

Problems and Prospects of the Hilly Watersheds in Bangladesh: Priorities for their Conservation

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Abstract

The forests of the Chittagong Hill Tracts (CHTs) in the southeastern part of Bangladesh occupy about 30% of the nation's total forest area and represent the most valuable watersheds in the country. Their importance lies not only in providing soil and water conservation for sustainable natural resources management in this part of the country but also in supporting the shifting cultivation subsistence farming of 13 forest-dwelling indigenous communities. Traditionally, the communities practice a farming method called *jhum*, which involves cultivation of food crops in forest land through clearing and burning of undergrowth in the dry season, usually leaving a fallow period (3-15 years) between successive crops on the same piece of land. However, over the last two centuries land use in the area has undergone tremendous change, including the clear felling of forest trees to make way for establishment of mostly monoculture plantations of valuable timber species such as teak (*Tectona grandis*), fruit trees, and other economically important cash crops. Due to land scarcity and almost yearly flood havoc in other parts of the country, people have been migrating to the CHTs. Population explosion has necessitated an expansion and intensification of agricultural activities in the hilly landscape, which together with deforestation, is causing serious degradation of the watersheds. This in turn has contributed to severe soil erosion and deterioration of water quality. Bangladesh has lagged behind its neighbours in the promotion of watershed management largely because of a lack of attention from policy makers and major international development partners. However, increase in sedimentation and soil erosion in the CHTs in the last part of the twentieth century has significantly increased the level of concern within the government.

In some parts of the watershed forest user groups still maintain traditional *mauza* reserves or the Village Common Forests (VCFs) that serve various livelihood needs and are crucial for watershed management. Many VCFs contain the headwaters of streams, natural springs and other aquifers, and are large repositories of biodiversity. However, no attempts have been made by government agencies to formalise the management systems of these traditional bodies, and their number has been declining due to various factors affecting the hill peoples' livelihoods. This study was undertaken to explore the livelihood and resource conservation strategies of the people living in some of these areas by means of interviews with semi-structured questionnaires, and to critically assess the relationship between their indigenous knowledge of resource conservation and their livelihood patterns. The key focus of the study is to identify feasible resource conservation and livelihood techniques. The system is examined from a holistic point of view that includes biophysical and as socio-politico-cultural dimensions. The study carefully evaluates and compares the ethno-ecological knowledge and practices of resource management in the VCF with that in non-VCF areas, assessing the use of resources by VCF and non-VCF communities and examining their impact upon watershed conservation and local livelihoods. Existing plantation establishment and

forest management techniques are also compared. The indigenous techniques of cultivation such as terracing, minimum tillage, controlled burning of debris, mulching and gully control by vegetative cover appear to provide a time-tested and positive impact on soil and water conservation. The presence of a good understorey vegetation of many herbs with medicinal use and other plants is a primary indicator of good site conditions in VCF areas. In these the harvesting of forest products is only permitted for village internal use and not for commercial sale. Generally, people in the VCF communities were found to be meticulous in their gathering of forest produce or hunting of animals: they strictly maintain seasonality and do not harvest or hunt species in short supply.

The sustainability of the VCFs faces threats that include population pressure and scarcity of agricultural land. These will have to be met primarily by the villagers themselves, though external agencies can extend a helping hand. Awareness and capacity building seem to be the important ways of helping the VCFs retain their the sustainability. Ultimately, tenurial security will be crucial to their long term sustenance and will require the political support of the government.

Keywords: Chittagong Hill Tracts (CHTs); indigenous communities; ethno-ecology; mouza reserves; Village Common Forests (VCFs); jhum.

I. Introduction

With a population of 123 million and a land area of 14.757 million ha, Bangladesh is one of the most densely populated countries in the world (834 persons/km²) with a per capita land availability of a mere 0.12 ha (Mondal et al, 2004). Most of the land surface is formed by the delta and alluvial plains of the Ganges, Brahmaputra and Meghna rivers. Within the alluvial plains there are several slightly elevated areas of older alluvium called terraces. The highest areas are the hilly regions, consisting of a series of valleys and ridges varying in elevation between 70 and 1,000 masl on the northeast, east and southeast margins of the country. As Bangladesh is a lower riparian country, watershed management is an important component in the country's ecological and economic health. Although watershed boundaries are not very clear in the plains, they are well defined in the hilly areas as in Chittagong and the Chittagong Hill Tracts (Khan, 1991). Current environmental concerns in the region are rapid depletion of natural forest resources, land and watershed degradation due to improper land-use practices and the shortened rotational farming cycles. In combination, these factors cause soil erosion, siltation of lakes and rivers, and soil fertility decline, thereby creating food insecurity (Khisa et al, 2006).

1.1 Context of watershed conservation in the hilly areas of Bangladesh

Forests in the CHTs in southeastern Bangladesh account for about 30% of the nation's total forest area and represent the country's most valuable watersheds. Their importance lies not only in conserving soil and water for sustainable natural resources management in this part of the country but also in supporting subsistence farming for 13 forest-dwelling indigenous communities. This area consists of 77% sloping land and was once covered by natural forests (Roy and Halim, 2001) which were

principally used to support shifting cultivation. However, over the last two centuries land use has undergone a tremendous change with clear felling of forest trees to make way for the establishment of mostly monoculture plantations of valuable timber species such as teak and fruit trees, and other economically important cash crops. Due to land scarcity and almost yearly flood havoc in other parts of the country, people have been migrating to the CHTs. According to the latest census conducted in 2001, the population of the area was 1.06, or 0.14% of the national population of 129.25 million. Over a period of 50 years, population density in the area rose from 22 people/km² in 1951 to 78 people/km² in 2001, an increase of 355%. This population explosion necessitated an expansion of agricultural activities in the hilly landscape at the cost of preservation of the watersheds. Degradation of watersheds then accelerated due to the combined effects of deforestation and unsystematic slash and burn practices, contributing to severe soil erosion and deterioration of water quality.

1.2 Study area

The study was conducted in some critical areas of the CHTs where the forest user groups maintain traditional community-managed '*mauza* reserves' or Village Common Forests. VCFs are smaller forest enclosures (rarely larger than 40.5 ha) scattered throughout the CHTs. They are crucial for watershed management as many of them contain the headwaters of streams, natural springs or other aquifers, and are the homes of diverse animal and plant life (including herbs and plants used in indigenous medicine) which have significant potential for medical science. As access to Forest Department (FD) controlled reserved forests is restricted, VCFs are the hill villagers' main sources of wood and bamboo for house building, medicine and other needs. So far no attempts have been made by government agencies to formalise the management systems of VCFs, which have been declining both in number and in size.

2. Scope and methodology of study

2.1 Scope

The key focus of the study was to explore indigenous resource conservation and livelihood techniques by looking at systems from a holistic point of view that includes biophysical and socio-politico-cultural dimensions. No systematic attempts have previously been made to assess the potential of resource conservation through communities in the VCF areas, and the relationship between VCF resources and people's livelihoods is not well understood. Therefore, this study looked at the relationship between indigenous knowledge of resource conservation and livelihood patterns, carefully comparing and evaluating ethno-ecological knowledge and practices of resource management as well as their impact on watershed conservation and local livelihoods. Existing techniques of plantation establishment and forest management practices were compared among VCF and the non-VCF communities.

2.2 Methodology

From October to December 2006 interviews with pre-tested structured questionnaires were conducted with 120 households from four VCF villages, two each from Rangamati and Banderban districts. These collected information on livelihood and conservation approaches. An additional 40 non-VCF households (those not directly dependent on VCFs) were also interviewed with same questionnaire.

3. Key issues and problems in watershed management

3.1 Reserved forests and Jhum

Traditionally, the communities practice a farming method called *jhum*. This basically involves cultivation of food crops in forest land through clearing and burning of undergrowth in the dry season, usually leaving a certain fallow period of 3-15 years between successive crops on the same piece of land. However, population pressure and the inclusion of *jhum* land in reserved forest has necessitated higher production from an ever shrinking land base. This has gradually shortened the fallow period to as little as two or one years, contributing to a sharp decline in productivity and deterioration of the forest ecosystem.

3.2 Monoculture plantation versus mixed cropping

Successive governments leased out big chunks of forest land for cultivation of monoculture crops such as rubber and other horticultural species. These deals were often based on economic considerations only, and ignored traditional user rights and values. Ethnic communities were also encouraged to implement monoculture farming strategies through land allocation policies. Subsequent unsystematic tillage on the hill slopes for establishment of monoculture plantations has led to serious land degradation.

3.3 Use and exploitation of natural resources

The extent and intensity of exploitation of natural resources in the hills is an important controlling factor in the conservation of watersheds and sustainable livelihoods. Seasonality of resource extraction and harvesting of forest produce is crucial to the food security of the inhabitants and plays a key role in controlling soil and water quality.

3.4 Cultural operations and plantation establishment techniques

Land preparation prior to establishment of monoculture plantations involves uprooting of tree stumps and burning of debris on the forest floor. In the clear-felled former forests this leads to serious soil erosion and depletion of soil moisture. The most serious problem with regard to gardening, particularly of pineapple citrus fruits, and some root crops such as ginger and turmeric, is the direct exposure of the soil surface to heavy downpour and surface runoff. This results in top soil erosion, which causes gradually diminishing harvests of the concerned crops, and ultimately also renders the land virtually useless for further cultivation or plantation purposes.

3.5 Apathy of government agencies

Bangladesh has lagged behind neighbours such as Nepal and Thailand in the promotion of watershed management, largely because the subject failed to receive adequate attention from the relevant policy makers or major international development partners. The recent increase in sedimentation and soil erosion in the CHTs since the end of the twentieth century has significantly increased the level of concern in the government. The FD plans to introduce participatory agroforestry in the degraded lands in the near future, through adopting uniform cropping models that may not be suitable to the heterogeneous landscape conditions of the CHTs and could therefore create further environmental problems for the indigenous communities.

4. Key results and lessons

4.1 VCF management

Since 1900, VCFs have presented excellent examples of traditional forest management by the indigenous communities in the CHTs. A committee headed by the *karbari* (village head) manages the VCF according to customary rules and laws. The natural forest land under the VCF is never used for *jhum* cultivation. Harvesting of forest products from the VCFs is only permitted by the village leader on the basis of a collective decision from the committee members and only when there is demand for the internal use of such products, and not for commercial sale or individual cash earning. Usually, timber is not extracted from VCFs except when required for community uses such as the construction of schools or prayer centres. However, the harvest of firewood, culinary herbs and non-wood products such as bamboo is permitted. Very poor villagers, who cannot afford to buy house construction materials, are given special consideration by the VCF management committee to harvest wood, bamboo and sun grass. Generally, forest resources are open to all households in the community but everyone requires permission from the VCF management committee. One striking example of plant conservation practiced by the communities is that only the local *kabiraj* or medicine men who treat the sick are permitted to enter VCFs for the collection of medicinal herbs.

4.2 VCF as a means of conservation and livelihood

The presence of good understorey vegetation consisting of many herbs and other plants is the primary indicator of good site conditions prevailing in the VCF areas. These understoreys are helpful to soil and water conservation. In some places, communities are totally dependent on VCFs to sustain the water flow of perennial streams so as to meet year round water requirements. Besides VCF management, the indigenous techniques of *jhum* cultivation such as terracing, minimum tillage, controlled burning of debris, mulching and gully control by vegetative cover appear to have a time-tested and proven positive impact on soil and water conservation. Generally, people in the VCF communities have been found to be more meticulous in gathering forest produce or hunting animals than those in the

non-VCF communities. They do not harvest or hunt anything in short supply and strictly maintain seasonality in harvesting, thereby helping the regeneration of these resources and securing their conservation. VCFs do not appear to satisfy all the livelihood needs of the communities because most family members have to work as daily wage-labourers. Some practice *jhum* for subsistence and a few depend on government food subsidies for their staple food supply (rice). However, annual overhead costs towards construction and repair of houses are largely offset through the harvesting of house construction materials from the VCFs. Gathering of culinary and medicinal herbs from the VCFs remains a year round activity and provides essential supplements to the communities' dietary and medicinal requirements. In some cases, pressure on VCFs in response to an increased demand for forest produce by the communities is posing a threat to their long term sustainability.

4.3 Enhancing livelihood opportunities for the VCF communities

To reduce the growing pressure on VCFs caused by increased collection of forest produce, it would seem feasible to develop appropriate farming technologies in line with indigenous knowledge. Respondents who were familiarised with 'Sloping Agricultural Land Technology', particularly from those Banderban, appeared to show an interest in these techniques which help the formation of natural terraces through gradual stabilisation of soil by farming contoured lines of hedgerows of suitable plants among forest trees.

4.4 Policy implications of research results

This study demonstrates that there is a huge potential for VCFs in the conservation of forest, soil and water in some critical locations, and that there is a wealth of indigenous knowledge and cultures involved in management of these resources. While many government projects have so far failed to address land degradation problem in most parts of the CHTs, many VCFs still stand protected against degradation without support from such projects. VCFs could certainly act as models of resource conservation in the degraded hilly landscape. However, a big constraint to these community forests is lack of tenure security, especially in view of the pressure from the FD to acquire the land for monoculture plantation purposes. This trend must change, and the existence of VCFs needs to be formalised within the context of the land use policy for the hilly areas of the country. In addition, government and non-government agencies should take measures for raising the socio-economic conditions of indigenous communities and encourage them to take responsibility for the rejuvenation of the already deteriorating VCFs.

5. Conclusions and recommendations

The communities in the CHTs require the forests for their livelihoods. Besides depending on *jhum* as the principal means of sustenance, they need bamboo poles, canes etc. to repair their houses, firewood for domestic consumption, medicinal plants for their health, and many other minor forest

products as part of their daily diet. These resources are gradually shrinking with the decrease in forest. VCFs are not recognised by government agencies and there is no technical and financial support from any government department to maintain them. The important role of these community protected forests in the livelihoods and cultures of indigenous communities should be recognised, including their function in local water supply protection and as a social safety net for the poorest. Therefore if VCF areas can remain protected, by helping the communities looking after them to achieve better living conditions, the hilly watersheds may in part save themselves from further degradation. The long-term sustainability of these VCFs will depend upon how useful the local communities feel these forests are to their everyday lives. Given the rising prices of timber and bamboo, the economic justification for VCFs will likely remain for a long time yet. The main threats to the sustainability of VCFs are population pressure and scarcity of agricultural land. This problem will have to be met primarily by the villagers themselves although external agencies can extend a helping hand. The fact that VCFs have survived for such a long time, despite their gradually diminishing area, suggests that some communities can sustain their VCFs while others fail. Lessons will have to be drawn from these successes and failures. Awareness and capacity building seem to be important measures for helping sustainability of the VCFs, but ultimately tenurial security might prove to be the crucial factor in their long-term sustenance. This issue will require the political support of the government.

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