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Tobacco cultivation in Bangladesh: is it a threat to traditional agro-practice?

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The impacts of tobacco cultivation on traditional agro-practices and knowledge, food security, agro-biodiversity and socio-economic conditions of a remote hilly tribal community of Bangladesh were investigated. Sixty per cent households were found practicing shifting cultivation compared with 10 yrs back changing local food availability. Local crop varieties were being lost due to low cultivation and weak seed preservation system. Despite better benefits from traditional cultivation, 90% people now fully depended upon tobacco cultivation for significant cash flow at a time. Increasing dependency upon tobacco cultivation is apparently making people economically vulnerable due to potential low sustainability.

Keywords: Agro-biodiversity; Chittagong Hill Tracts; Cropping pattern; *Jhum*; Shifting cultivation; Sustenance

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Over the last few decades, world tobacco consumption, production and trade have increased steadily [1]. In Asia and Oceania, the proportion of tobacco in global production has been increasing constantly: from about 30% in the 1950s to about 63% at the end of the last century[2]. In Bangladesh, although the tobacco acreage has decreased from 32,822 ha in 1997-98 to 29,377 ha in 2007-08 with a slight increase in the production from 36,655 MT to 40,248 MT[3,4], tobacco cultivation has been increasing day by day in certain parts of the country. The south-eastern hilly region of Bangladesh, the Chittagong Hill Tracts (CHT), is one of those regions. In Bandarban district of CHT, 127 ha of land was under tobacco cultivation in 1995-96, but 12 yrs later this figure has increased by more than 11 times (1,437 ha)[3,4].

The CHT is the homeland of 13 ethnic communities[5]. Their livelihoods depend upon subsistence agriculture in the form of *jhum* cultivation (shifting or slash and burn cultivation) – the core of hill economy[6]. This agro-practice is currently struggling to sustain because of low productivity due to shorter crop cycles, limited availability of land for cultivation, and increased population pressure. Nonetheless, in the recent years, adoption of highly profitable tobacco cultivation by local people has given a new dimension in the changing trend of *jhum* cultivation. In Bandarban, the tendency to undertake tobacco cultivation in lieu of *jhum* cultivation by the indigenous community appeared to be significantly high compared with the other hill districts (Rangamati and Khagrachhari). There is, however, limited published information on the impacts of tobacco cultivation on traditional agro-practices in the CHT, and in Bangladesh in general[7,8]. A study was, therefore, undertaken in Bolipara union of Bandarban to elucidate,

1 Changes in cropping pattern due to tobacco cultivation over the last 10 yrs and its impact on food security,
2 Impacts of tobacco cultivation on agro-biodiversity and environment,
3 Impacts of tobacco cultivation on socio-economic conditions, and
4 Sustenance of tobacco cultivation.

Methodology

The investigation was carried out in the first half of 2009 in Bolipara union of Thanchi upazila (longitude

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21º78', latitude 92º42'), Bandarban. About 10,300 people living in Bolipara belong to several ethnic communities; but *Marma* is the dominant one. Family size in the study community ranged from 2-9 people/family (average 5 people/family). About 50% of the knowledge providers were found to be illiterate.

Information was primarily gathered through semi-structured questionnaire survey, one-to-one discussions, and focus group discussion (FGD) during a number of field visits. Fifty households of the union who are currently cultivating tobacco were randomly surveyed with the questionnaire. One-to-one discussions were conducted with elderly persons, Headman (head of *mouza* or village, made up of several *para*) and *Karbari* (head of *para*) of the community, and a few local NGO staff members. An FGD was conducted with the tobacco farmers and general mass. Prior informed consent was taken from the knowledge providers. Secondary information was collected from different books and published journals, and relevant literature was collected from local Department of Agriculture Extension (DAE) office and Forest Range office. On the field trips, local indigenous NGOs introduced the authors to the knowledge providers and helped to gather information. Owing to limited resources, scope and time for the present study, the authors could only conduct a few trips to the study area and could stay for a short while with the informants to collect information. A compilation of the gathered knowledge and findings were shared with the knowledge providers in their local language in a local level meeting.

Results

Shifting cultivation vs tobacco cultivation

The study revealed that the local people had changed their traditional cropping pattern over the last decade. Six out of 10 families are now practicing *jhum* cultivation for crop production, but 10 yrs back all used to do it. Before 2000, the average area for *jhum* cultivation was 1.5 ha/household, which is now reduced to 0.6 ha/household. On the other hand, nine out of 10 families are now fully dependent upon tobacco cultivation. Almost all of them have no land for tobacco cultivation, thus rent land from local landlords, neighbours and close relatives. On an average 1.5 ha/household are rented for tobacco cultivation. The study also showed that about 90% households started tobacco cultivation 5-9 yrs ago.

Two main reasons were suggested by the people explaining the shift in agricultural practices: (1) the benefit from *jhum* cultivation is not sufficient now, and (2) by cultivating tobacco more income is possible. Our survey, however, showed that, in terms of income, tobacco cultivation gives people significant sum of money at a time than *jhum* cultivation, but if we compare these two cultivation regimes on the basis of net profit, the *jhum* cultivation is much more beneficial than tobacco cultivation because of much low input costs (Table 1).

Changes in cropping pattern and food security

In the past, all the families depended upon *jhum* cultivation to meet their daily food demand, but now only 60% families did so. About a decade back local people cultivated 32 types of crop in high proportion (Table 2), which have greatly declined in number as well as in extent (Fig. 1). At present, in the local market only a few crops are found, as people cultivate only some essential crop items in small amounts. As understood from the FGD, tobacco cultivation affected the local vegetable production by reducing arable space. Given the low supply of vegetables in the local market, vegetable price has gone up in the recent years.

The average annual income of the surveyed households was about US$ 2,100 (in 2009). Almost all the surveyed farmers currently also practicing *jhum* cultivation said that the present crop production was not sufficient to support their family needs. Hence, on average they had to spend US$ 900/household/yr in buying extra food. Around 40% of the surveyed households at present do not produce any food on their own, and spend on average US$ 1,480/household/yr from the earning of tobacco cultivation to purchase food.

Table 1—Comparison between *jhum* cultivation before 2000 and in 2009, and tobacco cultivation in 2009 in Bolipara, Bandarban on the basis of input, output and net benefit (mean ± standard deviation), n = 50; US$ 1 = 69 Bangladeshi Taka

Cultivation type	Input (US$/ha)	Output (US$/ha)	Net benefit in US$/ha (approx. %)
Jhum cultivation before 2000	243 ± 61	541 ± 290	298 (123)
Jhum cultivation in 2009	375 ± 195	718 ± 368	343 (91)
Tobacco cultivation in 2009	1,560 ± 225	2,638 ± 271	1,078 (69)

Tobacco cultivation, agro-biodiversity and environment

Tobacco cultivation has also shown some significant impacts on local agro-biodiversity. At present, 92% families were found not storing crop seeds anymore for *jhum* cultivation. But 10 yrs back, every family used to preserve their own seeds for the following year. Most of the households (about 60%) now bought seeds from the local markets, neighbours and friends who still practice shifting cultivation. This indicates a serious negative change in traditional means of seed preservation.

The local people quite interestingly mentioned that tobacco cultivation has negative impacts on the environment. All the people consulted said that tobacco farming reduces soil fertility, soil becomes very hard, other crops do not grow well (e.g. rice gets damaged before ripening), and increases soil erosion, diseases and water pollution. A few even mentioned that fishes found dead near the tobacco fields. The people admitted that they did not get any idea about environmental impacts of tobacco cultivation from the local DAE office, NGOs or the tobacco companies sponsoring them. The people therefore realized the mentioned impacts from their own observations and assumptions, and also from their neighbours, relatives and friends.

Table 2—Crop varieties used to be cultivated in *jhum* cultivation in 2000 in Bolipara, Bandarban. Scientific names are as per Tropicos.org (Missouri Botanical Garden; retrieved on 06 May 2010; http://www.tropicos.org)

Common name	Scientific name	Common name	Scientific name
Onion	*Allium cepa* L.	Five leaf yam	*Dioscorea pentaphylla* L.
Chinese amaranth	*Amaranthus retroflexus* L.	Cotton	*Gossypium herbaceum* L.
Elephant foot yam	*Amorphophallus paeoniifolius* (Dennst.) Nicolson	Bottle gourd	*Lagenaria siceraria* (Molina) Standl.
Pineapple	*Ananas comosus* L. (Merr.)	Snake gourd	*Luffa amara* Roxb.
Indian spinach	*Basella alba* L.	Tomato	*Lycopersicon esculentum* Mill.
Wax gourd	*Benincasa hispida* (Thunb.) Cogn.	Bitter gourd	*Momordica charantia* L.
Mustard	*Brassica juncea* (L.) Czern.	Banana	*Musa paradisiaca* L.
Turnip	*Brassica rapa* L.	Rice	*Oryza sativa* L.
Chili	*Capsicum annuum* L.	Pea	*Pisum sativum* L.
Papaya	*Carica papaya* L.	Sesame	*Sesamum indicum* L.
Melon	*Cucumis melo* L.	Eggplant/Brinjal	*Solanum melongena* L.
Muskmelon	*Cucumis melo* L. (a local var.)	Potato	*Solanum tuberosum* L.
Cucumber	*Cucumis sativus* L.	Black gram	*Vigna mungo* (L.) Hepper
Pumpkin	*Cucurbita maxima* Duchesne *ex* Lam.	Cowpea	*Vigna unguiculata* (L.) Walp.
Turmeric	*Curcuma longa* L.	Maize	*Zea mays* L.
Winged yam	*Dioscorea alata* L.	Ginger	*Zingiber officinale* Roscoe

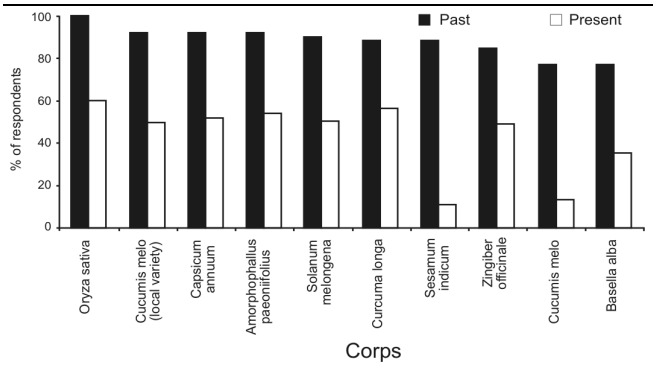

Fig. 1 – Percentage distribution of 10 major crops cultivated by the respondents (n = 50) in the past (2000) and at present (2009) in Bolipara, Bandarban

Socio-economic conditions vs sustenance

Tobacco cultivation indeed has visible social and economic implications in the study area. It has changed the society by enhancing cash flow in the local economy over a brief period of time. All tobacco farmers said that they have uptaken tobacco cultivation for better income for their families. Around 70% farmers further emphasized on an intention to change their present socio-economic status. After adopting the tobacco cultivation people appreciated some marked changes in their lifestyle (multiple responses considered): purchasing more food than earlier (when only *jhum* cultivation was practiced) (96%), sending children to school (92%),

purchasing new cultivable land (80%), building new houses (72%), reconstructing old houses (60%), purchasing domestic animals (cows, goats, pigs, ducks, etc.) (46%), and refurbishing houses (8%). Therefore, tobacco cultivation has proven to be an important alternative livelihood option for the *Marma* community of Bolipara.

Nonetheless, tobacco cultivation has an indirect impact on the labour market of the locality. The labourer wage for tobacco cultivation (US$ 3.60 /person/day) is more than double than any other activities. This has increased the overall demand of daily labourer wage in the area, but reduced the availability of labourer for other jobs. Similar indirect impact can be seen in the local fuel market as well. The price of fuel wood has gone quite up because of high demand of fuel wood for curing tobacco leaves.

Now the question is how sustainable this livelihood option is?

The present study drew a rather gloomy picture of the sustenace of tobacco cultivation in the area. The local farmers do not invest any cash in tobacco cultivation. The tobacco companies operating in the area give loan to these farmers for cultivation, by which the expenses of seed, fertilizer, pesticides irrigation, labour, etc. are met. In return, the farmers are bound to sell their produce only to those companies at the rates fixed by them. Although the farmers get good sum of money at a time for tobacco cultivation, with increasing number of contract growers the situation is changing. This in turn has made the local community start thinking about the future of this farming practice. People of the study area indicated that due to rapid increase in competition among farmers, increase in production cost, sudden unexpected rainfalls and consequent potential reduced benefit, tobacco cultivation would not sustain in the long run. Specifically, around 60% of the respondents said that this practice would sustain another 10-15 yrs. If tobacco cultivation does not sustain long, some farmer said that they would again get involved in *jhum* cultivation, some said in business, and some yet to know what they will do in case of such failure.

Discussion

In this dynamic world, change in livelihood pattern is now driven by better economic benefits for better living condition rather than sustenance or security of embraced options. Under such situation, traditions and norms may often become weak before the demand of economic betterment. Sponsorship from large agencies with attractive arrangements only promote such drive, as seen in the CHT of Bangladesh with the spread of tobacco cultivation in the recent time.

The present study has highlighted the impacts of tobacco cultivation on traditional agro-practices and knowledge, food security, agro-biodiversity and socio-economic conditions of a remote community. It has clearly indicated the recent changes in food availability in the study area, alteration in food habit of the local people, changes in demand-supply chain of *jhum* crops, new dimension in resource generation and utilization at household level, like buying food instead of growing it, and subsequent significant impacts on local food and nutritional security regime. In depth study on the changes in nutritional status of the area was not the scope of the present study. But, such study could shed some light on the overall nutritional regime as impacted by large-scale change in agriculture of an area.

A rapid loss of genetic diversity in agricultural crops is also evident in the study area because of cultivation of lesser number of local crop varieties and low preservation of the local seeds. Like other parts of the CHT, people of Bolipara used to wait for decades to cultivate the same piece of land as a part of their *jhum* cultivation tradition. But in the recent years, this interval has reduced to as low as 2-3 yrs. The main reason behind it is decline in arable land as it is now used for housing and other purposes. Although production is not as high as earlier, repeated cultivation in the same land has become unavoidable. Under this situation, tobacco cultivation further reduced the cropping area.

The study highlighted people's perceptions on possible impacts of tobacco cultivation on the local environment, but could not ascertain this. It is also possible that the respondents gave the above-mentioned pro-environmental information because the data collectors were working for an environmental organization in the area. Nonetheless, empirical evidence is needed to validate impacts of tobacco cultivation on the surrounding environment. There are, however, reports on indirect impacts of tobacco cultivation in the CHT, like use of fuel wood from the local reserve forests for curing tobacco leaves[9]; which is also seen in other parts of the world, e.g.

Tanzania[10,11]. Other indirect environmental impacts are due to high water-demand and need for large amount of fertilizers and pesticides in tobacco fields[12].

Because of increased dependency upon tobacco cultivation and its apparent low sustainability, the people of Bolipara are becoming economically vulnerable. If people start to go back to traditional *jhum* cultivation, low availability of local crop varieties and change is soil due to high application of fertilizers and pesticides would certainly affect the crop production. Limited knowledge on the impacts of tobacco cultivation among the local service providers, and inadequate communication between them and the farmers is making the situation worse in terms of knowledge flow.

Under these circumstances, three specific suggestions are noted below to guide the future course of action.

1 Studies are needed to further explore the impact of tobacco cultivation on traditional knowledge & practices and long-term socio-economic conditions of the local people, and on agro-biodiversity, soil fertility and ecosystems in the CHT.

2 Local communities should make more aware of tobacco cultivation, its possible impacts on their lives and its sustenance as a livelihood option.

3 Proper guideline from the government is essential to extend tobacco cultivation, including crop zoning.

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