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### Business prospects and challenges in *Haor* areas of Bangladesh

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#### Abstract

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Bangladesh has experienced promising improvements in its overall economic, social and health conditions, but the progress is not up to the mark in *Haor* areas. Improvements in this sector can lead to increase in production, employment and poverty reduction. Aside from increased productivity, farmers need a supporting business environment where availability and access to agricultural inputs are ensured, fair returns to investment are secured. Keeping these issues in mind, the study was conducted to measure productivity, profitability, and price variation of inputs and outputs; and to identify business challenges and suggest policy options for overcoming constraints and exploring intervention strategies in *Haor* regions. Primary data were collected from Mohongonj upazila of Netrakona district and Mithamoin upazila of Kishoregonj district. A total of 120 farmers and 24 service providers were interviewed for data collection. Face-to-face interview, focus group discussions (FGD) and key informant interviews (KII) were conducted to collect primary data. For analyzing the data, descriptive statistics and accounting method were used to achieve the objectives. The study revealed that average farm size of the respondents was 0.73 hectare. Most of the farmers (39.2%) followed the farming system of crop-livestock-fish catching (C-L-F). Fish catching was the most profitable enterprise with BCR 2.12. The differences in productivity of crop farming and poultry rearing between *Haor* areas and main land were found statistically significant. Remarkable differences in quantity and price of inputs and outputs were seen in *Haor* areas and main land. Favorable farm environment and proper utilization of agricultural resources were identified as major strength and opportunity in the study areas. Formation of agribusiness clusters involving input suppliers, credit/financial organizations and different support service providers will result in more income, better nutrition and improved livelihood of the *Haor* people. The study concludes that the business environment in the *Haor* areas has a high potential to be exposed with the integration of available local agricultural resources. Government price support and improved market management are recommended for accessibility and appropriate use of agricultural inputs, and for managing local productive resources in use of business prospects in the study areas.

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#### Introduction

Bangladesh has witnessed respectable improvements in its economic, social and health conditions with annual GDP growth of 6.6% (WB, 2016). While the overall conditions of the country are promising, those residing in the *Haor* areas have not yet enjoyed the same level of relative or absolute progress. *Haor* is basically very low lying river basin area below the level of flood plain, which is also similar to swamp land covered by water almost six months of a year starting from the monsoon (Sharma, 2010). The *Haor* areas of north-eastern region in Bangladesh cover about 2.0 million hectare of area and accommodate about 19.4 million people. There are about 373 *Haors* located in the districts of Sunamganj, Sylhet, Kishoreganj, Habiganj, Netrakona, Maulvibazar and Brahmanbaria. These 373 *Haors* cover an area of about 858 thousand hectare which is around 43% of the total area of the *Haor* region (MoWR, 2012). Farming is the major economic activity of the *Haor* region. Improvements in this sector can lead to increase in production, employment and poverty reduction. Aside from increased productivity through improved technology, farmers need a supporting business

environment where availability and access to agricultural inputs are ensured. In addition, farmers should be able to sell their products that yield fair returns to their investment.

The *Haor* region has long been lagging behind mainstream national development although the economic development of Bangladesh is moving steadily at a moderate pace. It is difficult to foresee the country's overall progress without the development of the *Haor* region as it covers a major part of the country and population which deserves special development initiatives. Since *Boro* rice is the only crop produced annually in the *Haor* area, the current economic system for non-aquatic resources offers very limited potential in terms of poverty alleviation. This single crop remains under the constant threat of partial to complete damage from the early on rush of flash floods. Fish catching is the important economic practice in these *Haor* areas. It is beyond doubt that suitable business environment will autonomously push the *Haor* areas to the light of development. The findings of the study will be used to design intervention strategies aimed at reducing the

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constraints of farming in the *Haor* regions. The range of activities may include advocacy and awareness creation at the local and national level, promote policy changes to alleviate the business constraints.

Relation of such condition has been depicted in a number of studies to take stock of existing research that are available and will highlight the need for present research which are:

Nowreen *et al.* (2013) evaluated the change of future climate extremes for the *Haor* basin area of Bangladesh and experienced the highest variability in both rainfall and temperature during the pre-monsoon season when flash floods normally occurred. Parvin (2013) performed an economic analysis of farm and non-farm activities with their income linkages in Dingaputa *Haor* of Netrokona district, and found that project participants' farm and non-farm income was higher as compared to the non-project participants' income. Khan *et al.* (2012) identified the impacts of flood on crop production in *Haor* areas of Kishoreganj district and revealed that *Boro* rice in *Rabi* season was damaged by flash flood due to unavailability of controlling measures. Alam *et al.* (2011) conducted a study on crop production in the *Haor* areas of Bangladesh and reported rice based potential cropping patterns; and Sharma (2010) explored the scenario of *Haor* vulnerabilities and other obstacles for sustainable livelihood development in Kishoreganj district and showed that 71% *Haor* households were effectively landless where 78.9% households suffered from food insecurity.

The above mentioned literature clearly indicate that a number of studies have been conducted on economic and livelihood prospect of *Haor* areas but there is no specific study on business prospects and potential in *Haor* areas. Therefore, the study will be very helpful to fill the research gap and add valuable information to the existing knowledge. The overall goal of the research was to address business prospects and challenges in *Haor* regions. The specific objectives of the study were: i) to measure productivity, profitability, and price variation of inputs and outputs; and ii) to identify business challenges and suggest policy options for overcoming constraints and exploring intervention strategies in *Haor* regions.

## **Materials and Methods**

### **Selection of the study area**

Primary data were collected from Mohongonj Upazila of Netrakona district and Mithamoin Upazila of Kishoreganj district. Four (04) villages of two (02) unions of each upazila (Gaglajore and Suair unions of Mohongonj upazila; and Mithamoin and Ghagra unions of Mithamoin Upazila) were taken under consideration. Thus a total of eight (08) villages were selected as study areas. These regions were selected for the study because they are very close to the *Haor* water bodies, dependent on rich natural resources, bounty of diversified farming systems and have favourable agribusiness environment.

### **Sampling technique and sample size**

Total 120 farmers were interviewed following stratified random sampling based on farm size. Fifteen sample respondents of each village were interviewed for collecting necessary data and information. Also, 12 service providers from each Upazila, i.e., a total of 24 service providers were interviewed for data collection.

### **Collection of data and information**

Field survey method through face-to-face interview using pre-tested structured questionnaire was used to collect primary data from the sample farmers. Moreover, a total of 8 focus group discussions (FGD) and 4 key informant interviews (KII) were conducted in each district with different stakeholders like, representatives of supporting institutions i.e., DAE, DLO, DoF officials, NGOs, input dealers, Upazila food office, rice millers and other market actors. The questionnaires were constructed and pre-tested for necessary modifications before starting the data collection. Besides, secondary information having relevance with this study were also used.

### **Analytical techniques**

After collecting necessary data, those were classified, edited and coded. For analyzing the data, descriptive statistics (i.e., sum, average, percentages, ratios, t-test, etc.) and accounting method (i.e., profitability analysis) were used to achieve the objectives.

Profitability of crop production per hectare, from the view point of individual farmers was measured in terms of gross return ( $GR = P \times Q$ ), gross margin ( $GM = GR - TVC$ ), net return ( $NR = GR - TC$ ) and benefit cost ratio ( $BCR = GR \div TC$ ) (Dillon and Hardaker, 1993).

Where, GR = Gross return (Tk.); GM = Gross margin (Tk.); NR = Net return (Tk.); BCR = Benefit cost ratio; P = Sales price of the product (Tk.); Q = Yield per hectare (unit); TVC = Total variable cost; TFC = Total fixed cost (Tk.); and TC = Total cost (Tk.).

Moreover, SWOT analysis (Gürel and Tat, 2017) was done to evaluate the strengths, weaknesses, opportunities and threats to identify the internal and external factors that are favorable and unfavorable to achieve the objectives of this research. Finally, recommendations were provided in the form of recommendation matrix (Dhar, 2016) to point out the facts of intervention exploring the business opportunities in *Haor* areas.

## **Results and Discussion**

### **Demographic information of the respondents**

The demographic information is represented in Table 1. It is seen that average family size of the respondents was 6.0 (higher than national average of 4.06 according to HIES, 2017). The study revealed that 66.7% member of the household was male and 33.3% were female indicating the average male-female ratio as 2:1. Average farm size of the respondents was 0.73 ha. In terms of respondents surveyed, 98.3% was male where only 1.7%

was female. Majority of them (49.1%) were under the age group of 16 to 55 years that are considered as active and working group. Most of the respondents were illiterate (43.3%) whereas 35.9% completed primary level of education. It was found that there were less educational facilities in the *Haor* areas compared to the main land. Dreadful transportation system played a major role behind most of the farmers' being illiterate in the study areas. In terms of farming activities, 95.8%, 70.0%, 40.8% and 60.8% respondents were involved with crop, livestock, poultry and fish catching, respectively. Almost all of the farmers were engaged in *Boro* rice production in the pre-monsoon period while in the monsoon period, almost three-fifth of them got involved in fish catching also (Table 1).

**Table 1. Demographic information of the respondents**

Particulars about the respondents		Percentages (%) of respondents
		6.0
Family size (no.)		(Male: 66.7%; Female: 33.3%)
Farm size (ha)		0.73
Sex	Male	98.3
	Female	1.7
Age	Below 5 years	3.7
	5 to 15 years	18.2
	16 to 55 years	49.1
	Above 55 years	29.0
Educational level attained	Illiterate	43.3
	Primary	35.9
	Secondary	15.0
	Higher secondary	5.0
Involvement with farming activities	Graduation	0.8
	Crop	95.8
	Livestock	70.0
	Poultry	40.8
	Fish catching	60.8

Source: Field survey, 2016.

### Major farming systems

The major farming systems identified in the study areas were Crop-Livestock-Poultry (C-L-P), Crop-Livestock-Fish catching (C-L-F), Crop-Poultry-Fish catching (C-P-F)

and Crop-Livestock-Poultry-Fish catching (C-L-P-F) which were followed by 18.3%, 39.2%, 30.0% and 12.5% respondents, respectively (Table 2). It is evident that, crop production and fish catching is almost common in all the farming systems in *Haor* areas. Islam et al. (2011) also exposed the similar findings where the authors found six dominant farming systems in Dingapota *Haor* of Netrokona district which were: crop-livestock-poultry-fish catching (C-L-P-FC), crop-livestock-fish catching-labour selling (C-L-FC-LS), fish catching-labour selling (FC-LS), crop-livestock (C-L), crop-livestock-fish catching (C-L-FC) and crop-livestock-poultry (C-L-P).

**Table 2. Major farming systems in the study areas**

Farming systems	No. of farmers (n = 120)	Percentages (%) of farmers
Crop-Livestock-Poultry (C-L-P)	22	18.3
Crop-Livestock-Fish catching (C-L-F)	47	39.2
Crop-Poultry-Fish catching (C-P-F)	36	30.0
Crop-Livestock-Poultry-Fish catching (C-L-P-F)	15	12.5

Source: Field survey, 2016.

### Productivity and Profitability of agricultural enterprises

Table 3 represents the average profitability of different agricultural enterprises under the major farming systems. It is seen that BCR of crop production (*Boro* rice), livestock rearing, poultry farming and fish catching were 1.27, 1.26, 1.26 and 2.12, respectively. A value of BCR more than 1 denotes the return as profitable. So it can be said that return from the enterprises were profitable. The results imply that the respondents received Tk. 127, Tk. 126, Tk. 126 and Tk. 212 from investing Tk. 100 in case of crop production, livestock rearing, poultry farming and fish catching, respectively. It was experienced that fish catching was the most profitable agricultural enterprise in the study areas.

**Table 3. Profitability of agricultural enterprises under the major farming systems**

Particulars	Agricultural enterprises			
	Crop production ( <i>Boro</i> rice) (Tk./ha)	Livestock rearing (Tk./animal/year)	Poultry farming (Tk./bird/year)	Fish catching (Tk./ha)
i. Total variable cost	95208	91307	3816	38117
ii. Total fixed cost	8974	25545	3495	2014
iii. Total cost (i + ii)	104182	116852	7311	40131
iv. Gross return	132485	147549	9224	85078
v. Gross margin (iv - i)	37277	56242	5408	46961
vi. Net return (iv - iii)	28303	30697	1913	44947
vii. BCR (iv ÷ iii)	1.27	1.26	1.26	2.12

Source: Authors' estimation, 2016.

It is apparent from Table 4 that there was a distinguishable difference in terms of productivity and profitability of different agricultural enterprises like crop, livestock, poultry and fish catching in *Haor* areas

and main land which were also statistically significant. The findings are faintly similar with Uddin and Dhar (2017) where the authors revealed that crop, livestock and poultry were found profitable under C-L-P farming

system, where homestead and agroforestry was found profitable under C-L-HA farming system; and the differences in productivity of agricultural enterprises

between *Char* land and main land were found significant in most of the cases.

**Table 4. Productivity and profitability of different agricultural enterprises**

Enterprises	Productivity			Profitability			
	<i>Haor</i> area	Main land	Difference	<i>Haor</i> area	Main land	Difference	
Crop (kg/ha, Tk./ha)	8679	7901	778 (0.041***) <sup>a</sup>	28303 (BCR: 1.27)	12457 (BCR: 1.09)	15846 (0.071*) <sup>a</sup>	
Livestock	Milk (litre/animal, Tk./animal)	125	112	13 (0.209) <sup>a</sup>	30697 (BCR: 1.26)	27173 (BCR: 1.02)	3524 (0.092*) <sup>a</sup>
	Meat (kg/animal, Tk./animal)	21	19	2 (0.318) <sup>a</sup>			
Poultry	Egg (No./bird, Tk./bird)	69	82	-13 (0.004***) <sup>a</sup>	1913 (BCR: 1.26)	2085 (BCR: 1.49)	-172 (0.118) <sup>a</sup>
	Meat (kg/bird, Tk./bird)	3	2	1 (0.034***) <sup>a</sup>			
Fish catching (kg/ha, Tk./ha)	946	520	426 (0.215) <sup>a</sup>	44947 (BCR: 2.12)	13615 (BCR: 1.07)	31332 (0.028***) <sup>a</sup>	

Source: Authors' estimation, 2016.

Note: <sup>a</sup>p-value; \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% probability level, respectively.

**Factor share of income from different enterprises**

Table 5 depicts factor share of income from different enterprises. It is seen that producers' share was the highest in all the enterprises (42%, 47%, 46% and 38% in crop, livestock, poultry and fishery, respectively) which was followed by labour in case of crop, livestock and fishery (26%, 21% and 25%, respectively) and capital in case of poultry (21%). Valentinyi and Herrendorf (2008) had measured the US income shares of capital and labor for the standard sectors used in multi-sector versions of the growth model and found that these factor income shares differed across sectors, e.g., the capital share of agriculture was more than two and a half times that of construction and more than 50% larger than that of the aggregate economy.

**Table 5. Factor share of income from different enterprises (in percentage)**

Factors	Crop	Livestock	Poultry	Fishery
Land	13	15	14	19
Labour	26	21	19	25
Capital	19	17	21	18
Producer' share	42	47	46	38

Source: Authors' estimation, 2016.

**Spatial variation in price and quantity of major agricultural inputs and outputs**

Table 5 demonstrates spatial variation in price and quantity of major agricultural inputs and outputs between *Haor* areas and main land. Major differences in quantity of inputs were seen in fingerlings and feed in terms of fish catching; and major differences in price of inputs were in livestock feed, poultry feed and medicine, and fingerlings and feed in terms of fish catching. Also, remarkable differences were identified in the outputs of agricultural enterprises, especially in the final product

from fish catching (Table 5). Schnepf (2006) avowed that the general price level of an agricultural commodity, whether at a major terminal, port or commodity futures exchange, is influenced by a variety of market forces that can alter the current or expected balance between supply and demand.

**SWOT analysis**

SWOT analysis for business prospects and challenges of farmers is represented in Table 6. In terms of strengths, 76.7% respondents stated about favorable farm environment and 71.7% stated about enterprise interdependence (ranked 1<sup>st</sup> and 2<sup>nd</sup>, respectively); and in terms of weakness, 75.8% respondents stated about weak marketing system and 63.3% stated about lack of agricultural credit access (ranked 1<sup>st</sup> and 2<sup>nd</sup>, respectively). Considering opportunities, 72.5% respondents stated about improvement in agricultural technologies and 60.8% stated about proper utilization of agricultural resources (ranked 1<sup>st</sup> and 2<sup>nd</sup>, respectively); and in terms of threats, 84.2% respondents stated about environmental vulnerability where 80.0% stated about declining amount of cultivable land (ranked 1<sup>st</sup> and 2<sup>nd</sup>, correspondingly) (Table 6). Loksha *et al.* (2002) found the similar result and exposed that the major strength of agribusiness sector in India includes creating employment opportunities for small and marginal farmers, landless labourers and educated unemployed persons who are specialized in the field of agriculture; and high cost of machineries particularly, the imported machineries and equipments as the major weakness.

**Table 5. Spatial variation in price and quantity of major agricultural inputs and outputs**

Crop						
Inputs	Quantity (kg/ha)			Price (Tk./kg)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Seed/seedlings	42	36	6	300	280	20
Fertilizers	42	45	-3	23	20	3
Outputs	Quantity (kg/ha)			Price (Tk./kg)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Final product	8450	8500	-50	16	20	-4
Livestock						
Inputs	Quantity			Price (Tk./animal)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Feed (kg/head/year)	140	125	15	6500	5850	650
Artificial insemination	-	-	-	250	300	-50
Vitamin and medicine	-	-	-	200	150	50
Outputs	Quantity			Price (Tk./animal)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
No. of livestock	4	6	-2	25000	25750	-750
Poultry						
Inputs	Quantity			Price (Tk./bird)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Feed	-	-	-	1300	1100	200
Vitamin and medicine	-	-	-	200	400	-200
Outputs	Quantity			Price (Tk./bird)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Final product	-	-	-	7500	8600	1100
Fish catching						
Inputs	Quantity			Price (Tk./ha)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Human labour (no./ha/day)	10	-	10	3000	-	3000
Fingerlings (no./ha)	-	3600	-3600	-	105240	-105240
Feed (kg/ha)	-	2300	-2300	-	705000	-705000
Capital cost (Tk./ha)	-	-	-	2000	1200	800
Water supply	-	-	-	-	30250	-30250
Outputs	Quantity (kg/ha)			Price (Tk./ha)		
	Haor area	Main land	Difference	Haor area	Main land	Difference
Final product	20700	15480	5220	1845620	1786350	59270

Source: Authors' estimation based on field survey, 2016.

**Table 6. SWOT analysis for business prospects and challenges of farmers**

Statements	% of farmers	Rank	Statements	% of farmers	Rank
<b>Strengths</b>			<b>Weakness</b>		
Increased farm productivity	53.3	3	Scarcity in input availability	57.5	3
Enterprise interdependence in the form of input-output relationship	71.7	2	High price of inputs	40.0	4
Favorable farm environment	76.7	1	Weak marketing system	75.8	1
Sufficient workforce	49.2	4	Lack of agricultural credit access	63.3	2
<b>Opportunities</b>			<b>Threats</b>		
Improvement in agricultural technologies	72.5	1	Price fluctuation	64.2	4
Diversification in farming practices	57.5	3	Environmental vulnerability	84.2	1
Proper utilization of agricultural resources	60.8	2	Declining amount of cultivable land	80.0	2
Market potential for value added agricultural products	45.0	4	Land transformation from cropland to others	68.3	3

Source: Field survey, 2016.

### Business prospects in the study areas

The findings demand to develop some forms of agribusiness activities based on local agriculture and rural community which ultimately contribute for the betterment of *Haor* economy, farmers' income

generation and livelihood improvement. From the field level experiences, the researchers found lack of responsibility of the local extension agents in terms of giving input support to the farmers which ultimately caused reliance of the farmers to the private sector.

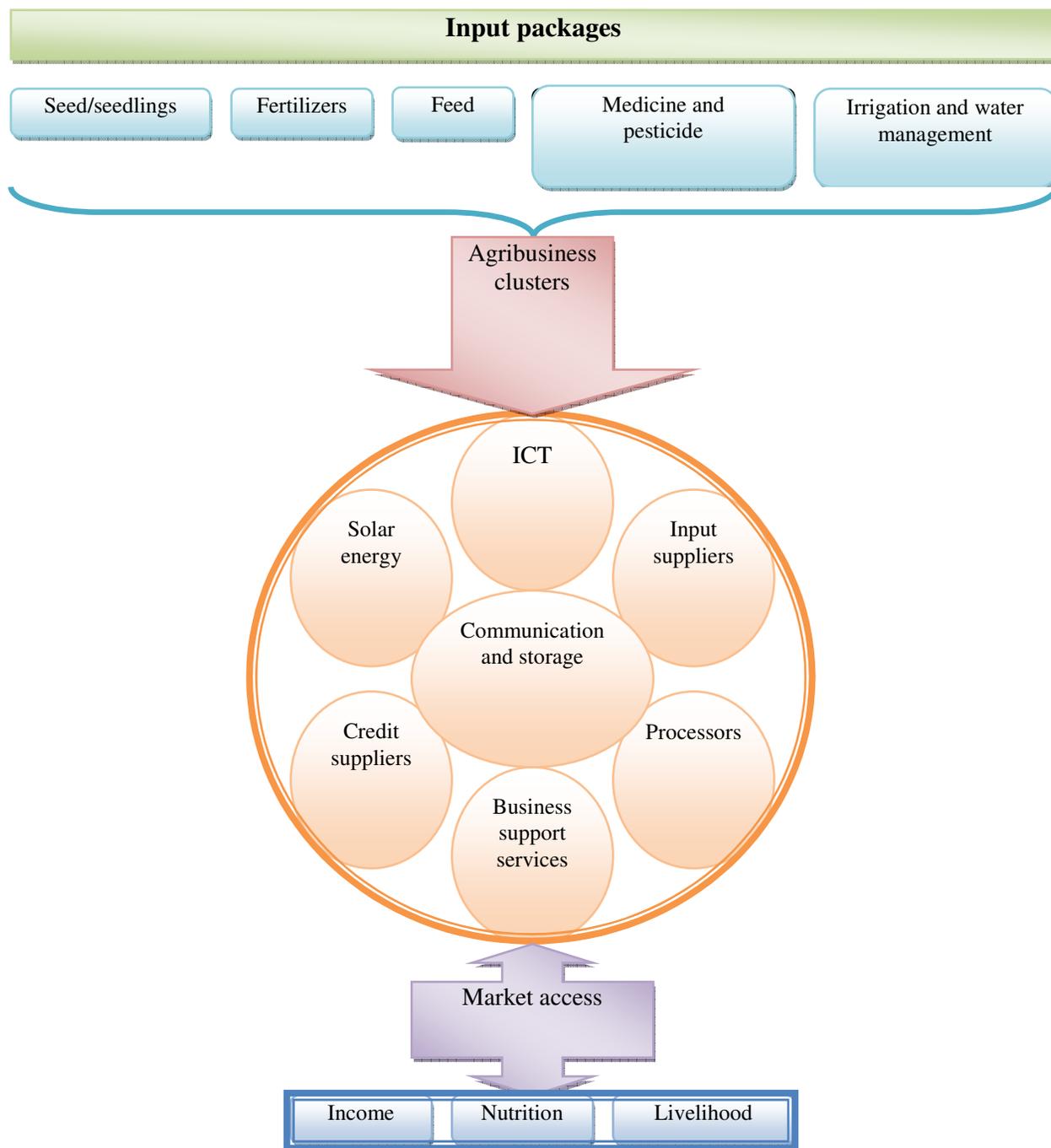


Diagram 1: Conceptual framework of business perspectives in *haor* areas

Diagram 1 depicts that targeting on crucial agricultural input packages, agribusiness clusters with the involvement of input suppliers, credit/financial organizations, different support service providers will be formed. Such supportive business environment will contribute notably for farmers' employment creation and income generation. Thereby, farmers' market access will be easier through more income yielding from different agricultural enterprises, better nutrition will be ensured and livelihood of the *Haor* people will be improved. Tersoo (2013) supported this concept where the author declared that the farm, non-farm and processing components of agribusiness are capable of generating

jobs, provision of income, poverty reduction and infrastructural growth in Nigeria.

### Considerable issues of agribusiness and future opportunities

The study areas hold a high agribusiness environment with plenty of local resources. Higher local and regional demand for good quality agricultural energy inputs (i.e., fertilizers, pesticides, feed, etc.) has created possible opportunities for fertilizers and pesticides industries, feed mills, etc. Now-a-days, modern agricultural equipments and machineries create crying need to these areas. Increased rice productivity and large amount of

fish availability in the *Haor* areas show great prospects of establishing rice mills and fish processing industries (Table 7).

However, to address whether the agribusiness venture has a good business opportunity, it is necessary to analyze adequately the factors like potential market for the proposed business, economic availability of sufficient raw product and the production process as

well as environmental conditions with the availability of facilities and services to be required by the proposed venture. The venture has the potential to be profitable if all of these factors are analyzed adequately. It is also important to consider the challenges as: price fluctuation, environmental vulnerability, declining amount of cultivable land, land transformation, etc. and so on.

**Table 7. Available resources and extent of agribusiness opportunity**

Enterprises involved	Avenue of agribusiness potential	Available resources	Considerable issues	Extent of opportunity based on researchers' observation		
				High	Medium	Low
Crop	Fertilizers and pesticides industries	Labour abundance and availability of quality ingredients	Higher demand and market price, and employment opportunities		√	
	Seed processing industries	Availability of high quality grains	Lack quality seed and demand for high yielding variety seeds			√
	Rice mills	Higher rice productivity and labour availability	Risk of paddy damage and immediate course of action, and higher demand for processed grains	√		
Livestock and poultry	Feed mills	Availability of quality ingredients	Demand for quality feed; and lack of specialized feed for each of livestock and poultry		√	
Fish catching	Fish processing industries	Plenty of different kinds of fishes	Higher demand of processed fish and export potential	√		
All agricultural enterprises	Agricultural equipment and machinery industries	Availability of manpower, and equipment producing and processing elements	Lack of necessary agricultural equipments and machineries in time, and higher demand and market price	√		
	Transportation vehicles and storage	Availability of labour and scope of investment	Higher demand due to product perishability	√		

Source: Researchers' observation, 2016.

### Recommendations for policy intervention

The recommendations based on intervention points in accordance with respondents' agreement are represented in Table 8. It is experienced that 81.5% respondents agreed with formation of contract based cooperative groups for fair output price and 76.8% respondents

agreed with establishment of seed bank and fertilizer depository. Other recommendations were provision of agricultural incentives for reducing migration rate and usage of appropriate vehicles (according to 39.7% and 46.4% farmers, respectively) (Table 8).

**Table 8. Recommendation matrix**

Points to be intervened	Recommendations	Facts of consideration	Agreement of respondents (%)
Agricultural inputs (e.g., seed and fertilizer)	Establish seed bank and fertilizer depository	Research and extension needed	76.8
Fair output price	Form contract based cooperative groups	Policy intervention needed	81.5
Motivation of agricultural labour	Provide agricultural incentives for reducing migration rate	GO-NGO support needed	39.7
Mode of transportation and storage	Use appropriate vehicles considering road condition and establish cold storage	Public private partnership needed	46.4

Source: Field survey, 2016.

## Conclusion

The study concludes that the business environment in the *Haor* areas has a high potential to be exposed with the integration of available local agricultural resources. This can contribute to the improvement of livelihood of the people living in *Haor* areas. The people of the study areas were dependent on fish catching along with other activities in the *Haors* which was supported by crop production, livestock rearing and poultry farming. Involvement with these agricultural enterprises was comparatively profitable and productive in *Haor* areas compared to the main land. Considering the findings, several issues have been arisen to think which are: government price support and improved market management are needed for availability and applicable use of agricultural inputs, and support from GOs and NGOs for managing local productive resources in use of business prospects in the study areas. Moreover, organization of seminars and workshops are necessary to build awareness of the respondents for overcoming the constraints.

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