



ENVIRONMENTAL EFFECTS DUE TO SUBSISTENCE ACTIVITIES OF PEOPLE IN AN AREA OF TEKNAF PENINSULA

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ABSTRACT

The main objectives of the study are to find out the extent of participation in subsistence activities by the people and to determine environmental effects occurred due to these activities. Data were collected through interview, focus group discussions and scored causal diagrams from Marishbonia village of Teknaf upazila under Cox's Bazar district. People in the area were engaged mainly in subsistence activities by using natural resources causing some environmental effects. Among the subsistence activities, *pan* (betel leaf) cultivation was the most prevalent one. Cutting forest trees, collecting bush, cutting bamboo etc. from the forest were the most common resource damaging activities. Common effects due to such activities are fewer trees on hilly areas, extinction of bamboo and bushes on hills, cutting down hills for earth and so on. Most of the respondents (69.33%) had less participation and 30.67% had medium participation in subsistence activities. The root causes behind the problems faced by the peoples in conserving environmental resources were the cultivation of *pan* and making *pan boroz* (betel leaf shed).

Key words: Environment, participation, subsistence activity, Teknaf Peninsula

INTRODUCTION

A subsistence activity means the activity in which people live on either taking the recourse or making food from the environment in which they live. In this process, people use the resource by deteriorating the environment or by managing the environment. Most of the cases, through subsistence process, people live on the resource by hampering the environment (Anonymous 2009). The south-east portion of Bangladesh consisted of hills and terraces which was full of hill forests in the past decades. But due to population pressure and food crisis, hills and forests have been destroyed at a constant rate by people. Poorest people of the area, who depend most immediately upon local ecosystems for their livelihood, are seen to be responsible for the degradation of biodiversity, as well as being those who will be most affected by the effects of this biodiversity loss (Mukul *et al.* 2008). People are destroying the hills and cutting the trees for living and for producing food materials. This process is growing rapidly and it is feared that after some years the existing hills and hill forest will be totally finished and biodiversity of that area will be greatly

lost. Thus, the environment of that area is becoming susceptible to various types of natural calamities.

An alarming rate of degradation of the environment in the area has already been noticed. This is due to poor attention to its improvement and maintenance. Besides, people have lack of knowledge or a poor knowledge about environmental safety. Either they do not know much about how to protect their environment in scientific way or they do not get ample scope to that compromising their daily needs. So, day by day the environment and climate of that area are becoming unfriendly for the future use due to their unmanageable subsistence activities.

From different viewpoints, it is clear that the knowledge of environmental safety of their locality plays a vital role in maintaining a healthy environment for their living. Since people are using their existing sustainable resources in a different but unmanageable way other than using in a proper way, it is essential to know their problems in using existing resources towards environmentally friendly sustainable practices. This is necessary in order to develop an extension strategy by which the resources

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of those people living in that locality become motivated towards sustainable agricultural, fisheries

and forest management that would not create problems to environment. The present study was thus undertaken with main objectives: (i) to find out the extent of participation in subsistence activities of the people; (ii) to determine environmental effects occurred due to subsistence activities of the people and (iii) to explore problems confronted by people in hill-forest areas in conserving environmental resources

MATERIALS AND METHODS

The study was conducted in Marishbonia village of Baharchhara union under Teknaf upazila of Cox’s Bazar district in Bangladesh. The village is situated in a critical position. In the east, there are hilly areas, the sea is located in the west and in between two sides there is a small cultivable flat land. So, different types of biodiversity are observed in this village. In all 207 households of Marishbonia were considered as the population of the study.. Among them only 75 people were randomly selected as respondents for interview. In order to collect relevant data for the study, focus group discussions (FGDs), personal interview and scored causal diagrams (SCDs) were conducted and prepared.

In order to measure the extent of participation in household subsistence activities, eight subsistence activities in different aspects were selected through FGD with local people for the present study. A 4-point rating scale was used to obtain the score of the opinion of the peoples amongst each activity. To measure the extent of participation in subsistence activities three dimensions of participation namely (i) frequency of performance, (ii) part of work done and (iii) control over decision were used. The first dimension included involvement, the second ensured action and the last dimension covered the psychological aspect of participation. Each of the dimensions was quantified separately with a four-point rating scale against seven broad categories each of which included four sub-categories of household subsistence activities (Akhter 2007). The extent of participation has been computed according to the formula of Participation Index (PI). In this way, PI could vary from 0 to 100%, 0 indicating no participation and 100 indicated full participation in household subsistence activities by people.

To measure the extent of environmental effects due to subsistence activities, twenty four effects were selected through FGD with local people and consultation with other relevant experts. A 4-point rating scale was used for computing the extent of effects as perceived by the respondents against each of the activities. The mean score of all respondents for a specific reason was considered as the index of severity of the effects. To measure problems faced by people in conserving environmental resources, Scored Causal Diagrams (SCDs) of Participatory

Farm Management (PFM) method was prepared (Galpin *et al.* 2011). The SCDs were used to examine in detail the causes and effects of problems, and to identify the ‘root’ causes which need to be addressed, and to analyze the relative importance of the problems and prioritize them.

RESULTS AND DISCUSSION

Participation in Household Subsistence Activities:

Household subsistence activities are those in which people had been living on for everyday life. In the study area, people were mainly involved in eight subsistence activities. The extent of participation in subsistence activities of the people were ranked from 1 to 8 on the basis of their total score of participation.

Table 1 reveals that the total score of the subsistence activities ranges from 40 to 472. It is found that “maintaining *pan boroz*” is ranked first and “farming in cropland” ranked second among all the subsistence activities. This was due to the tradition of production of *pan* in the area. People would get instant profit by cultivating *pan* at a low cost of production. That is why people are starting *pan* cultivation day by day at a rapid rate. As *pan* cultivation claims a lot of natural resources, it remains as number one killer of natural resources especially from hills. Similar findings (Tani *et al.* 2011; Asahiro *et al.* 2012 and Tsuruta *et al.* 2012) also show that *pan* cultivation through making *pan boroz* leaves perpetual pressure on the hill greens of the area.

Table 1. Ranking of the subsistence activities participated by the people

Subsistence activities	Total score	Rank
Maintaining <i>pan boroz</i>	472	1
Farming in cropland	450	2
Cutting trees from the hill	425	3
Cultivating <i>chon</i> grass on the hill	424	4
Collecting bushes from the hill	321	5
Cutting bamboo from the hill	300	6
Collecting earth from hill	80	7
Fishing in sea	40	8

The observed score regarding the extent of different subsistence activities by the respondents ranged from 20-65 and mean score was 35 (Table 2).

Maximum respondents (69.33%) fall in the low category, while 30.67% were in medium and none of the respondents were in the high category of participation. This is due to reason that most of people in the study area did not get scope to continue most of the activities throughout the year. Because, these activities are mostly dependent on the cyclic processes of nature.

Table 2. Extent of the subsistence activities participated by the people

Score range		Respondents (N=75)			Mean Score
Possible	Observed	Categories	No.	%	
		Less (<33)	52	69.33	
0-100	20-65	Medium (34-66)	23	30.67	35
		High (67-100)	0	0	

Environmental Effects due to Subsistence

Activities: Environmental effects are resulted from subsistence activities using natural resources. These effects cause serious damage to the ecology of the area. As a result, food supply and living standard of the people are changing rapidly. People use the natural resources in such a way that these resources would disappear and that the area would also lose its potential for further uses. The main environmental effects are identified in this study according to its severity on environment.

The observed score regarding the extent of participation in subsistence activities by the people ranged from 21-35 and the mean score was 32.5. The categorization of the people according to the subsistence activities are presented in Table 3.

Table 3. Overall extent of subsistence activities participated by the people

Score range		Respondents (N=75)			Mean Score
Possible	Observed	Categories (score)	No.	%	
		Less (<13)	11	14.67	
0-40	21-35	Medium (14-27)	40	53.33	32.5
		High (28-40)	24	32.00	

Table 3 showed that more than half of them (53.33%) fall in medium category of effects and 32% and 14.67% in high and low categories respectively. It was found that most of the people were involved in making *pan boroz* and cultivation of *chon* (sun) grass.

Severity of the environmental effects is defined as how severely the people of the area have been using as well as destroying the existing environmental resources. People are destroying the environmental resources in an unmanaged way so that day by day their subsistence living is at alarming condition. The result regarding severity ranking of environmental consequence has been presented in Table 4.

Table 4. Severity ranking of effects for each of the subsistence activities

Subsistence activities	Total score	Rank
Maintaining <i>pan boroz</i>	1021	1
Cutting trees from the hill	912	2
Cultivating <i>chon</i> on the hill	902	3
Collecting bushes from hill	875	4
Cutting bamboo from the hill	803	5
Collecting earth from hill	720	6
Fishing in sea	601	7
Farming in cropland	402	8

The total score of the effects of subsistence activities ranged from 402 to 1021 for all the respondents. In the present study, it was found that “maintaining *pan boroz*” ranked first and “cutting trees from the hill” ranked second in severity ranking of consequences. The outcome is probably due to lack of knowledge of the inhabitants about environment and their instant needs to maintain livelihoods. People are making *pan boroz* for instant and quick benefits and through this process they are changing the ecology of the area while they cut trees from hills having no other easy livelihood options. However, the following part deals with the two subsistence activities which stood first and second in ranking regarding severity of consequences.

The main subsistence activity performed by the inhabitants in the area is cultivation of *pan*. It is one of the income sources in the area of most of the people. For *pan* of cultivation, the ecology of the area is seriously affecting. From the study, it was found that people used various types of natural resources which were procured from the surrounding environment. These materials are called the resource inflows which were needed to cultivate *pan*. For the cultivation of *pan*, water, thin bamboo from hills, rotten leaves and bushes, young tree or branch of trees, *chon*, twig of trees pesticides and fertilizers, wooden poles, thick bamboo etc. are used. Afterwards, *pan* is produced along with some materials as resource outflow. The inflow and outflow of *pan* can be diagrammatically seen in the following Figure 1.

The total score regarding the extent of ecological consequences due to maintaining *pan boroz* has been presented in Table 5. The extent of ecological consequences due to maintaining *pan boroz* was ranked from 1 to 5 on the basis of total score.

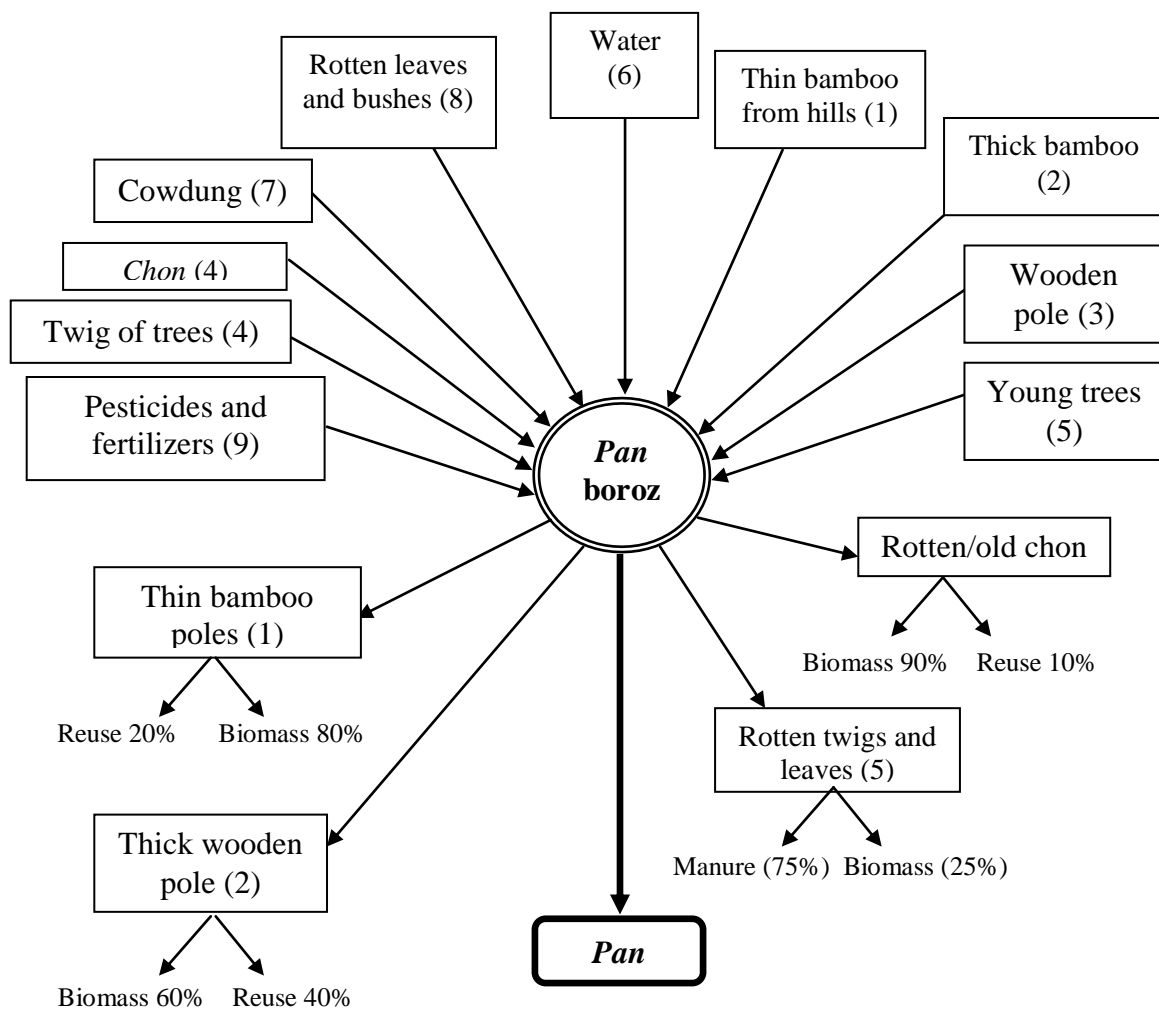


Figure 1. Resource Flow Diagrams (RGDs) of pan boroz for Marishbonia village

Table 5. Ranking of ecological consequences observed due to maintaining *pan boroz*

Consequences observed	Total score	Rank
Cutting down of trees from hills	320	1
Extinction of rare bamboo, bush and other tree species	318	2
Cutting down of hills to cultivate <i>pan</i>	275	3
Pollution of hill environment due to use of toxic chemicals	261	4
Pollution of hill environment due to use of toxic chemicals less fertility of hill foot soil	250	5

Table 5 revealed that “cutting down of trees from hills” is ranked on the first position because for the *pan* cultivation, people severely damage the forest people clear the forest land totally. “Extinction of rare bamboo, bush and other tree species” is ranked

on the second position because most cases bamboo field and bush land are also cleared.

The total score regarding the extent of ecological consequences due to cutting trees from the hills has been presented in Table 6. The extent of ecological consequences due to cutting trees from the hills ranked from 1 to 5 on the basis of total score.

Table 6. Ranking of ecological consequences due to cutting trees from the hills

Consequences observed	Total score	Rank
Decrease in hill tree species	302	1
Increase in <i>pan</i> cultivation	291	2
Decrease in wild animal population	190	3
Decrease in wild animal habitat	180	4
Increase in landslide	173	5

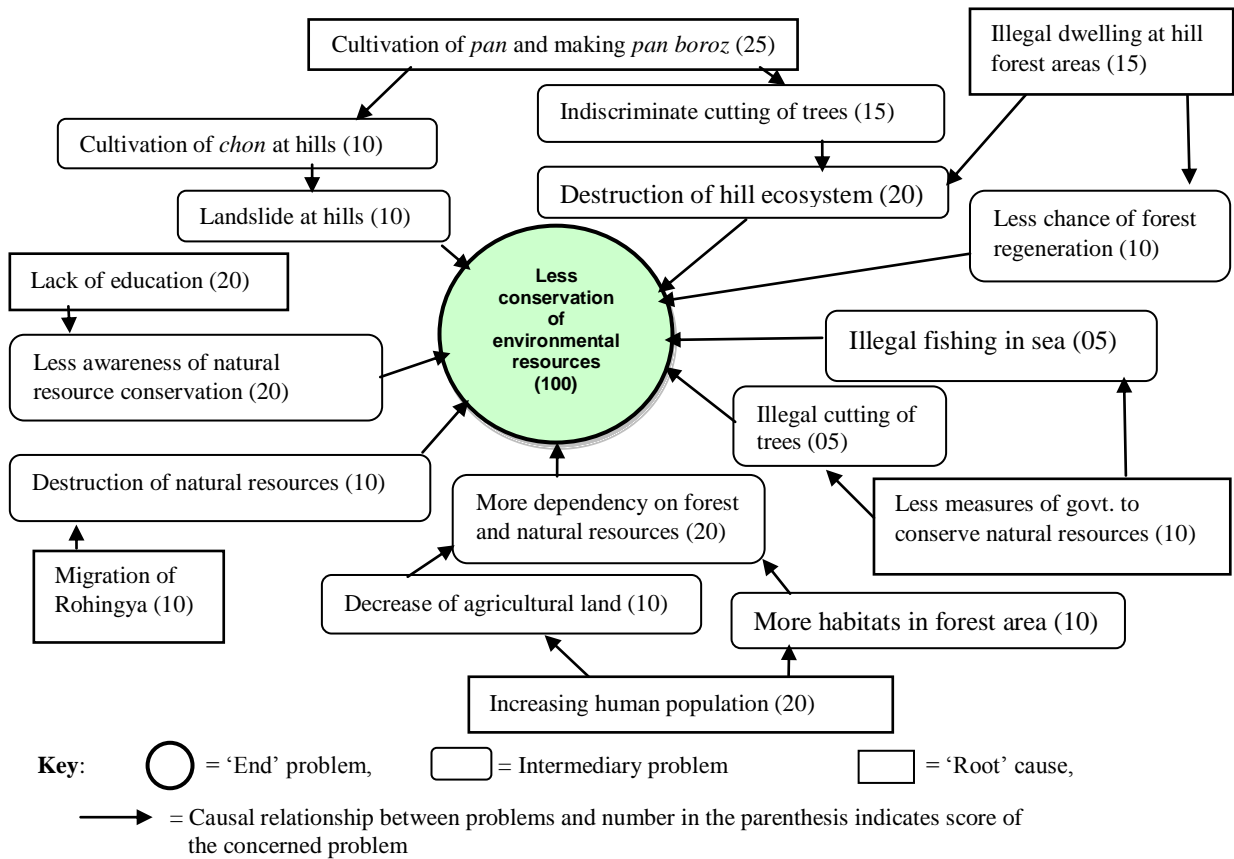


Figure 2. SCDs showing problems of environmental resource conservation

The Table indicates that 'decrease in hill tree species' ranked the first position. This occurs because people of the surrounding are cutting trees for their multifarious uses. 'Increase in *pan* cultivation' is under the second position as people are cutting trees for *pan* cultivation. Day by day it is increasing for earning good cash from *pan* cultivation. 'Decrease in wild animal population' ranked third as animals do not find much leaves these days of various tree species for their consumption.

Problem Confrontation by the People in Subsistence Activities: Poor conservation of natural resources was considered as the end problem for which the root causes and relationships among themselves were identified through group discussion (Figure 2). The major root causes identified were the cultivation of *pan* and making *pan boroz*, the lack of education, increasing human population, illegal dwellings in hill forest areas and the others. However, the cultivation of *pan* and making *pan boroz* was the most crucial problem coming out of subsistence activities of people. People are cultivating *pan* for higher and instant earning to change their living status. But the problem is that people do not cultivate *pan* in a sustainable manner and deteriorate the ecosystems of the area due to the lack of education and dare human needs.

Rich forests once nurturing wild elephants in the Teknaf Peninsula in Bangladesh have been mostly lost. The cause of this deforestation was not commercial logging or a large-scale development, but the accumulated effects of daily activities by the local residents. This paper examines human influences on the forest by cultivation of *pan* (Piper betel) for its leaves as an important cash crop. The betel cultivation is crucial for residents surviving in unfavorable conditions for agriculture. As those two ways of *pan* cultivation affecting the forest are assessed, each factor may contribute to the loss of 5% of the forest area in the village.

Most of the hill-forest areas of the area were government property. People entrance was extremely prohibited. But some types of people of the area illegally entered into the forest land and cut down all major trees which were very much important for the biodiversity of the area. Moreover, migrated *Rohingya* had taken shelter into the forest land. They first cut down the trees for making house and then cutting trees as their earning source because they had not enough work to do. Though the other root causes such as illegal dwellings in hill forest areas, migration of *Rohingya* and less measures of government to conserve natural resources bear less significance but these could never be overlooked.

CONCLUSION

The study area is very narrow surrounded by the sea and hill-forest land and population are increasing rapidly. Increased populations were taking shelter to the hill-forest areas by cutting the trees and hills. Moreover, increased number of *pan* cultivation and *chon* on the hills are accelerating the environmental degradation in the area. People of the area were using the natural resources without recycling management of the ecosystem. At this crucial stage of environmental degradation due to their subsistence activities, people need to pay attention so that they can protect their ecosystems of the area from the hands of danger in the future. Cultivation of *pan* and making *pan boroz*, lack of education and increasing human population were the major constraints confronted by the inhabitants in conserving the environmental resources.

The above mentioned problems were intermingled with each other forming a vicious complexity, which is not easy to overcome. Yet, these are to be eliminated or reduced by proper management practice and creation of awareness among the people. Thus, awareness, knowledge and skill should be developed among the people. Population must be controlled otherwise every efforts for conservation and development may go in vein. GO and concerned NGO should take this area under special consideration for the improvement, both the people and environment. Livelihood options alternative to forest and other natural resource destruction may resolve these critical problems of the area.

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