land	0.49	50.0
Land holdings (in ha.)	Less than 9	52.2	34.7	Irrigation facility	0.0	0.0
	9 or more	47.8	65.3			
Fuel used for cooking	Firewood	86.1	100.0	Literacy rate	60.9	49.3
	LPG	13.9	0.0			

Source: Field survey

tribal for claiming their rights. According to them this would lead to conflict between tribal and non tribal.

Encroached villagers were also informed about the *FRA 2006* through their village leader who arranged land for them. When encroachers were asked about their opinion on *FRA 2006*, they revealed that this was an *Act* to give land *patta*³ to forests-dwelling communities. The main reason behind such revelation was the teaching by their leader⁴ who often instigated these people by saying that the *FRA 2006* was merely an instrument to give land *pattas*. Such kind of belief might prove harmful in future. As a result, the people overlooked other important environmental and conservation issues of the *Act* such as conservation of forests and role of *Gram Sabha*'s in biodiversity protection.

It was found from FGD that mainly because of the potential benefit people were interested in biodiversity conservation. It should be noted that biodiversity conservation has different benefits ranging from ecological to economic (Christie and Rayment 2012). Therefore, it would be wise to study the determinants of willingness to spend labour hours for biodiversity conservation programme. On an average, dwellers of village forest were likely to spend 3 to 4 labour hours per week while encroachers would like to spend about 2 hours for biodiversity conservation. When encroachers were asked about their low likelihood preferences, they replied that they were hesitating to work under any government conservation programme because it might be a threat towards their existence in that area. Linear logistic function was applied to find the determinants of willingness to spend labour. The results have been shown in Table 4.

From Table 4, it was clear that respondents in village forest were 2.86 times more willing to pay than that of encroacher's village. It was

found by Sonowal (2007) that encroachers were rather involved in massive destruction of forests as they feel a total alienation themselves from the forest which was emotionally attached to them in past years. Feeling of deprivation might make them more hostile for which they might be reluctant to spend labour hour for biodiversity conservation program. Family size was not been found to be an important variable to affect willingness to spend labour hour. Sex of the respondent was an important variable to affect willingness to pay. A male respondent was 0.46 times more willing to supply labour than a female. That was obvious because female folk might not find it convenient to work in such programs. The study resembled the finding of a study by Hill (1998) where the attitudes varied among male and female and females were less likely to nourish positive opinion towards elephants around the Budongo Forest Reserve, Uganda. It was also found by Echessah et al. (1997) that male headed household with participation in literary events were willing to offer more labour hour for the menace caused by Tsetse mosquito. Moreover, they had to remain busy with domestic activities. Age of respondents and years of schooling were also found to be significantly related to willingness to pay. Another study which measured willingness to pay for public good found that age was an important factor to determine willingness to pay (Kamuan-ga et al. 2001). Those who were less than 48 years old were 1.06 times more willing to work for biodiversity conservation than those who were more than 48 years old. This meant as the age of the respondent's increased they were less likely to spend some labour hours for biodiversity conservation. The literate people were 8.03 times more willing to work than those of illiterate people.

Table 4: Willingness to pay in terms of labour hours for biodiversity conservation

Variables	Odds ratio	SE	Z	Prob>(z)
Di=1, for village forest=0, otherwise	2.86	1.11	2.72	0.01
Family size Di = 1, less than 5=0, 5 or more	0.90	0.07	-1.24	0.18
Sex Di = 1 male= 0, female	0.46	0.27	-1.33	0.00
Age Di = 1, less than 48 years= 0, 48 years or more	1.06	0.01	4.81	0.00
Educational qualification Di = 1, literate= 0, illiterate	8.03	2.86	5.86	0.00
Occupation Di = 1, cultivation = 0, otherwise	1.27	0.21	1.39	0.16
Size of land holdings Di =1, more than 9 ha = 0, 9 ha or less	1.62	0.36	-2.15	0.03
Log likelihood= -132.88, LR chi ² (7)= 113.97, Prob>chi ² =0.00, Pseudo R ² =0.30				

Source: Calculated by authors

Size of land holdings was found to be significantly related to the dependent variable i.e. spending labour hours for biodiversity conservation programme. This shows that those with bigger land holding were more likely to say 'yes' to spend some labour hours for the biodiversity programme. This conforms to the theoretical prediction where asset possession motivates households to contribute to natural resource management. The underlying argument is that those who are economically better-off can afford to make greater contribution of time, labour and money towards collective action (Girma and Begene 2012).

CONCLUSION

The paper mainly wants to make a comparative study between forest and encroacher's village about the determinants of willingness to pay labour hour for biodiversity conservation. It is clear from the result that people from village forest are more likely to contribute for biodiversity conservation in comparison to encroachers' village i.e. encroachers are less willing to work for biodiversity conservation. The results also show that younger people are more willing to offer labour hour in comparison to old. Similarly educational qualification also plays an important role. But whether the respondent is a cultivator or otherwise does not have any significant impact on the willingness to pay. This is contrary to theory of agri-economic literature which generally assumes that farmers' motivations for participating in conservation measures are largely economic ones which makes them work for conservation programme. Household with smaller size of holding are less willing for biodiversity conservation in comparison to household with larger holding size. The findings lead to the conclusion that the issue of biodiversity conservation is determined by multiplicity of factors and they had individual attention.

RECOMMENDATIONS

The study has clearly shown that emphasis should be given on motivating the encroachers as there is difference in the willingness to pay between village forest and encroachers as village forest people is 2.72 times more willing to pay than encroachers. It should also be remem-

bered that it is next to impossible to evict the encroachers from forest land. Therefore, the encroachers who are living in that area should be given valid land documents up to a certain period of time. This will be an incentive to make the encroachers think that the land, environment and the nature belong to them and they should preserve it. The encroachers should be convinced about the benefit of biodiversity conservation which may arise from different programmes and measures. It may include discussion with the encroachers or it may be done with the help of *Gram Sabha*. There is need of mass education program to educate the illiterate people whose willingness to spend is less than that of educated people. Women have been found to be less willing to work in comparison to men for biodiversity conservation. But they should be educated about issues related to biodiversity conservation so that they may influence other able bodied family member to work in such programs. To conclude, it may be said that common people have shown willingness to participate in conservation programs but the ultimate responsibility lies with the government regarding how to gain people's support.

NOTES

1. *Gram Sabha* means a village assembly which consists of all adult members including women of a village and in case of states having no *panchayats*, *padas*, *tolas* and other traditional village institutions and elected committees, with full and unrestricted participation of women (Government of India 2007).
2. *Adivasis* are those people who migrated from Orissa, Bihar and other states of India to Assam and engaged in tea gardens as labourers thereafter
3. *Patta* is a document, which gives legal ownership of land.
4. It is not clear whom the respondents considered as a leader. Sometimes they referred to a leader as an influential man among themselves or sometimes to an agent of political parties.

REFERENCES

- Bora MC 2001. Natural Resource Management: Sustainable Extraction Level of Forest in Assam. *EERC Working Paper Series*, CPR-3, Mumbai: IGIDR.
- Chatterjee S, Saikia A, Dutta P, Ghosh D, Pangging G, Goswami AK 2006. Background Paper on Biodiversity Significance of North East India for the Study on Natural Resources, Water and Environment Nexus for Development and Growth in North Eastern India. WWF-India. From <<http://www.mdoner.gov.in>> (Retrieved August 12, 2012).
- Christie M, Rayment M 2012. An economic assessment of the ecosystem service benefits Derived

- from the SSSI Biodiversity Conservation Policy in England and Wales. *Ecosystem Services*, 1(1): 70-84.
- Deacon R 1999. Deforestation and ownership: Evidence from historical accounts and contemporary data. *Land Economics*, 75(3): 341-359.
- Echessah PN, Swallow BM, Karma DW, Curry JJ 1997. Willingness to contribute labor and money to Tsetse control: Application of contingent valuation in Busia District, Kenya. *World Development*, 25(2): 239-253.
- Girma W, Begene F 2012. Willingness to contribute to collective forest management: Evidence from Godere in the Gambela Region of Ethiopia. *The Journal of Socio-Economics*, 41(1): 79-86.
- Government of Assam 2008. Forest Department, Assam. From <<http://www.assamforest.co.in>> (Retrieved 12 November, 2009).
- Hill CM 1998. Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environmental Conservation*, 25(3): 244-250.
- Kamuanga M, Swallow BM, Sigue H, Bauer B 2001. Evaluating contingent and actual contributions to a local public good: Tsetse control in the Yale agro-pastoral zone, Burkina Faso. *Ecological Economics*, 39: 115-130.
- Mahanta R 2010. *Forest Resource Use and Biodiversity Conservation: A Case Study of Assam*. Major Research Project, University Grants Commission, New Delhi.
- Mahanta R, Das D 2012. Attitudes towards biodiversity conservation of forest dwellers and encroachers: A case study of Assam in north-east India. *Small-scale Forestry*, DOI:10.1007/s 11842-012-9213-3.
- Matta J, Alavalapati J, Tanner G 2007. A framework for developing market-based policies to further biodiversity on non-industrial private forests (NIPF). *Forest Policy and Economics* 9(7): 79-788.
- Moon K, Marshall N, Cocklin C 2012. Personal circumstances and social characteristics as determinants of landholder participation in biodiversity conservation programs. *Journal of Environmental Management*, 113: 292-300.
- Ninan KN, Sathyapalan J 2005. The Economics of biodiversity conservation: A study of a coffee growing region in the Western Ghats of India. *Ecological Economics*, 55: 61-72.
- Primmer E, Karppinen H 2010. Professional judgment in non-industrial private forestry: Forester attitudes and social norms influencing biodiversity conservation. *Forest Policy and Economics*, 12: 136-146.
- Shrivastava RJ, Heinen J T 2007. A microsite analysis of resource use around Kaziranga National Park, India. *The Journal of Environment and Development*, 16(2): 207-226.
- Sonowal CJ 2007. Demographic transition of tribal people in forest villages of Assam. *Stud Tribes Tribals*, 5(1): 47-58.
- Tamuli J, Choudhury S 2009. Rethinking at Forest Policies in Assam: Facilitating Reserved Forests as De facto Open Access. MRPA Working Paper. From <<http://www.mpra.ub.uni>> (Retrieved January 10, 2012).
- Walpole MJ, Goodwin HJ 2001. Local attitudes towards conservation and tourism around Komodo National Park, Indonesia. *Environmental Conservation*, 28(2): 160-166.