

People's Knowledge on Coastal Biodiversity Management

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Abstract

The paper presents the results of a research work on coastal people's knowledge on biodiversity management in the context of the Coastal and Wetland Biodiversity Management Project (CWBMP). The study was undertaken in the Sonadia ECA (Ecologically Critical Area) of Cox's Bazar district. Data were collected from 100 respondents of two groups of people – members of the Village Conservation Group (VCG) and the non-VCG members. A structured personal interview schedule was used in data collection during the months of March and April, 2008. People's knowledge on coastal biodiversity management was measured by developing a knowledge test using the concept postulated by Bloom (1956) and revised by Anderson and Karthwohl (2001). Regarding all six levels of knowledge, the VCG-members possessed higher knowledge than the non-VCG members. Majority (74%) of the VCG members had medium knowledge while 26% of them possessed high knowledge on coastal biodiversity management issues. On the other hand, 74%, 24% and 2% of the non-VCG members possessed medium, low and high knowledge respectively. Out of eleven characteristics of the respondents, eight (age, education, training exposure, organizational participation, extension media exposure, cosmopolitaness, social participation and experience in biodiversity conservation activities) showed significant positive relationships with their knowledge. However, only age was negatively related, while family size, farm size and annual income did not show any significant relationships with people's knowledge on biodiversity management issues.

Keywords: *Biodiversity, knowledge, cognitive domain, Bloom, CWBMP*

Introduction

Biodiversity of Bangladesh is very rich and is very important both nationally and globally all over the world. Due to unplanned and uncontrolled activities of human being the ecology as well as natural resource bases of Bangladesh are becoming unbalanced day by day which is a great threat to the country (Gain, 1998). In order to preserve the major

biodiversity bases of the country, the Bangladesh Government in its "Bangladesh Environment Conservation Act 1995" declared eight areas as Ecologically Critical Areas (ECAs), which include: (i) Strip of 10 km outside the Sundarban reserve forest, (ii) Sea front of Cox's Bazar and Teknaf, (iii) Saint Martins Island, (iv) Sonadia Island, (v)

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Hakaluki Haor, (vi) Tanguar Haor, (vii) Marjat Baor, and (viii) Gulshan and Baridhara lake area. In the declared ECAs, some activities are totally prohibited; the prohibited activities are: cutting or collecting natural forests and trees, killing or hunting of wild life, catching or collecting oysters, corals, turtles, or others, all kind of activities destroying the natural habitat for plants and animals, any activities, which can change the natural characteristics of soil and water, building industries that pollutes soil, water and sound, any activities, which is harmful for fishes or any other aquatic life etc (Bangladesh Gazettes, 1995).

In order to increase local people's participation in and effective management of biodiversity of the ECAs, the Government in 2003 undertook the "Coastal and Wetland Biodiversity Management Project" (CWBMP) for the ECAs of Sea front of Cox's Bazar and Teknaf, Sonadia Island, Saint Martins Island and Hakaluki Haor. The CWBMP is funded by GEF (Global Environment Facility) under the supervision of UNDP. The Department of Environment (DoE) under the Ministry of Forest and Environment is the implementing agency on the behalf of the Government of Bangladesh.

The DoE, with collaboration of a number of partner NGOs, is implementing activities like conservation of plants, animals, fishes and wild lives in the project areas. The partner NGOs involve local peoples through formation of community based organization known as "Village Conservation Group" (VCG). The NGOs provide the VCG members training on effective management of biodiversity and encourage them through motivational campaign towards this end. The VCG members voluntarily work for preservation of biodiversity while utilizing the natural resource bases, involve in awareness campaign and guard the coastal area off any illegal activities. The VCG members have been actively involved in CWBMP activities since 2005. Thus, it is assumed that the local people's knowledge on conservation of biodiversity issues increased in the mean of time. Therefore, the study was undertaken to assess coastal people's knowledge on biodiversity management. The specific objectives of the study were: (i) to assess the knowledge of the coastal people on biodiversity management and (iii) to explore any relationships between the selected characteristics of the coastal people and their level of knowledge on the biodiversity management.

Methodology

Study area, population and sample: As mentioned above, the study was conducted in Sonadia ECA, i.e., in the Sonadia Island and Ghatibhanga village of Maheskhali upazila under Cox's Bazar district. Both the VCG members and non participants in VCG (hereafter referred to as non-VCG members) of the locality were the population of the study. An up to date list of all VCG members was collected from the local staff of BCVD (Bangladesh Centre for Village

Development), the partner NGO of the CWBMP in Sonadia ECA. There were three VCGs in the study area: Sonadia Purba Para, Sonadia Paschim Para and Ghatibhanga and numbers of VCG members in these three villages were 35, 42 and 50, respectively. A sample of 50 members (about 40% of the population) were randomly selected as the sample from the VCG members, while another 50 villagers from each of the selected VCG member's neighbours were randomly

selected as the sample from the non-VCG members.

Variables of the study: The dependent variable of the study was “coastal people’s knowledge on biodiversity conservation issues”, while the independent variables were: age, education, family size, farm size, training exposure, annual family income, organizational participation, extension media contact, cosmopolitaness, social participation, and experience in biodiversity conservation activities. The independent variables were measured employing conventional standard methods and may be seen in the original report (Hossain, 2008).

People’s knowledge on biodiversity conservation was measured considering the seven dimensions of biodiversity management issues as adopted by the CWBMP. The dimensions were: agriculture (crop production), horticulture, wildlife, fisheries, eco-tourism, community development and environment. A knowledge test was developed in accordance with the requirements of six levels of cognitive domain for measuring knowledge as postulated by Bloom (1956) and revised by Anderson and Karthwohl (2001). The six levels of cognitive domains were: remembering, understanding, applying, analyzing, evaluating, and creating. To develop the knowledge test, one question was arranged in the line of each of the six levels

of cognition. Therefore, for each of the seven dimensions of knowledge, six closed-type questions were assigned (one for each of the six levels) based on importance, difficulty and depth of knowledge. Following the study of Rahman (2004), each question for remembering and understanding levels were assigned to 2 scores, while for applying and analyzing levels were assigned to 3 scores and evaluating and creation levels were assigned to 4 scores. Therefore, the possible knowledge score of a respondent could range from 0-14 for remembering and understanding levels, 0-21 for applying and analyzing levels, and 0-28 for evaluating and creating levels. Again, the overall knowledge score of a respondent was computed by summarizing her/his obtained scores in all dimensions, and the score could range from 0 to 126.

Data collection and analysis: Data were collected by using a pre-tested and structured interview schedule wherein all the scales and questions regarding the independent and dependent variables were arranged in a logical order. The first author, with the help of CWBMP officials and NGO workers, collected the data from the sampled respondents by face to face interview during 10 March to 15 April, 2008. SPSS 15.0 version was used in data processing and tests like correlation and t-test for the difference of means were used as and when necessary.

Findings and Discussion

People’s knowledge on coastal biodiversity management

The major focus of the study was people’s knowledge on coastal biodiversity management. As mentioned earlier the overall knowledge score was obtained by summarising all dimensional scores of a

respondent. The respondents’ observed overall knowledge scores were ranged from 47 to 113 against the possible range from 0 to 126. On the basis of the overall knowledge score, the respondents have been classified into three categories as shown in the Table 1.

Table 1. Categories of respondents and overall knowledge on biodiversity conservation issues

Categories of respondents and score range	Percentage of respondents		Mean and s.d. ¹		t-value
	VCG-members	Non-VCG members	VCG-members	Non-VCG members	
Poor knowledge (up to 65)	0	24			
Medium knowledge (65-90)	74	74	85.55	71.02	10.297***
High knowledge (>90)	26	2	(6.65)	(7.44)	

***=Significant at 0.001 level of probability, ¹Figures in the parentheses indicate concerned standard deviation

Table 1 clearly shows that coastal peoples average knowledge on biodiversity conservation issues were medium in general while the VCG-members had significantly higher knowledge than the non-VCG members. The high t-value for the difference of means confirms this interpretation. On the other hand, according to the knowledge score no VCG members was found to fall in the category of possessing low knowledge while 24% non-participants in VCG possessed poor knowledge on coastal biodiversity conservation issues. Although an overwhelming majority (74%) of the respondents from the both group had medium knowledge, a convincing 26% of the VCG-members possessed high knowledge on coastal biodiversity conservation issues while only 2% of the non-VCG members had the same level of knowledge. One can recognize this result as the impact of CWBMP intervention and it might be concluded that the project intervention was gradually facilitating people's increased knowledge on coastal and biodiversity conservation and management issues. The formation of VCG groups, community level mobilization through partner NGOs, motivating people in alternative livelihood activities, and local people's involvement in biodiversity preservation activities could be considered as the major reasons for the higher level of knowledge of the VCG members. The finding duly supports the common notion that people's knowledge usually increases with the intervention of development

programmes as reported in the case of IPM (Alam *et al.*, 2005).

People's level of knowledge

As mentioned earlier according to Bloom's revised taxonomy of cognitive domain proposed by Anderson and Karthwohl (2001), the respondent's level of knowledge on coastal biodiversity management was measured in six levels. The respondents' levels of knowledge have been presented in Table 2. Table 2 clearly shows that the VCG-members of the locality possessed significantly higher knowledge than the non-members of VCGs in all six levels of knowledge. It is observable that the respondents' ability to explanation decreased at the increase of difficulty, i.e., while the respondents obtained relatively higher scores in understanding and remembering levels, their scores markedly decreased in the subsequent levels. This is also supported by the study of Rahman (2004). The difference between the both groups of respondents were small in lower levels of difficulty and the difference became bigger at the increase of difficulty as indicated both by numerical values and larger values of t-statistics. It may be concluded from this observation that people's participation in CWBMP activities through VCGs increased their levels of knowledge on coastal biodiversity management issues.

Table 2. Distribution of the respondents on the basis of levels of knowledge

Levels of knowledge	Observed score range (Possible range)	Mean and standard deviation ¹		t-value
		VCG members (N=50)	Non VCG members (N=50)	
Remembering	9-14 (0-14)	12.94 (0.74)	12.34 (0.82)	3.833***
Understanding	9-13 (0-14)	12.04 (1.02)	10.76 (1.32)	5.432***
Applying	8-18 (0-21)	15.03 (1.59)	11.83 (1.82)	9.358***
Analyzing	11-17 (0-21)	14.39 (1.65)	11.73 (1.74)	7.83***
Evaluating	12-21 (0-28)	16.14 (1.43)	12.42 (1.72)	11.783***
Creating	13-19 (0-28)	15.01 (2.11)	11.91 (1.49)	8.471***

¹Figure in the parenthesis indicating standard deviations

***=Significant at 0.001 level of probability

Characteristics of the coastal people in Sonadia ECA

Eleven characteristics of the coastal peoples of Sonadia ECA have been studied and presented in this paper. Salient features of these characteristics along with their way of measurement and results of t-test for the significance of the differences of means have been presented in Table 3.

Table 3 indicates that the VCG members were younger in age having more level of education than the non VCG members. It is observable that level of education among the non-VCG members was very low, which needs attention of policymakers in undertaking any development programmes. Average family sizes of the both groups of respondents were larger than national average (5.67) and the people of the locality had very small land to operate for farming.

Annual family income averages indicate the poor livelihoods condition of the locality. The VCG members, compare to their non-member neighbours, had higher training exposure, organizational participation, extension media contact, social participation and experience in biodiversity management, all may be attributed to their involvement with VCGs for several years. There was no difference between the two groups of islanders in regards with their cosmopolitaness.

Relationships between characteristics of the respondents and their knowledge

Pearson's Correlation Coefficient (r) was used to test any relationship between the characteristics of the peoples of Sonadia ECA and their knowledge on biodiversity conservation issues. The summary of the correlation test has been presented in the Table 4.

Table 3. Characteristics profile of the respondents along with the t-test results

Characteristics with the unit/methods of measurement	Obtained score range (possible)	Mean and Standard deviation ¹		t-value
		VCG (n=50)	Non-VCG (n=50)	
Age (years)	23-80	31.86 (6.06)	39.84 (11.92)	-4.219***
Education (year of schooling)	0-10	4.05 (3.24)	1.10 (2.06)	5.34***
Family size (numbers)	3-21	8.26 (3.15)	7.44 (2.57)	1.426
Farm size (ha)	0.2-4.08	0.67 (0.69)	0.43 (0.33)	2.172*
Annual family income ('000 Tk)	17-160	47.92 (24.23)	48.84 (23.67)	-0.192
Training exposure (days)	0-8	4.16 (1.20)	2.10 (1.56)	7.413***
Organizational participation (scale score)	0-12	3.18 (1.96)	1.88 (1.98)	3.298**
Extension media contact (scale score)	7-27	19.86 (4.34)	13.20 (2.82)	9.101***
Cosmopoliteness (scale score)	4-13 (0-18)	9.18 (2.23)	9.14 (2.22)	0.09
Social participation (scale score)	5-19 (0-24)	10.36 (1.78)	8.60 (2.59)	3.954***
Experience in biodiversity management (years)	0-7	2.94 (1.38)	0.74 (0.72)	10.027***

¹Figures in the parentheses are the concerned standard deviations

*, ** and *** = Significant at 5%, 1% and 0.1% level of probability

Data presented in the Table 4 depict that out of eleven selected characteristics, the respondents' level of education, training exposure, organizational participation, extension media contact, cosmopoliteness, social participation and experience in biodiversity management activities were positively correlated with their knowledge on biodiversity conservation. Age was found to be negatively correlated. On the other hand, the respondents' family size, farm size and

annual income had no significant relationship with their knowledge.

A significantly negative correlation between age and knowledge implies that older people of the island had less knowledge on biodiversity issues. Education is a key characteristic of any person and it plays a vital role in a person's knowledge and perception of any daily life issue and it is of utmost important in a person's participation and involvement in any development

activities (Rahman and Naoroze, 2007). Therefore, a positive relationship between education and knowledge of the respondents is also important to interpret positive relationships between people's knowledge in coastal biodiversity conservation issues with training exposure, extension media contact,

social participation, organizational participation, cosmopolitaness and experience in biodiversity management activities. Finally, all these should be considered as the key factor for gaining knowledge about biodiversity conservation and management.

Table 4. Relationship between the selected characteristics of the respondents and their knowledge in biodiversity conservation

Selected characteristics of the People of Sonadia ECA	Correlation co-efficient (r) with 98 d.f.
Age	-0.285**
Education	0.486 **
Family size	0.001
Farm size	0.099
Annual income	0.049
Training exposure	0.497**
Organizational participation	0.385**
Extension media exposure	0.769 **
Cosmopolitaness	0.408 **
Social participation	0.492 **
Experience in biodiversity management activities	0.538 **

* = Significant at $p < 0.05$, ** = Significant at $P < 0.01$

Conclusion

People of the study area possessed fairly good knowledge about coastal biodiversity management issues. However, the peoples involved in CWBMP through VCGs had higher knowledge than the people who did not have any such affiliations. It could be concluded from the observation of levels of knowledge that CWBMP participants' levels of knowledge became higher than that of the non-participants with increase of difficulty of knowledge items. That means a gradual involvement of local people in coastal and natural resource management through different participatory programmes will increase people's knowledge on complex

environmental and biodiversity knowledge and will pave their increased participation in such programmes. At the same time, issues on coastal people's livelihoods and education should be properly addressed during undertaking such resource conservation programmes as these are the basic factors for participation. Majority of the respondents possessed medium knowledge on biodiversity conservation. Such factors of training, organizational participation and extension media contact should be properly incorporated in a participatory development programme like CWBMP.

Acknowledgement

The authors acknowledge the support provided by CWBMP Cox's Bazar unit office during conduction of this study.

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