<u>Project Interim Report 2</u>

Project title:

Monoculture Plantations in Bangladesh: Consequences for Biodiversity Conservation and Rural Livelihoods

Project Site:
Lawachara Protected Area, Bangladesh

Project ref. no: **10669-2**

July, 2013

by:

Mohammad Belal Uddin, PhD
Department of Forestry and Environmental Science
School of Agriculture and Mineral Sciences
Shahjalal University of Science and Technology
Sylhet -3114, Bangladesh.
email: belal405@yahoo.com / belal-for@sust.edu
Website: http://www.sust.edu/for/teachers.html

Monoculture Plantations in Bangladesh: Consequences for Biodiversity Conservation and Rural Livelihoods

Introduction

Monoculture plantations in Bangladesh were raised mostly with exotic species. They have both advantages and disadvantages with respect to biodiversity conservation and security of rural livelihoods. This second interim report will concentrate on the security of rural livelihoods as the first interim report was made on biodiversity conservation. Based on mono-plantation literatures, they have mixed effects on conservation of local livelihoods. Since, last few decades, plantation forestry in Bangladesh had been built up with monoculture plantations. Therefore, the aim of this study was to determine the effects of mono-plantation on rural livelihood conservation. This study will help the forest and natural resource managers to design a proper and sustainable nature conservation plan for the future which will conserve biodiversity in one hand and secure rural livelihoods on the other. These anticipated outcomes from this project will help the policy makers providing necessary and relevant information to formulate nature conservation related policies for Bangladesh in the face of global climate change!

Hypothesis

I test the hypothesis that livelihood benefits vary with ecosystems characterized with mixed natural forests and monoculture plantations.

Materials and Methods

The study was conducted in Lawachara Protected Area (Figure 1) which is situated in north-eastern region of Bangladesh. This region has a good combination of mixed natural forests and monoculture plantations. A semi structured questionnaire was designed to collect information about the dependency of villagers on monoculture plantations. It included the operational characteristics of the respondents such as educational status, livelihood activities and their dependency level on forest resources from those plantations etc. There are 14 villages in and around the Protected Area. From them two villages were selected namely *Magurchara Punji* and *Dokkhin Baligaon* purposively. The *Magurchara Punji* was inhibited by *Khasia* tribes and *Dokkhin Baligaon* by local people. There are about 40 households (HHs) and in *Dokkhin Baligaon* about 60 HHs. From *Magurchara Punji* total 12 HHs and from *Dokkhin Baligaon* 18 HHs were selected purposively with 30% sampling intensity. After collecting data from the respondent survey, necessary and relevant data information was set aside for analysis of the data and to avoid unnecessary information. The data that taken for the data analysis were, education level, housing pattern, occupation,

dependency on forest for fuel wood collection, fruit collection, medicinal plant collection, NTFPs collection etc. of the villagers. Then the percentage uses of mono plantation species were compared with the percentage uses of indigenous plantation species. Finally, it was revealed from the analyses that how do the monoculture plantations play role on rural livelihoods.
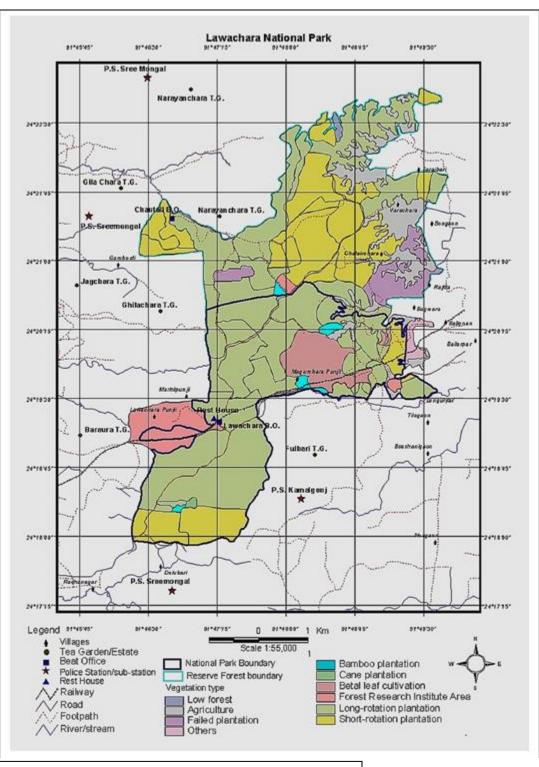

Figure 1: Map of the study area

Results and Discussion

Dependency of the Local People on Monoculture Plantations for Livelihood

Family Size:
Total number of household found in *Magurchara Punji* was 40 and 12 households were surveyed with a population 59. Of the total population 52.54% was male and 47.46% was female. Average family size is 4.92. In *Dokkhin Baligaon* total household found 60. From them 18 households were surveyed with the population of 92. Average family size was 5.11. Of the total population 41.30% was male and 58.70% was female. These family sizes in the study area reveal the dependency of local people on forest resources both from mixed and mono-plantation for their livelihoods.

Occupation:
Main occupation of the forest villagers of *Magurchara Punji* is betel leaf cultivation. Some are involved in lemon cultivation, small business, fisheries etc. Betel leaf cultivation is the traditional occupation of *khasia* community (Figure 1). It is their primary occupation. 83% people do lemon cultivation as their secondary profession. About 58% people collect fuel wood from the forest for their livelihood, which is their secondary profession. Most of the fuel wood is collected from the exotic mono-plantations, as exotics perform well as fuel wood.
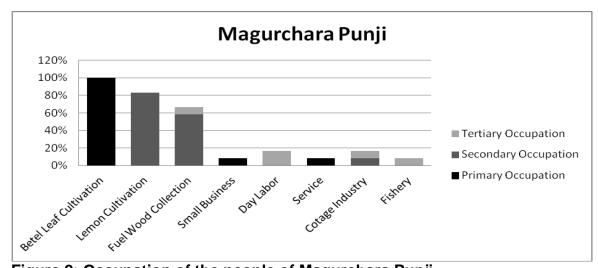

Figure 2: Occupation of the people of Magurchara Punji

People living in *Dokkhin Baligaon* are mainly poor comparing with the people of *Magurchara Punji.* About 94% people collect fuel wood as their primary occupation (Figure 2). 11% people are involved in small business as their primary occupation. They also involved in betel leaf collection, honey collection, cottage industry, fisheries etc. as their secondary and tertiary occupation.

As most of the people (94%) in *Dokkhin Baligaon* and About 58% people in *Magurchara Punji* involved in fuel wood collection as their primary occupation

(Figure 2 and Figure 3), so they are mainly dependent on forest resources. Most of the fuel wood (74.09%) comes from forest (Figure 4). These findings show one of the major livelihood roles of mono-plantations in the study area. By the study it has been also found that, people have more interest in monoculture plantation than indigenous plantation regarding fuel wood collection.
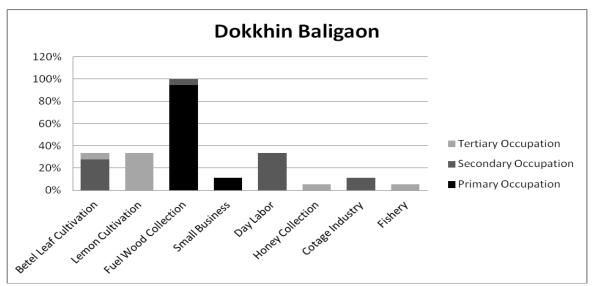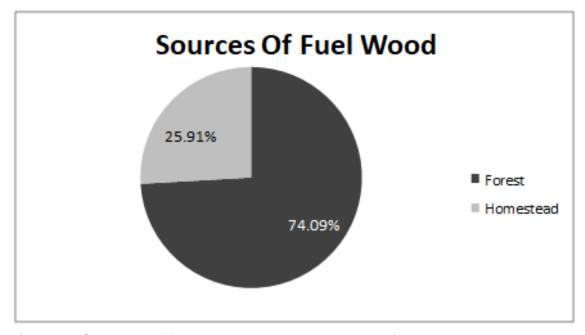

Figure 3: Occupation of the people of Dokkhin Baligaon

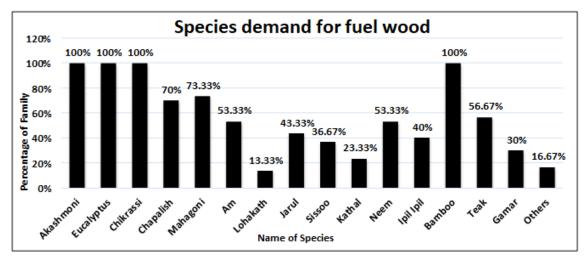**Figure 4: Sources of fuel wood consumed by the villagers**

Figure 5: Species demand for fuel wood in the village

As the availability of mono-plantations is higher than the mixed ones, so people collect maximum fuel wood from exotic trees from these mono-plantations (Figure 5). About all the villagers collect fuel wood from *Acacia spp., Eucalyptus spp., and Chikrassia spp.* trees. There are also demands for *Swetenia mahagoni, Tectona grandis, Gmelina arborea, Artocarpus spp., Lagerstroemia speciosa* etc. species for fuel wood. So, for fuel wood collection villagers prefer exotic species in mono-plantations more than indigenous species. It is true because of their have high fuel value and fast growing characteristics.

Medicinal Plant Use:
Bangladesh has vast resources of medicinal plants. These plants have been used for human welfare, producing medicines and also used for raw materials for fragrance and cosmetic production. As most of the people in Bangladesh live under poverty line, so sometimes they do not afford to buy medicines from the shop, so they collect medicinal plants from forests or from their home garden and utilize them on behalf of drugs. Many modern pharmaceutical companies also used medicinal plants for producing drugs. About 7 species are commonly used by the villagers of *Magurchara Punji* and *Dokkhin Baligaon.* Some other species are also used. Some of the villagers have knowledge about which species should be used for any particular disease, but rest of others use medicinal plants for their diseases without knowing that species will work on that disease or not.
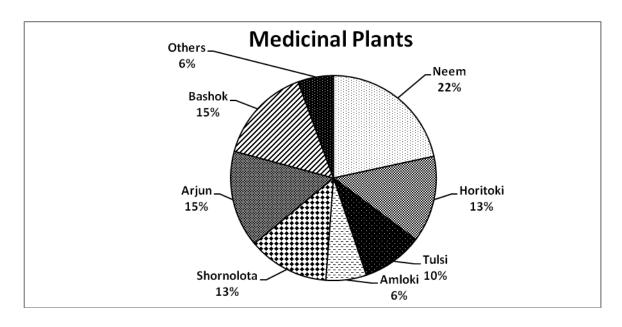
Figure 6: Medicinal Plants used by the villagers

Villagers collect the medicinal plants from both exotic mono-plantations and indigenous plantations. Some species like Neem (58.62%) and Arjun (63.33%) are mostly collected by the villagers from exotic plantations. Other medicinal plants like Horitoki (70%), Tulsi (53.33%), Amloki (62.50%), shornolota (71.43%) and Basok (76.47%) are mostly collected from indigenous plantation. So for medicinal plants based rural livelihoods, villagers are dependent on both indigenous plantation and mono-plantations to a great extent.

Table 1: Sources of medicinal plants

Name of the species (Local)	Sources	
	Exotic Plantation	Indigenous Plantation
Neem (*Azadirachta indica*)	58.62%	41.38%
Horitoki (*Terminalia chebula*)	30%	70%
Tulsi (*Ocimum sanctum*)	46.67%	53.33%
Amloki (*Phyllanthus emblica*)	37.50%	62.50%
Shornolota	28.57%	71.43%
Arjun (*Terminalia arjuna*)	63.33%	36.67%
Bashok (*Adhetida vasica*)	23.54%	76.47%
Others	33.33%	66.67%

Monoculture Plantation from the aspect of livelihood:
From the study it was found that, for livelihood villagers prefer both mixed plantations and mono-plantations. However, in some cases they are prone to mono-plantation raised by exotic species due to their fast growing capacity, ability to grow in any harsh condition, high market value as fuel wood and timber. For collection of fruit, medicinal plants they are dependent on both indigenous and exotic species. People also found problem for collecting fodder for their livestock. No matter how much the poor people need exotic species for their livelihood, but they are not ignoring the importance of indigenous species for their daily life. Most of the villagers said, they prefer both exotic and indigenous plantation. But as they have evaluated that the rate of regeneration under exotic plantation is less than indigenous plantation, so they suggested indigenous plantation mixed with exotic plantation.

Conclusion

This project is expected to lead country's first attempt to identify the patterns of monoculture plantations and their effects on rural livelihoods. These methodological approach and the experiences from this study will help forest managers, planners and policy makers to design a biodiversity and natural resource conservation plan which will control the conversion of forests into monoculture plantations, optimize biodiversity and nature conservation through ensuring people needs. As conversion into monoculture plantations is a human induced environmental change, this study will also help to improve local and regional environmental conditions.