An Ethnographic Enquiry into the Adoption of Contour Hedgerow Intercropping Agroforestry Technology by the Farmers in the Chittagong Hill Tracts, Bangladesh

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Introduction

In recent years, shifting cultivation has largely failed to support farmers' livelihoods because of rapid population growth, scant and degraded soil and forest resource bases, a shortened rotational cycle of production, and changing demands and lifestyles (Khan and Khisa 2000). Contour hedgerow intercropping agroforestry technology (CHIAT) has been widely promoted in many parts of Asia to minimise erosion, restore soil fertility, and reduce poverty (Partap and Watson 1994). There has been great enthusiasm for CHIAT in Bangladesh, and the Chittagong Hill Tracts Development Board (CHTDB) fielded the Upland Settlement Project (USP) during the mid 1990s with a mandate to popularise CHIAT and associated technologies in the locality.

Notwithstanding the enthusiasm, however, the adoption rate of CHIAT by farmers has lagged far behind expectations. This article reports on the experience of the Upland Settlement Project (USP), a community focused land management and agroforestry programme, and its attempts to introduce and disseminate CHIAT in the Chittagong Hill Tracts (CHT) of Bangladesh. The project attempted to rehabilitate and develop some impoverished ethnic farmers who had hitherto been engaged in 'jhum' (shifting cultivation). This paper looks at selected dynamics of the adoption of CHIAT by the USP farmers.

Methodology

Under the USP, 1000 families have been resettled in 20 purposely developed project villages in the districts of Khagrachari and Bandarban (for an introductory account of USP, see Khan and Khisa 2000). Each village accommodates 50 households. A total of 100 households were randomly selected for this research, 5 households from each village.

The observations reported here draw on the authors' personal involvement in the USP in varied management and advisory capacities. Following Khan (1998), the methodology of our latest fieldwork consisted of personal observation (without controls), ethno-historical analysis, and group discussions.

Land Use Patterns and Dynamics of Adopting CHIAT

Each farming household was allotted a total of 2.1 ha of land, out of which 0.5 ha was intended for homestead agroforestry, and 1.6 ha for raising rubber (inter cropped with banana). Table 1 summarises the common land use pattern in the study area.

Table 1: Land use in the agroforestry plots

Slope Category				
Level to gently sloping (up to 5%)	Sloping (5-15%)	Moderate steep (15-30%)	Steep (30-60%)	Very steep (above 60%)
Upland rice Vegetable Ginger Turmeric Banana Pineapple Lemon Guava Papaya Custard apple Areca nut	Upland rice Vegetable Ginger Turmeric Banana Pineapple Lemon Guava Papaya Custard apple Areca nut	Upland rice Banana Litchis Jack fruit Pineapple Mango Amra Bel Areca nut	Upland rice Banana Litchis Jack fruit Pineapple Bamboo spp	Upland rice Banana Forest species (especially *Gmelina arborea, Tectona grandis, Acacia* spp, *Cassia* spp, *Leucaena* spp) Bamboo

The USP staff suggested that farmers plant contour hedgerows with nitrogen fixing tree and shrub species (e.g., *Leucaena* spp., *Tephrosia* spp., *Flemingia* spp., *Indigofera* spp.) in the moderate to steep sloping parcels. Although almost all the families initially adopted CHIAT, many of them discontinued after a lapse of a few years for the reasons discussed in the next section. At the time of the survey, 42% of the respondent farming households actively practised CHIAT (Table 2)

Table 2: Adoption of CHIAT

District(s)	Project village	No. of HH	No. of sampled HH	No. of sampled HH practising CHIAT
Khagrachari	Bailyachari 1,2,3	150	15	7
Khagrachari	Taimatai 1,2,3	150	15	9
Khagrachari	Wasu 1,2,3,4	200	20	11
Bandarban	Chemi 1,2	100	10	4
Bandarban	Kuhalong 1,2,3	150	15	4
Bandarban	Rajbila 1,2,3,4,5	250	25	7
Total	10	1000	100	42

The farmers who practised CHIAT gave the following reasons: it helps reduce soil erosion, restores soil fertility, encourages diversified cropping, and is economically more rewarding that shifting cultivation. Recent and ongoing research have corroborated the farmers' views that CHIAT contributes to a significant reduction in soil loss and surface run-off, and increases biomass production (Khisa 2001).

Constraints to Adopting CHIAT

The following constraints to adopting CHIAT were identified.

- Insecurity of land tenure was the major reason for the farmers' reduced interest in investing in land development through CHIAT. Despite repeated attempts by the project authorities, formal title to the land has not yet been secured due to bureaucratic red tape and procedural complications.
- The four CHIAT demonstration plots are concentrated in one location (Alutila), leaving the majority of farmers beyond its domain of service and influence.
- The farmers' experiences suggest that CHIAT is a labour intensive and physically exhausting technology.

- Many farmers still consider shifting cultivation to be the major source of food and fear that CHIAT may not adequately satisfy their food needs.
- The farmers report that CHIAT requires substantial monetary investment. Some of the respondents candidly admitted that poverty forced them to spend and divert the money meant for agroforestry to household consumption.
- In some areas the soil and terrain are particularly harsh and infertile and in these locations, the performance of CHIAT is discouraging.
- Some issues associated with the poor technical design of the project have subsequently caused problems. Initially, for example, *Tephrosia candida* was used to establish hedgerows, but it later proved to be inefficient (primarily due to its intolerance of intense pruning) and gave people a negative impression of CHIAT. Furthermore, at the time that CHIAT was prescribed, some of the plots had already been covered with different perennial crops, which left little room for the introduction of hedgerows.
- In most cases, exotic species were prescribed for hedgerows and land development, but the farmers have their own preference for mostly indigenous species.
- Seventy-two per cent of the respondents considered the project support and services, especially regarding the provision of planting materials and fertiliser, micro-credit services, and hands-on technical advice on hedgerow establishment and maintenance, to be inadequate.
- The relevant extension and research activities were mostly carried out on a piecemeal, superficial, and uncoordinated basis. The USP's motivational and extension approaches for CHIAT involved arranging purposely tailored training courses and maintaining demonstration plots. Out of a total of 1000 farmers, some 175 (92 from Bandarban and 83 from Khagrachari) have so far received training, but none of them were women. The impact and purpose of training seem somewhat blurred.
- Although some audio-visual tapes and vernacular publications for the promotion and dissemination of CHIAT have been developed, their number and impact are limited.
- Most farmers find it psychologically strenuous to come to terms with the process of transformation from their pervious nomadic mode of life, that pivoted around shifting cultivation, to the relatively permanent mode of life required by the project.

Conclusions and Recommendations

The extent of adoption of CHIAT has remained low, which is primarily attributed to factors such as unsecured land tenure, economic hardship, high degree of labour intensity, high cost of the technology, lack of institutional credit services, insufficient logistical support, and the psychological strain associated with the transformation from a nomadic culture to a relatively permanent form of living. Even with these limitations, however, CHIAT remains a promising technology which has contributed significantly to reducing runoff and soil loss and augmenting biomass production and, more importantly, has sparked a sense of interest among selected farmers who are actively practising the technology. These farmers, albeit few in number, generally express satisfaction and hope for CHIAT. Drawing on the intimate discussions with farmers and our empirical observations, a number of recommendations can be made for improving the effectiveness of CHIAT and facilitating its adoption by farmers.

- The USP could experiment with establishing natural vegetative strips on contours, which has met with considerable success in other parts of Asia (Stark et al. 2001)

- Formal title to land and written contracts concerning distribution of the project's benefits should be arranged to reassure the farmers.
- The CHIAT demonstration sites need to be extended and dispersed to the major concentrations of farmers.
- Mass media, especially local radio and television, may be approached to disseminate CHIAT.
- Markets and necessary market information must be ensured to enable the farmers to make informed decisions. The departments of agricultural extension and forest could play a significant role in this regard.
- Rather than attempting to put an abrupt ban on jhum, it should be phased out slowly and gradually. Limited jhum may be allowed alongside CHIAT to help farmers compare the relative performance of both systems.
- Practically oriented research on CHIAT should be increased to illuminate those concerned in exploring ways to improvement.
- When selecting species, farmers' preference has to be given the highest priority.
- The technical design of the project needs to be periodically revised, taking on board the farmers' views and felt needs.
- The training programme must be expanded to cover representatives of all households; the content and efficacy of the programme have to be closely monitored and revised, drawing on the farmers' responses.
- Door-to-door extension, on-farm demonstration, and follow-up of the field training are required; existing extension services need to be coordinated.
- Particularly harsh pieces of land, where CHIAT has little prospect of success, should initially be avoided so that potential failure will not cause a negative impact on the farmers' morale.

References

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