

TECHNICAL BULLETIN

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Integrated Farming Systems to Improve Farm Productivity in Haor Areas

Haors with their unique hydro-ecological characteristics are large bowl shaped floodplain depressions located in the estuarine flood plains of the Surma, Kushiya, Meghna, Dhenu and Ghoraute rivers of Bangladesh. They cover about 19998 sq km of area in the northeastern districts of Kishoreganj (eastern part), Netrakona, Sunamganj, Habiganj, Moulavibazar and parts of Sylhet and Brahmanbaria and are home to some 20 million people. The haors are recurrently deep flooded to 5-10 m depth from late May to October when they take the appearance of a sea. The environmental conditions in the haor zone permit only a one-season cropping in the year in rabi (winter) when Boro Rice, Potato, Groundnut, Sweet Potato, Mustard, Pulses, etc. are grown. In some years, the maturing rabi crop is seriously affected by flash floods and hailstorms and biotic stresses like insect infestation. However, the haor region, with a fishing area of 114793 ha, is a huge



A deep-flooded haor



Homestead in a haor area

reservoir of inland fresh water fish and is a major contributor to the country's total fresh water fish output. Unfortunately, the haor areas, in spite of being traditionally an economically highly productive zone of the country, hitherto remained under-developed. People living here for generations, were remained by and large under privileged poor. Poor and the extreme poor households constitute 35% and 40%, respectively of the total population. Homestead land erosion, siltation and flash floods frequently occur and severely limit yields or even destroy most of the

crops. The haor areas, thus, are highly food insecure for the poor and extreme poor people. This otherwise productive natural resource of the country and people living there merit due attention of researchers and policy makers. Integrated farming systems (IFS) involving crops, fisheries and livestock deserve special attention for achieving and sustaining food security, promoting economic development and eradicating poverty in the haor region.



KRISHI GOBESHONA FOUNDATION

A non-profit foundation for sustainable support to agricultural research and development

Methodology

Agricultural R&D initiatives in this project involved attempts to a) develop and fine tune location-specific system-based technologies, b) increase systems productivity and household incomes and c) efficiently mobilize and manage natural resources. Twenty-five farms were selected for integrated farm development and whole farm analysis was done. In all, 117 experiments were conducted as component studies. Technology dissemination and adoption drives were carried out among haor farm households to improve the productivity of rice, homestead vegetables and fruits, fish, poultry, duck, cattle, sheep, and homestead agroforestry species. Some new crops, including 10 creeper and winter homestead vegetables for growing in and around homesteads were introduced. The following interventions were tested in the haor areas of Sunamganj:

Interventions tested for agricultural production boosts in haor areas of Sunamganj

Enterprise	Traditional practices	Interventions
Rice	BRRRI dhan28, BRRRI dhan29, Birun	BRRRI dhan28, BRRRI dhan29, BRRRI dhan50, BRRRI dhan58, BRRRI dhan63, Tapiboro, Rata boro, Begum bichi, Atobshail
Field crops	-	BARI sorisha-14, BARI sorisha-15
Vegetables	Local bottle gourd, radish, Indian spinach, water spinach, sponge gourd, local country bean, jute, red amaranth, stem amaranth.	Lady's finger, ash gourd, ridge gourd, snake gourd, bitter gourd, cucumber, chilli, cabbage, cauliflower, bottle gourd (hybrid), pumpkin, red amaranth, stem amaranth, tomato, egg plant, spinach, squash, coriander, cucumber, yard long bean
Agroforestry	Hijal and Koroch	Mango, guava, litchi, coconut, ber, papaya, mahogany, rain tree
Livestock	Local poultry, duck, pigeon, sheep, cow	New poultry breed (Fayoumi, Sonali), Duck breed (Jhindin, Khaki Campbell), pigeon, highly prolific breed of sheep (Garole), vaccine for ranikhetdisease, fowl pox, duck plague disease of poultry and duck, deworming, FMDfor cattle
Fish	Fish catching	Fish culture (seasonal and perennial ponds), cage culture, sanctuary

Results and Outputs

Twenty-three technologies for crop, livestock and fish production were developed following farmer participatory intervention tests over a period of four years. Adoption of the new farming systems technologies by haor farm households improved the productivity of rice, homestead vegetables and fruits, fish, poultry, duck, cattle, sheep, and agroforestry systems.

Diversification and intensification of farming and non-farming activities generated employment and income. Efficient mobilization and management of natural resources were achieved through capacity building of the participants by training, motivation, consultation and making inputs available for sustainable production systems.

Crops and agroforestry

Distribution of fruit and timber saplings for planting during dry season increased the total number of trees in the project area from 7 to 40. New rice varieties viz., BRRRI dhan50, BRRRI dhan58, BRRRI dhan63, BRRRI



Growing vegetables year round in a haor homestead

dhan50, Tepi Boro and Atabsail were adopted. Monocropped kanda lands were converted into double cropped lands through the introduction of Mustard, Potato, Coriander, Okra, Cauliflower, Cabbage, etc. which increased cropping intensity and land productivity. Vegetable production was rare among haor people. Earlier, on an average they used to earn only Tk. 214 per farm with traditional production practices. Introduction of assorted vegetable crops enabled the poor farmers to produce for domestic consumption as well as increase family incomes through sale of vegetables. The haor farm families were encouraged with seeds and training to grow seasonal vegetables like Cabbage, Cauliflower, Tomato, Eggplant, Chili, Bottle Gourd, Country Bean, Pumpkin, Squash, Red Amaranth, Spinach, Bitter Gourd, Ash Gourd, Uidge Gourd, Sponge Gourd, Snake Gourd, Indian Spinach, etc. year round in the homesteads which fetched Tk. 45591 with a minimal investment of Tk.2644 per farm.

Fish

The main occupation of haor people is fish catching during monsoon. The farmers were given monosex tilapia, sharputi and carp fry to start fish culture in seasonal ponds. They harvested fish from ponds during the off season and used for family consumption. Cage culture of GIFT tilapia brought about a higher income (gross return Tk. 6947 and gross margin Tk. 1847) than monosex tilapia (gross return Tk. 6499 and gross margin Tk. 1300). Among the participants one farmer started to culture monosex tilapia in cage. As haor areas remain under flood water for more than 8 months in some years, fishermen may continue fish catching almost throughout the year.

Livestock

Improved rearing and care increased the number of poultry per farm from 4 to 14, that of duck from 3 to 80 and that of cow from 2 to 3. Regular vaccination and deworming reduced mortality and improved livestock health and enhanced farmers' incomes. Before project interventions, the average income per farm was about Tk. 10368 from eggs, chicken and duck. Incomes increased substantially with a gross margin of Tk. 109374 per farm.

Economic and social benefits

Technological interventions positively impacted incomes for haor farmers. The benefit-cost ratio of duck farming was 1.97 indicating high profitability. The average annual total income of a project farmer was Tk 51530 compared with that of a non-project farmer (Tk. 39936). The interventions also improved livelihood of farmers of the haor area within two years. Increased consumption of vegetables improved the nutritional security of the farming families. The IFS approach of farming and livelihood also resulted in women empowerment. The number of bank accounts operated by the farmers especially female farmers increased. Overall, the physical, social and economic environment are more congenial for the haor dwellers than ever before.

Impacts

The use of improved IFS technologies substantially increased productivity of field crops, vegetables, livestock, fishes, agroforestry systems. Diversification and intensification of farming and non-farming activities created employment opportunities and enhanced farm household incomes. Annual incomes from integrated farming increased from Tk. 50854 per farm before intervention at the baseline to Tk. 269577 per farm after interventions. Impact analysis revealed that the human, natural, physical, financial and social capitals were boosted. The total income per farm was increased by 58.87% over the baseline value.

Recommendations

- ❖ Integrated farming systems research and development programs need to be continued to further improve land productivity and increase farmers' incomes in the haor region of the country.
- ❖ Technologies developed/modified/validated/adopted at the research sites should be disseminated through DAE, DLS, DoF and NGOs.
- ❖ Utilization of homestead and kanda land through vegetable cultivation is important to improve haor farmers' livelihood.
- ❖ Fish sanctuaries should be established in at least 10% of the beels in the haor region.
- ❖ DoF may initiate and encourage cage culture of fish for small haor farmers.
- ❖ Improvement of the marketing channel and value chain for haor products is necessary.

This technical bulletin has been prepared on the basis of technical information available from a completed CGP project of KGF, the details of which are given below:

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