

AGRICULTURAL ECOSYSTEM AND SUSTAINABLE DEVELOPMENT IN BRAHMAPUTRA BASIN, ASSAM, INDIA

**SHORT PAPERS
and
ABSTRACTS**

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Improvement of *Aman* Rice Cultivation against Flood Damages in Jawar Village, Haor Region of Bangladesh

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Introduction

Aman rice cultivation in the rainy season takes a leading part in Bangladesh still in spite of recent spread of *boro* rice cultivation in the dry season. But rice cultivation in the rainy season is apt to be damaged by the flood. In 1987, one of the devastating floods of these days damaged Bangladesh. In this paper attempt has been made to discuss the 1987 flood in Jawar village located in the fringe of a large inundated area called *haor* (Fig.1) with reference to *aman* rice cultivation. At first, the characteristics of flood and damages caused to *aman* rice cultivation have been discussed, and then a plan towards improving the environment of the small paddy fields to stabilize cultivation in the rainy season has been proposed.

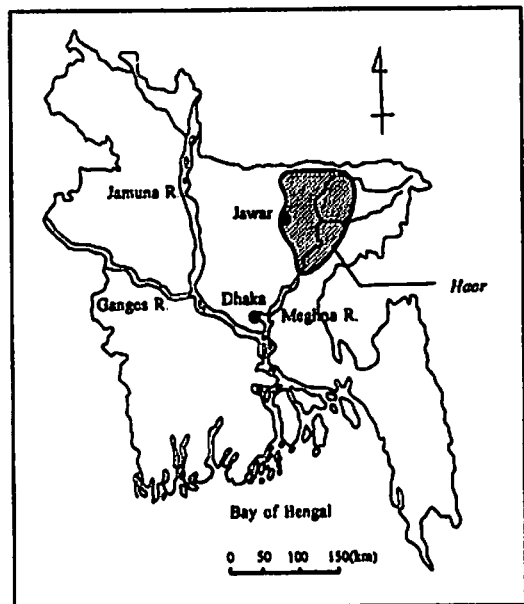


Fig1: Location of Jawar village

Characteristics of 1987 flood

Fig. 2 shows the precipitation and water level in the drain of *bil* in the village and Fig.3 describes the change of water depth along a cross-section of the village. Two peaks are observed in the beginning of August and late September after localized torrential downpour amounting to more than 140mm. Specially the first flood was so big that many houses were inundated up to

the floor (Fig.3). All cultivated lands were flooded (95% of total area) and even high-fields on *kanda*, the highest farmland which does not get inundated in normal years, were also flooded at the maximum water level which was 1.5 to 2m higher than that of the level of the normal years. Then water level decreased to just near normal maximum height (Sept 25) and increased again 50 to 60cm because of rainfall in late September.

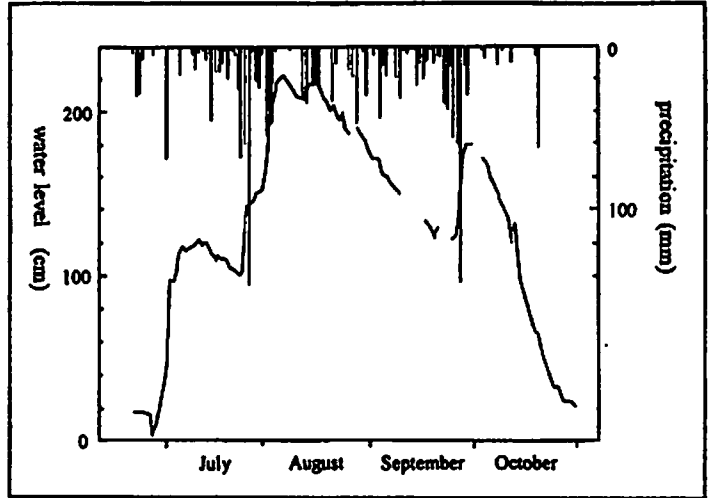


Fig 2: Precipitation and water in the drain of *bil* (Jawar village 1987)

This time water level in the high-field did not reach the first flooding level, while it was upto 1m in the medium-fields where in normal years water rises upto only 50 cm. These two high floods not only inundated many houses but also damaged *aman* rice cultivation seriously.

Damage of *Aman* Rice Cultivation by 1987 Flood

Aman area concentrates in *kanda* or highest farmland which is classified into three types: high, medium and low-field (Fig.3).

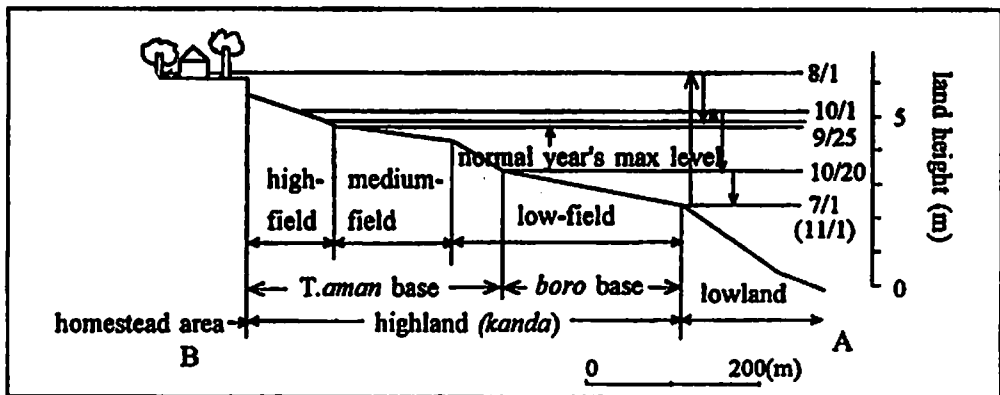


Fig 3: Change of water level in 1987 flood (Jawar village)

The first flood damaged not only *aman* plants transplanted in the field but also seedlings in the nurseries. The damaged nursery was 0.04 ha in size, i.e. more than two-third of the total. As water receded, farmers sold their paddy seed, jute and cattle to purchase seedlings, mainly *pajam*, and transplanted in high and medium-fields from mid- to the end of August. The second flood damaged the transplanted *aman* plants again. Normally, the medium-field does not get inundated but at the second flood even the high-field was inundated. There was no direct damage in the high-field because of low inundation. But in the medium fields transplanted seedlings were damaged second time. In the medium-fields, farmers usually transplant *aman* rice at the end of August. In the case of *pajam*, *rabi* crops are cultivated in December. They broadcast mustard or wheat in November in the medium-fields where seedlings could not be transplanted.

In a few low-fields, tall seedlings of LV were transplanted in the middle of September but in most of the other fields, seedlings could not be even transplanted because of deep water. And consequently, transplanted LV seedlings were almost damaged by the second flood. After the second flood receded, LV seedlings of *mongir* were transplanted again in these fields from the middle of October although the local variety of rice is transplanted from the beginning of September to the beginning of October in the normal years. The normal yield is 2.8 t/ha but in 1987 it decreased to 1.4-1.6 t/ha because of late transplantation.

Forty hectares, which is equivalent to only one-third of the normal year's 120ha could be transplanted. Cultivation of 67 percent of total *aman* rice area covering mainly medium- and low-field and other 8 hectares damaged by the two waves of flood after transplanting had to be given up.

Countermeasure to Stabilize Rice Cultivation in the Rainy Season

1. Controversial points regarding *aman* rice cultivation

Harvesting of T.*aman* rice in the medium- and low-field sometimes becomes late by one month than that in the high-field because transplanting in the former two types of fields, which depends on water recession, tends to be late. Moreover, in these fields, irrigation is required in October and November when surface water drains naturally from gently-sloping *kanda* in October. Such water shortage at the growing period is also a serious problem in addition to direct damages caused by inundation. Besides uncertain transplantation depending on water recession, transplanting is made difficult by the presence of a lot of water hyacinth brought by flood. Decrease of *aman* rice area resulting from such kind of problems deprives the daily labour farmers who have little chance to work in the rainy season. And if transplantation is delayed, many farmers may have a poor harvest even in the case of LV rice as stated above.

2. Stabilization of rice cultivation by *jangal* and *B.aman*

The authors propose to take up the following measures to resolve the problems of rice cultivation in the rainy season:

- (1) Storing surface water by constructing *jangal* or embankment to solve the problem of water shortage for the late growing rice in the low- and medium fields on *kanda* (Fig.4).

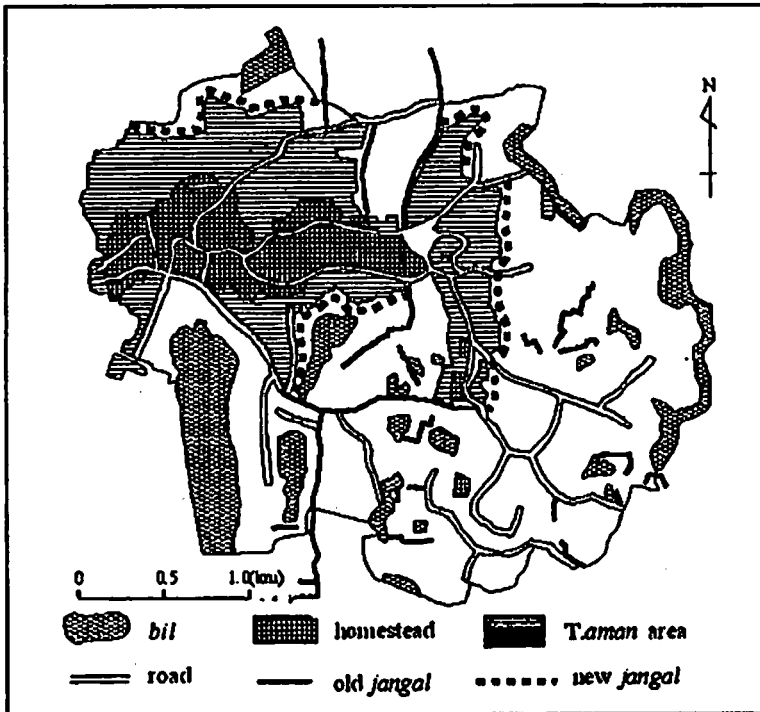


Fig 4: New *jangal* for *T.aman* cultivation (Jawar village)

- (2) Planting annual legume *dhanca* (*Sesbania aculeata*) on the top of *jangal* in order to stop the invasion of water hyacinth and waves into rice fields (Fig.5).
- (3) Transplanting deep water *aman* (*B.aman*) rice at the beginning of the rainy season which is well adapted to flood in the low-field.
- (4) Seeding deep water *aman* rice to transplant quickly again, if flood occurs at the latter half of the rainy season.

B. aman rice is photosensitive and can be harvested in November or December even if transplanted a few months later or earlier. Young plants can remain in the nursery for a few months and farmers can transplant tall seedlings even in deep inundated fields.

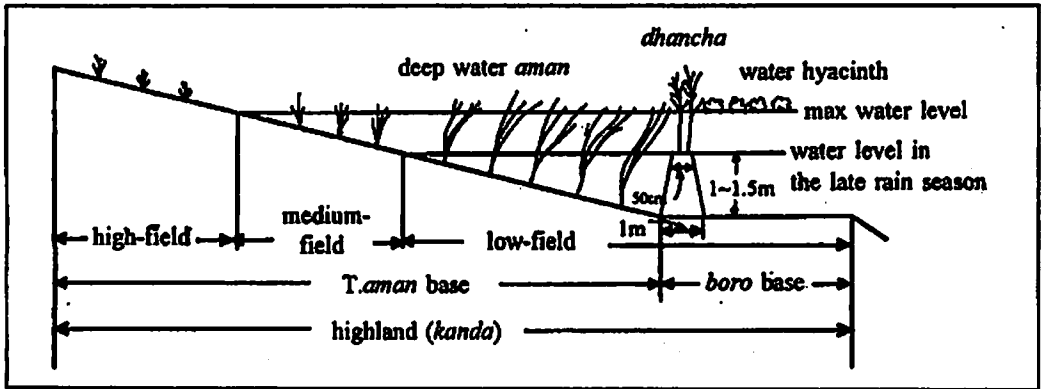


Fig 5: Transplanting cultivation of deep water rice by *jangal*

For the second transplantation it is necessary to sow again on the nursery of the first transplantation. The *aman* rice nurseries in the village are located on the flood-free higher lands. Deep water *aman* rice which grows quickly in flood environment can be cultivated even in the low-fields as normal water is 1 to 2m deep at most and flood water tends to increase slowly.

Thus, transplanted *aman* rice cultivation can be made stable and the deep water *aman* rice cultivation may be improved by planting *dhancha* and storing water at the end of the rainy season by *jangal*. This new trial is expected to be a workable plan not only to recover the abandoned 80 hectares of land in 1987 as deep *aman* transplanting fields but also solve the water shortage problem that occur at the end of the rainy season.

Conclusion

Stabilization of *aman* rice cultivation by introducing *jangal* and by transplanting deep water *aman* rice may become an equally profitable countermeasure for many farmers than that of *boro* rice cultivation. For this countermeasure, group works for construction and maintenance of *jangals* are required and it is expected that the experience of water management in the dry season developed historically by the villagers could be helpful.