

IMPACT OF HOMESTEAD FARMING ON RURAL ECONOMY OF INDIAN SUNDARBAN

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Homestead farming system (HFS) is mainly a need-oriented, self-provisioning, integrated, multi-species, economically sustainable and environmentally safe farming system around the house. In order to understand the contribution of HFS to household income and to devise ways to maximise returns from HFS, a survey was conducted covering 480 households in three blocks (Kakdwip, Namkhana and Sagar) of South 24-Parganas district of West Bengal located in Sundarban. Out the households surveyed, 91% come under the marginal category having less than 1 ha of landholding in which 0.1 ha was used for homestead farming. 28% income of total 480 households were contributed by HFS that comprised of aquaculture (54%) followed by animal husbandry (37%) and horticulture (9%). The 22% of total households who practised betel vine cultivation in homestead land earn an additional gross income of Rs.75, 000/annum. More than 40 local varieties of horticultural crops and more than 25 fish species are cultured in HFS. However, due to inadequate supply of input and improper management, the quality and quantity of produces were not optimum. The study has clearly indicated the potential of sustainable intensification of HFS for increasing production and income of poor households in rural areas, and it would lead to poverty alleviation.

INTRODUCTION

In the beginning of 20th century, India was having 260 million people who did not have incomes to access a consumption basket which defines the poverty line. Of these people, 75% were in the rural areas which made the country as a home for 22% of the world's poor (http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch3_2.pdf). In India, 29.8% of the rural population were below poverty line with a meagre income of Rs.672.8/capita/month (http://planningcommission.nic.in/news/press_pov1903.pdf). This high evidence of poverty indicates that poverty eradication is the central pillar of rural development and it should be one of the major objectives of the country. Since poverty is a global issue, the alleviation of poverty in India is vital for the attainment of international goals (http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch3_2.pdf).

Poverty in rural areas is widespread with increasing landlessness among the rural poor which deprive them of their livelihood base. Moreover, agriculture plays a pivotal role in the Indian economy (<http://www.igidr.ac.in/pdf/publication/WP-2012-014.pdf>). Agriculture and allied sectors like forestry, logging and fishing accounted for 14.1% of the GDP in 2011–12, employed 58.2% of the total workforce and thus play a major role in the overall socio-economic development of the country (<http://indiabudget.nic.in/budget2012-2013/survey.asp>). Therefore, agriculture and related activities are not only contributing to overall growth of the country's economy but also reducing poverty by providing employment and food security to the majority of the Indian population. Recent data for 2010-11 shows that marginal and small farmers accounted for 85% of the operational land holdings in India. About 67% of them belong to marginal land holders holding less than 1 ha, while 18% belong to small land holders holding 1-2 ha (<http://agcensus.dacnet.nic.in>).

Agricultural wage earners, small and marginal farmers and casual workers constituting bulk of the rural poor are engaged in non-agricultural activities. An earlier study has empirically established that small holdings are equal or better than large holdings from efficiency point of view but that is not enough to compensate the small holdings due to the high cost of cultivation (<http://www.igidr.ac.in/pdf/publication/WP-2012-014.pdf>). The consumption expenditure of marginal and small farmers exceeds their estimated income by a substantial margin and presumably the deficits forced them for borrowing or other means (Anon, 2008).

In these prevailing circumstances, to achieve economic security and extract the maximum potentiality of locally available resources, HFS, a food based adaptation strategy is the most dependable tool for rural people to offer a considerable protection to households (Bhattacharya *et al.*, 2014). Since in rural India, most of the households have a small piece of land in backyard of the house, utilization of this fallow land by establishing homestead farming system can ensure economic as well as food and nutritional securities which may ultimately reduce the level of poverty, food insecurity and malnutrition. The system is mainly a need-oriented, self-provisioning, integrated, multi-species, economically sustainable and environmentally sound farming system around the house where the soil is enriched by household refuse and manure (Agboola and Isola, 1993). It is such a form of integrated farming which allows year-round cultivation of different agricultural (horticultural and aquaculture) products. The system can provide either a source of additional income to the households or function as an alternative livelihood. Women's potentiality can also be easily utilized by adopting this system towards not only for their empowerment but also for livelihood development (<http://www.egfar.org/news/homestead-farming-avenue-women-entrepreneurship-south-24-paragans-district-west-bengal-india>). This project was conceived to find out the impact of HFS on rural economy in West Bengal as well in Bangladesh. Our studies during National Agricultural Innovative Project (NAIP) brought few researchable issues on backyard/homestead farming system. The contribution of HFS households is not studied well in Indian Sundarban. This study aims to determine the

relative contribution of homestead and field food production systems among household categories. Despite being an important element of rural landscapes and playing a pivotal role in the predominantly bioresource-based rural economy, HFS has not received attention in any policies or programs by the government. Therefore, the study was taken to document the evidence and bring awareness on the importance of HFS in rural area.

MATERIALS AND METHODS

Site description

In order to understand the contribution of HFS to household income and to devise ways to maximise returns from HFS, a household survey with pre-designed questions has been conducted. This study builds on the information derived from that survey which was conducted in South 24 Parganas, an extreme southern district of West Bengal. The district consists of 29 blocks among which 13 are coastal blocks. The study included three coastal blocks, namely Kakdwip, Namkhana and Sagar which are located in the southern extremity of South 24 Parganas.

Sample design and data collection

The sample design considered 2 gram panchayats from each block and 3 villages from each gram panchayat. Twenty households (40 households in Sagar) from each village were selected for the survey by following simple random sampling method and all together 480 households (HH) were considered for the survey. An important reason behind the selection of Sagar block and more number of households from there was to get a clearer picture on the dynamic island ecosystem surrounded by brackishwater.

The survey was conducted during the year 2012-13. Secondary data were collected from various departments and organisations from the state level to village level and also from

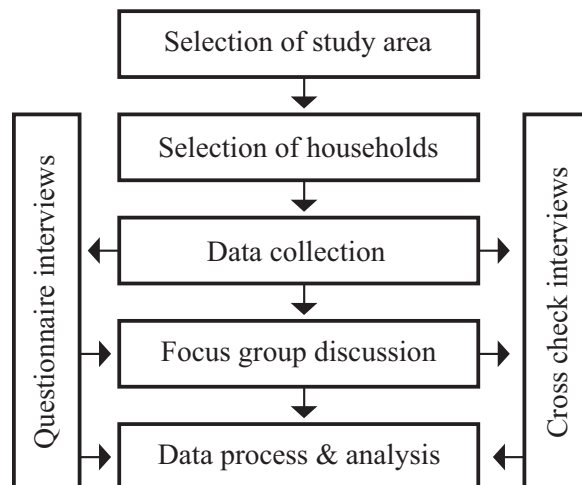


Fig. 1: Sampling design

publications such as journals, reports, internet etc. Primary data were collected for the year 2011. A specially-designed and pre-structured questionnaire was used in this study for collecting information from the households. Both open and closed ended questions were asked and to verify that information a cross check interview along with a focus group discussion (FGD) had also been done. The collected data were coded and then analysed by adopting statistical tools like frequency, average, and percentage analysis.

Table 1: Distribution of sampled households

Block	Total no. of households	Average family size	No. of sampled households (HH)
Kakdwip	44,796	5	120
Namkhana	29,951	5	120
Sagar	31,461	6	240
Total	1,06,208	5	480

RESULTS AND DISCUSSION

Socio-economic condition of the study area

Farmers in rural areas continue to experience great disparity in income and revert to natural resources as the most accessible sources of livelihood (Madaswamy, 2004). Due to very small land holdings and low productivity, most of the households maintain a diversified pattern of occupations because no single activity provides sufficient resources to ensure their livelihood. However, in the study region, livelihood system was primarily depending on casual labour (Table 2). All together the income of the surveyed households was around Rs.70,000/- in which farm activities provide around 43% and non-farm activities provide around 57%. This indicated the low purchasing power of the poor households which hampers their livelihood by depriving them of getting nutritious and balanced food in their regular diet.

Table 2: Major occupational pattern of the surveyed households

Occupation	% of household
Casual labour	42
Betel vine cultivation	22
Business	10
Paddy cultivation	7
Govt. job	5
Van pulling	5
Others (Carpenter, fishing etc.)	9

The average family size of the study area was 5 (Table 1). The findings show that the participation rate of females in respect of total female population was quite lower than that of male (Table 3). Therefore, males were dominant in homestead farming than females because of Indian customs where women are still forced to restrict in only domestic activities (Tansel, 1997). It proved the presence of gender inequity in homestead farming in this region.

Table 3: Gender wise participation in homestead farming system

Male %	Female %
66	54

Distribution of land among different components of homestead farming system

The most important resource of any farming system is land. Among all the surveyed households, 91% belonged to marginal category holding <1 ha of land. The share of homestead land was 27% among the overall land holding of the households. The total land area distributed for different components of HFS was less than 0.1 ha (Table 4). Pond was the most important component of this system and all the components directly or indirectly depend on it.

Table 4: Land distribution for various homestead farming components

Aquaculture (ha)	Horticulture (ha)	Animal husbandry (ha)
0.05	0.03	0.01

Different components of homestead farming system

HFS is comprised of several components which are broadly divided into three categories like aquaculture (fish culture in homestead pond), horticulture (vegetable, fruit, betel vine cultivation etc.) and animal husbandry (livestock and poultry rearing) and each component has potential to provide benefit to the household members both in terms of monetary and nutrition aspects. The economic objective of homestead aquaculture is to produce maximum amount of marketable fish or shrimp from a given volume of water with a minimum cost and time (Ogundari and Ojo, 2009), while homestead horticulture creates more integrated, diverse, productive, profitable, healthy and sustainable land-use systems by direct integration of trees into the cropping system (Ahmed and Rahman, 2004) and poultry can help poor households to increase their food security, reduce their vulnerability and start a process that will move them out of poverty (Anon, 2003; Darudec, 2003). The farm households purchased food and food items from market on credit only when some cash income was expected to come but purchasing of food on credit by rural households to maintain food security is not sustainable over a long period (Akrofi, 2012). So the households produce food in their own land.

Table 5: Households practiced different components of homestead farming system

% of practicing households practice		
Aquaculture	Horticulture	Animal Husbandry
94	76	71

Dominant species/ variety in homestead farming system

The surveyed homestead farms were highly variable in respect to the occurrence of various plant and animal species. This was attributed to the fact that homestead farms consisted of deliberately cultured food crops species (Akrofi, 2012) which produced diversified food items. The survey results reported that more than 25 aquaculture species, more than 40 varieties of horticultural crops and 4 breeds of animals (livestock and poultry) were found in the homestead farms. Among the aquaculture species, *Labeo rohita* (rohu), *Catla catla* (catla), *Cirrhinus mrigala* (mrigal), *Puntius gonionotus* (Japani Punti), *Labeo bata* (Bata), *Oreochromis niloticus* (Tilapia) etc. were found as the most dominant in homestead ponds. While *Abelmoschus esculentus* (ladies finger), *Luffa acutangula* (Ribbed gourd), *Solanum tuberosum* (Potato), *Allium cepa* (Onion), *Cucurbita maxima* (Pumpkin) etc. were most cultivable crops irrespective of blocks. In horticultural crops, 76% were used as food items (vegetable and fruits) which are followed by spices (12%), medicinal plant (12%), timber (10%), fodder (5%) and others (5%), such as ornamental and perishable crops etc. In aquaculture, 92% were fish species and 8% were shrimp/prawns. Among the fish species, 11% were reported to be entered from riverine water. Animal husbandry was dominated by cattle, pig, goat and chicken.

Production of different components in homestead farming system

The role of small farms in development and poverty reduction is well recognized (Lipton, 2006). Productivity growth ensures farmers to produce more food with the same amount of resources and make it more economically efficient and environmentally sustainable (FAO, 2013). It was observed by Birthal *et al.* (2011) that in terms of production, small and marginal farmers also make larger contribution to the production of high value crops (Birthal *et al.* 2011). But in the present study, production in different components indicated the insufficient yields from homestead farming. In the study region, productivity of aquaculture was 1470 kg/ha which indicated that the production was quite less than national average, i.e. 2900 kg/ha (2011-12) ([http://www.dahd.nic.in/dahd/WriteReadData/Fisheries% 20Profile%20of%2 0INDIA.pdf](http://www.dahd.nic.in/dahd/WriteReadData/Fisheries%20Profile%20of%20INDIA.pdf)). In horticulture, the productivity of vegetable was 2902 kg/ha, while the national average is 17300 kg/ha (Vanitha *et al.*, 2013). Major reasons behind the low production faced by the households were unavailability of quality seeds, high input cost, soil salinization and disease incidence (Bhattacharya *et al.*, 2012).

Table 6: Production of different components

Components		Production (unit/household)
Aquaculture		76 kg
Horticulture		100 kg
Animal husbandry	Egg	260 pc
	Milk	120 lit
	Meat	53 kg

Economics of homestead farming system

The present study resulted that the system contributes 28% of total household income. Fig. 2 further shows that aquaculture was the most profitable enterprise in term of higher gross return, where it constitutes the lion share of the revenue gained from the system and it was followed by animal husbandry. Animal husbandry also plays an important role in family income as it contributes 37% of total homestead farm income.

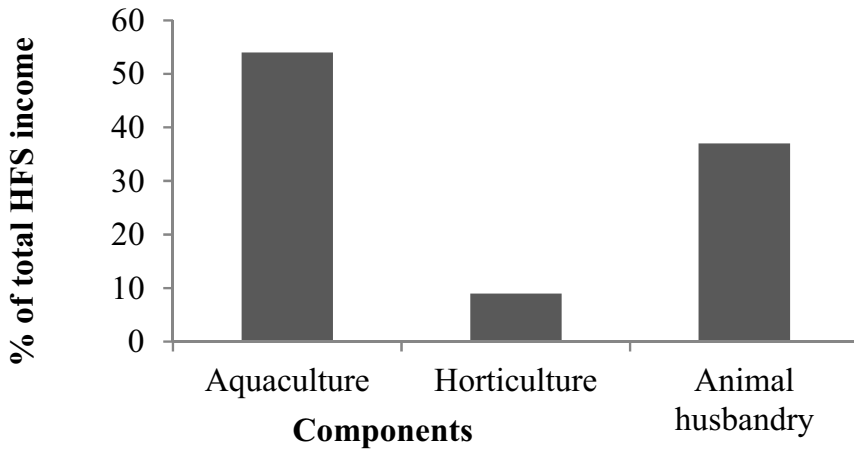


Fig. 2: Revenue gained from different HFS components

Though the horticulture productivity was approximately 49% higher than that of aquaculture, the cumulative effect of high market value and preferable food item (fish) of Bengali households accelerated the revenue from aquaculture production.

Table 7: Benefit-Cost ratio in homestead farming system

Production cost (Rs)	Gross return (Rs)	Net return (Rs)	Benefit-Cost ratio
3318	19014	15696	5.7:1

Though it was observed that inadequate supply of quality input and improper management of farm hampered the optimum production of homestead farming (Table 6), the Benefit-Cost ratio 5.7 indicated that it may become a highly profitable business for the rural poor.

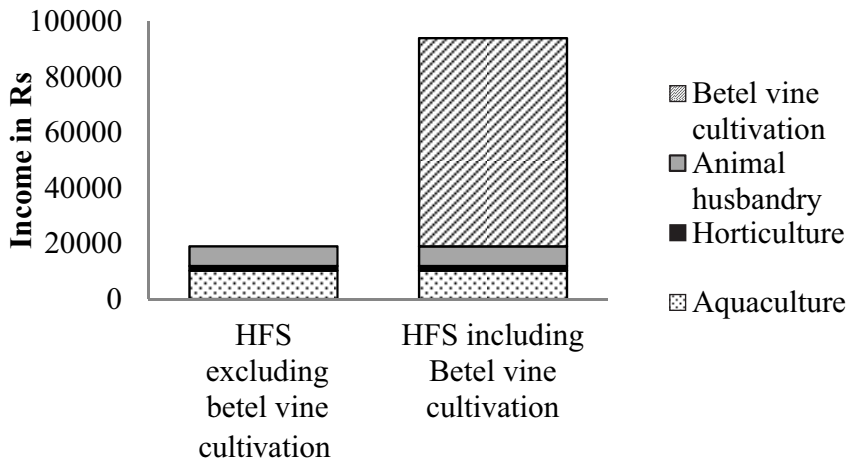


Fig. 3: Income gained from homestead farm

Furthermore, the 22% households who practiced betel vine cultivation (Table 2) in homestead land with other components and depend on it as primary source of income earn an additional gross income of Rs.75,000/annum. Therefore, the betel vine has been nomenclated as “Green Gold of India” (Guha, 2006) and this practice became the backbone of the economy of some farming communities.

Improvement of household economy by homestead farming system

Earlier it was discussed that the rural households suffering in poverty were having an annual income below Rs. 50,000 (http://planningcommission.nic.in/news/press_pov1903.pdf). The present study analysed that the economic status of these households may increase by 39% by practicing HFS which can provide revenue of around Rs. 19,000 per year (Table 7 and Fig. 3). Hence, it is clear that homestead farming system can reduce the poverty by enhancing the economic status of the below poverty line households.

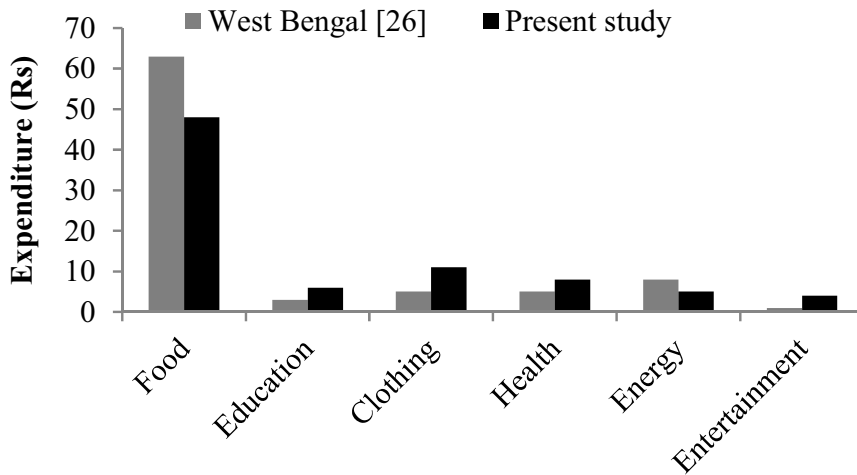


Fig. 4: Impact of HFS in household expenditure

The homestead farm not only supplements the household income, it also improves the standard of living. This extra income is used for children during festivals, educational expenditure, medical emergencies and overcoming food shortages among others (Mishra *et al.*, 2012). The comparison graph of West Bengal’s average expenditure pattern with the present study shown in Fig. 4 also summarised that direct consumption of food and fire wood from homestead farm reduces the expenditure on food and energy and the savings generate from this provide an opportunity to have a better investment capability on children’s education and health.

CONCLUSION

This study has identified the potentials of homestead framing system in increasing the resilience due to natural and social disasters in the coastal areas of South 24 Parganas district. From the study, it appeared that since crop based agriculture is highly season specific, the adoption of HFS may play a vital role as a form of insurance which has immense potential to reduce vulnerability and enhances resilience to circumstances to improve rural economy.

In spite of all the above facts, still HFS is not a very successful venture in most of the households (Sethy *et al.*, 2010). As the functioning of any individual farm system is strongly influenced by the external rural environment including policies and institutions, markets and information linkages (Dixon *et al.*, 2001), the development of HFS depends on enabling policy and institutional activeness for good governance, macroeconomic stability, rural infrastructure, secured property rights, especially for women and effective market institutions (FAO, 2012). The focus should be more on building the capacities of farmers to adopt technology in existing farm condition (<http://www.icar.org.in/en/node/6441>). Moreover, in case to mitigate the effects of climate change, sufficient resources to adaptation

including infrastructure and market development, diversifying livelihood portfolios to include higher yielding, more stress-resistance crop and livestock varieties have to be devoted (Fanarpan, 2010). Therefore, a growing demand for home grown safe-to-eat food and safe water scarcity caused by the worsening natural calamities in this region should encourage a large number of families to take over this practice, but in this aspect some institutions needs to stepped up to popularise the practice. And finally, a synergy has to be made between the indigenous technologies and modern technologies developed by scientists (Rajagopal, 2012) for effective practice of homestead farming.

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