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**Analysis of Factors Affecting Market Participation by
Brinjal Farmers: A Case Study of Jashore and Narsingdi
District, Bangladesh**

by Masud Rana and Keshav Lall Maharjan

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Title: Analysis of Factors Affecting Market Participation by Brinjal Farmers: A Case Study of Jashore and Narsingdi District, Bangladesh.

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Abstract

Brinjal is an important vegetable for earning cash income for rural farmers in Bangladesh. However, enhancing farmers to participate in the better remunerative market are constrained by several factors. This research aimed to identify the factors affecting the urban market participation decision of brinjal farmers. For the primary data, we conducted 113 brinjal farmers using random sampling technique. Linear probability model was used to identify the factors affecting participation decision in the market. The results identified that participation decision on market depend on years of schooling, farming experience, farm size, distance from farm to urban market, road quality from farm to market, access to extension services, market information, trust-based credit from traders, yield, and farmer price. Participation on urban market by the farmers positively dependent on farm size, road quality from farm to market, access to extension services, market information, yield, and farmer price. On the other hand, distance from farm to urban market negatively affected to participate on urban market. We suggest that policymakers need to adopt inclusive policy to increase farmer's participation in urban market and increase the efficiency of the local market.

Keywords: Participation; Linear probability model; urban market; local market, policymakers; inclusive, efficiency

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1. Introduction

Marketing of agriculture products has an important role in achieving the aims of food security, poverty reduction and sustainable agriculture (Chiv et al., 2018). To ensure income from agriculture produces farmers depend on the traders, nearby market, roadside markets for selling their produces. But accessing better price depends on the choice of market and traders. So, market participation is a major gateway for rural people assuring better income and improving food security (Kyaw et. al., 2018). It can be noted importantly that linking farmers to market is necessary. Although there are debates which markets are appropriate and feasible for farmers (Poole, 2017).

Economic development of many developing countries, particularly South Asia is highly dependent on agriculture growth as large number of populations depend on agriculture directly or indirectly for their livelihood (Stamn et al., 2006). Not an exception, Agriculture is the engine of Bangladesh's economy and remains one of the important sectors of the nations despite steady towards industrialization. This sector contributes 14.23% to the country's GDP and employs around 40.60 percent of total labor force (BBS, 2019). About 54% households live in rural areas, among the total households, 46.61% are agricultural farm households, which have an average 0.05 acres of cultivated land (BBS, 2019).

Vegetables are grown in homesteads of rural areas such as small, medium, and large size land to meet the demand of household consumption as well as commercial purposes. The production volume for total vegetables was 4336 thousand metric tons in 2019 and 3068 thousand metric tons in 2010 (BBS, 2019). It means that the country's vegetable production increased by 41.32% in

2019 compared to 2010 (BBS, 2019). This increase shows that production has tremendously grown in the last ten years in Bangladesh.

Nearly, 142 types of vegetables are grown in Bangladesh both summer and winter season even all the year round (Rahman et al., 2020). Brinjal is the second most important vegetable in Bangladesh in terms of both production area and yield and a popular source of income for small and marginal farmers, only surpassed by potatoes (Shelton et al., 2020). In 2019, brinjal cultivated with 82000 acres produced 530000 metric ton (BBS, 2019). It is an important source of income for small resources poor Bangladeshi farmers. Therefore, farmer's income depends on market participation and search track for accessing more income from the market. Linking farmers to better price market is crucial for economic development of the farmers. It indicates that market participation of farmers is an important track for ensuring better price for their improved livelihood through linking better price market participation. To ensure farmer welfare and increases their participation in better price market are the key concern for the policymakers. So, the main objective of this study was to identify the factors affecting urban market participation by brinjal farmers.

2. Literature Review

There are many numbers of determinants for market participation for smallholder as well commercial farmers. These determinants are mainly affected by two ways external and internal factors. External factors like existing physical and institutional infrastructure such as road, electricity, transport system, communication, market, and rules of law affect market participation by the farmers (Poole, 2017). In reverse, farm size, experience, capital, schooling, assets ownership, human skill, and utilization of market information are the internal factors that affect market participation. In relation with this internal factors Mukarumba et al. (2018) identified that

household characteristics such as labor shortages, low level of education had negative impacts on market participation.

Generally, most of the farmers live in rural areas and depend on agriculture income by selling their produces to farmgate sale or market. As farmers live in remote areas with poor road infrastructure, market distance, these are hindering to participate in the better price market such as nearest urban market. For instance, poor quality of road infrastructure was an impediment to participate on formal market of smallholder's farmers in India and Kenya (Ochieng et al., 2017; Panda and Sreekumar, 2012). In contrast, Kyaw et al. (2018) found that movement of goods from rural areas to urban areas influenced market participation by smallholder rice farmers in Myanmar due to better road condition.

Many studies have indicated that smallholder farmers are constrained from participating remunerative markets by several factors such as poor bargaining power, lack of access to institutional and physical access, high transaction cost, household characteristics such as labor shortages, low level of schooling, low volume of production (Zamasiya et al., 2014).

Vegetables are considered to have high economical & nutritional value (Mannan and Rahman, 2017). It contributes to rural livelihood through generating cash income. Farmers can get higher return from vegetables production than from rice production (Rahman et al., 2020). But this high income generated from vegetable farming was positively correlated to high value market participation (Maspatella et al., 2018). In addition, to participate in the high value market like supermarkets in developing countries there is set of parameters and condition which are not connected to all the farmers even if they have large farm size and volume of production. Economic liberalization has made space to farmers for participating in the market (Asfaw et al., 2010).

However, remotes area farmers lack marketing knowledge and participate mostly in the nearby local market. Vegetables are perishable in nature and cannot be stored for longer periods, which necessitates immediate sale after harvesting (Ahmed and Feher, 2009).

Market participation is the ability to participate in a market effectively and efficiently (Poole, 2017). It increases the ability from subsistence farming to market engagement mode. As Bangladesh is now moving from subsistence to commercial agriculture farmers need to focus on diversification of surplus produces, secure extension services, information, fair prices of farmers, access to high value market. So, success of commercialization depends on the secure connection with better price and access to premium market. But remoteness, inadequate infrastructure, transport and storage facilities, diverse number of traders and difficulties accessing reliable information on products and prices hinder them to access better price market (Osmani and Hossain, 2015). Even, trading system and nature of market vary from market to market. This sometimes creates difficulties of reliable market information to access in the market. However, very few studies have been conducted in Bangladesh to identify the factors responsible for market participation by the farmers. As of our knowledge, no studies have been conducted for factors affecting market participation in the study site. So, this study was an effort to fill the research gap and contribute to the policymakers for understanding factors behind this. Thus, the main objective of this study was to identify the factors affecting urban market participation by brinjal farmers.

3. Material and Methods

3.1 Study area

The study was conducted in two districts namely Jashore and Narsingdi. Jashore district is located at south-western region whereas Narsingdi district is located at north-eastern region of Bangladesh.

These two districts are geographically separate from each other in Bangladesh. However, economy of Jashore and Narsingdi are predominantly dependent on agriculture. Nearly, 63.38% and 51.22% of the total households are agriculture farm holdings in Jashore and Narsingdi district (BBS, 2019). Due to fertile land and favorable climate condition this two districts are very suitable for brinjal production. In 2019, about 27% of total brinjal produced in Bangladesh came from two districts (BBS, 2019). About, 30-60% of the local produced vegetables goes to capital city Dhaka from these areas (DAE, 2018; Karim and Biswas, 2016). Considering the availability and huge production of brinjal Jashore and Narsingdi district were purposively selected. One sub district from each district, Sadar sub-district from Jashore and Belabo sub-district from Narsingdi were selected under this study. In study areas, there are two main wholesale markets, one is large wholesale market situated near the main center of sub-district and another one is small wholesale market located in the village areas. Generally, farmers participate in either large wholesale market or small wholesale market in these study areas. So, for better understanding in this study, this two-market categorized as large wholesale market as “Urban market” and small wholesale market as “Local market”.

Local market: In local market, trade is operated by the direct sales by the producers to local market traders or the partner of the large wholesaler traders. Local markets are usually arranged on a periodic basis or on specific weekdays. They are commonly organized at a central place of villages and besides a main road connected with district highway.

Urban market: A market in which producers and buyers are in large number, the size of market is also large such as large volume traded, large number of producers and buyers, every day of operation, located at main center of sub-district.

3.2 Conceptual framework of market participation

The conceptual framework (figure 1) implies the interrelationships of explanatory variables

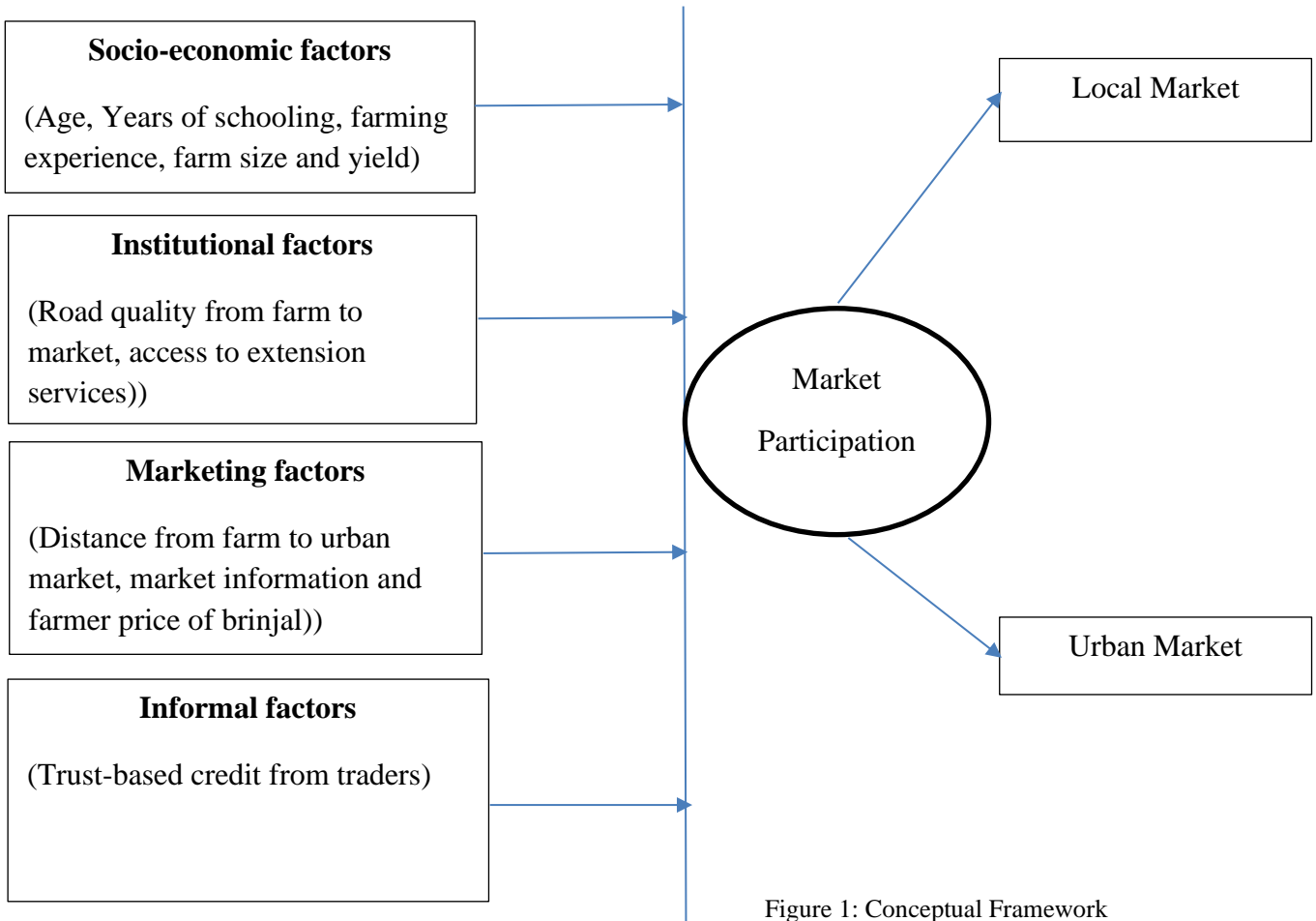


Figure 1: Conceptual Framework

used in this study and how they are interdependent. The socio-economic factors were age, years of schooling, farming experience, farm size and yield. The institutional factors were road quality from farm to market, access to extension services and the marketing factors were distance

from farm to urban market, market information and farmer price of brinjal. Therefore, the only informal factor was trust-based credit from traders. All these factors were influenced to take market participation decision either in urban or local market.

3.3 Sampling procedure

The target population was all farmers engaged in brinjal cultivation and sold to market. At first, a common list of vegetables producers was collected from the Sub-district agriculture offices from the study areas, then from the common list of vegetables producers only the farmers who cultivate brinjal and sold to market either local or urban market were randomly selected from the study areas.

Table 1: Sample distribution in terms of study area.

District	Sub-district	Number of Respondent	Percentage of total respondent
Jashore	Sadar	60	53
Narsingdi	Belabo	53	47
Total		113	100

3.4 Data collection

Data were collected through face-to-face interviews with the semi-structured questionnaire. The questionnaire included both open and closed-ended questions. Before conducting final survey, the questionnaire was approved by research ethics committee, Graduate School of International Development and Cooperation (IDEC), Hiroshima University with complying ethical aspects like basic human rights, protection of personal information and security of data. Questionnaires were pretested using farmers before conducting the final survey. Data was collected in the period of August 15, 2020, to September 30, 2020.

3.5 Data Analysis

Data were coded and entered Microsoft excel sheet, then data were analyzed using (STATASE 15) software. Descriptive statistics such as means, percentages, standard deviation and frequencies were used to describe the data.

Dependent Variable

The dependent variable denotes two market participation that farmers participate in the study area sold their brinjal to two market- (1) Urban market or (2) Local market. Here the linear probability model (LPM) was used to identify the probable relationship on independent variable to participate in the market.

Independent Variable

Independent variables were categorized based on Socio-economic characteristics (Age, Years of schooling, farming experience, farm size and yield), institutional factors (Road quality from farm to market, access to extension services), marketing factors (Distance from farm to urban market, market information and farmer price of brinjal) and informal factors (Trust-based credit services). Based on the independent variable following Linear probability model equation was derived to identify the factors affecting market participation by the farmers, the following linear probability model was.

$$Y_i = \beta_0 + \beta_j X_{ji} + U_i \quad (i=1,2,...n \text{ observations} \quad \text{and } j=1,2,...k \text{ variables})$$

Where, Y (0, 1) is a dependent variable and X is a set of independent variables, β_j is the coefficient of the independent variable, β_0 is constant/intercept and U_i is the error term.

Table 2. Description of dependent, independent variables and expected sign.

Dependent Variable		
Variable	Description	Measurement
Market Participation	Participate to either Urban or Local market	1= If participate Urban Market 0= If participate Local Market

Independent Variable				
Variable	Description	Measurement	Category	Expected sign
X_1	Years of Schooling	Number of years	Continuous	+
X_2	Farming Experience	Number of years	Continuous	+
X_3	Farm size	Acre	Continuous	+
X_4	Distance from farm to urban market	Kilometers	Continuous	-
X_5	Road quality from farm to market	1 if paved road, 0 if unpaved road	Dummy	+
X_6	Market information	1 if yes, 0 if no	Dummy	+
X_7	Access to extension services	1 if yes, 0 if no	Dummy	+
X_8	Trust based credit from traders	1 if yes, 0 if no	Dummy	-
X_9	Farmer price ⁴	BDT/Kilogram	Continuous	+
X_{10}	Yield	Kilogram/Acre	Continuous	+

4. Justification for inclusion of Independent Variables

4.1 Years of Schooling:

Years of schooling of farmers was taken as continuous variable meaning the number of years spent in formal educational institution. Schooling years of farmers may have better skill, knowledge and

⁴ Farmer price means price received from selling per kilogram brinjal from the market where he participated.

utilize the market information to improve the marketing practices. The higher level of schooling years has been found to positive effect on farmers participation to take quick decision compared to those who have low level of schooling years (Kyaw et al., 2018; Mamo et al., 2014; Kuma and Getnet, 2011; Birthal et al., 2005;). Thus, it was considered that years of schooling might have positive impact on market participation decision.

4.2 Farming experience

Age and farming experience are highly correlated. To remove the biasness of the result, age excluded from the list of variables in this study. Farming experiences improve the long-term relationship with the traders and have more bargaining power to output market for selling brinjal and connected with more market information. According to Vakis et al. (2003) farming experience improve farmer's negotiation skill. Thus, it was expected as a positive sign for this study.

4.3 Farm size

Farmers who had large farm in brinjal cultivation might increase the probability to participate in the urban market. It was also assumed that large farm size might have other multiple agriculture produces which indicated to gain more experience, knowledge with the market that helped to make the decision to participate in the market. Increase in land under vegetables cultivation and large farm size were positively influenced to make channel and market choice (Abebe et al., 2016; Xaba and Masuku, 20120. Thus, it was measured as continuous variable in per acre and expected as positive sign.

4.4 Distance from farm to urban market

This is continuous variable in kilometer, and it was expected as a negative sign. The closer the distance from farm to market, the lesser transportation cost and near the market prefers market participation. Several studies found the negative influence of distance on smallholder farmers participation in the market (Tarekegn et al., 2020; Alene et al., 2008; Makhura et al., 2002; Mariano et al., 2012; Siziba et al., 2011, Xaba and Masuku, 2012). Farmers who had farm location far away from urban market might be less likely to sell urban market and participate in nearer market.

4.5 Road quality from farm to market

It was expected as a positive influence on market participation and assumed that decision depends on the quality of road directly connected from farm location to market. It was categorized as dummy variable for paved road and unpaved road connection from farm location to market. Farmers who had access to paved road connection from farm location to market may have better access to transportation facilities, better market information, save time to the access market that can positively influence market participation decision. Two studies found that farmer near the main road had better access to market information and transportation facilities (Chiv et al., 2020; kassa et al., 2017).

4.6 Market information

Farmers who did the prior contract with his/her fellow farmers through social network relationship about the market price information and contacted over phone to get price and operational information about the market that might be positive influence to make appropriate decision for participating in the market. Market information helped improve farmer knowledge of the market

and made an appropriate plan to sell rice in the market (Kyaw et al., 2018). Thus, it was measured as a dummy variable and expected as positive sign in this study.

4.7 Access to extension services

Farmers who had access to extension services about the market linkages with large wholesalers, sometimes free weight facilities for produces, training and advisory services about application of fertilizer and pesticides, sorting, packaging, and market information under government development project support might be positive influence on market participation decision. McNamara and Tata (2015) found that access to extension services brought knowledge, market information and technical skills for smallholder's vegetables farmers. Therefore, it was assigned as positive sign for this dummy variable.

4.8 Trust based credit from traders.

Farmers who had trust-based credit from their traders before harvesting, next selling or at the time of cultivation with brings promise that he/she could sell his produces to traders. It is not like formal credit services; it was totally dependent on trust-based credit services between producers and traders. Though, formal credit services that some studies found that access to credit positively related with output market and more value addition (Mamo et al., 2014). In contrary, it was assigned as dummy variable and expected as negative sign that it may have constrained to the farmers to make freedom of choice to participate in the market.

4.9 Farmer price

Price received from the market by the farmers for his/her per kilogram selling of brinjal was an important variable that farmers might choose appropriate market participation which was expected

as positive sign. Azam et al. (2012) found that farmers boosted to produce large volume of yield because of high price. In this study, it was measured as continuous variable and expected as positive sign.

4.10 Yield

The total production of brinjal in per acre was measured in kilogram as continuous variable. An increase in production was found to increase farmer market participation (Kyaw et al., 2018). Therefore, the total yield of brinjal hypothesized to positively influence on market participation decision.

5. Result and Discussion

5.1 Demographic and Socioeconomic characteristics of farmers

Table 3 describes the descriptive statistics of the farmer's socio-economic characteristics and market factors between the participants of urban and local market. The sample of 113 farmers identified that 51 farmers had participated in urban market and 62 farmers participated in local market. The average schooling years of urban market participants was 7.76, where 5.69 years for local market participants. There were at 1% level of significant difference between urban and local market participants for schooling years. It indicates that urban market participants had higher schooling years than local market participants. The average years of farming experience for urban market participants was 24.60, while 22.35 years for local market participants. It means that in case of farming experience, it had no significant difference between urban and local market participants.

The average farm size for the urban market participants was 0.51 acre, while it was 0.28 acre for the local market participants. It implies that urban market participants had large brinjal farm size than local market participants, and it was at 1% level of significant difference.

The results reveal that the average distance from farm location to urban market for urban market participants was 2.93 kilometers and 4.06 kilometers for local market participants. It indicates that urban market participants are closer to urban market, while local market participants were comparatively farther from urban market, and it had at 1% level of significant difference.

Table 3. Summary statistics of selected variables of brinjal farmers.

Variable	Urban market (N=51)			Local market (N=62)			Mean difference	P value
	Mean	Min.	Max.	Mean	Min.	Max.		
Years of Schooling (years)	7.76 (3.62)	0	17	5.69 (3.13)	0	12	2.07***	0.001
Farming experience (years)	24.60 (9.98)	6	40	22.35 (9.06)	5	40	2.25	0.211
Farm size (acre)	0.51 (0.33)	0.08	2.00	0.28 (0.13)	0.08	1	0.23***	0.000
Distance from farm to urban market (kilometers)	2.93 (0.70)	1.50	4.50	4.06 (0.77)	3	6	1.13***	0.000
Yield (Kilogram)/acre	13778 (1108)	10900	15800	12096 (1182)	9117	14333	1682***	0.000
Farmer Price (BDT/Kilogram)	23.33 (1.24)	21	26	20.00 (1.97)	17	25	3.33***	0.000

Note: Numbers in the brackets are Standard deviation; Min=Minimum; Max=Maximum; Significance at ***1 percent, ** 5 percent, * 10 Percent (\$1=BDT 85)

The average yield of urban market participants was 13778 kilograms per acre, while 12096 kilograms for local market participants. It denotes that urban market participants had higher yield per acre than local market participants, and it was also at significant difference at 1% level. In case of farmer price received from the market between the two market participants illustrates that urban

market price was higher than the local market, while the farmer who participated in the urban market received average BDT. 23.33 for per kilogram brinjal and farmer who participated in the local market received BDT. 20.00 for per kilogram brinjal. It was at a 1% level of significant difference. So, it could be summarized that years of schooling, farm size, distance from farm to urban market, yield and farmer price were an statistically significant differences for participating in urban market.

In table 4 results show the frequency of selected variables of brinjal farmers for road quality from farm to market, access to extension services, market information and trust-based credit from traders between the two market participants.

Table 4: Summary statistics of selected dummy variables of brinjal farmers.

Variable	Measurement	Urban market (N=51)		Local market (N=62)		Overall Frequency
		Frequency	%	Frequency	%	
Road quality from farm to market	Paved road	43	84	9	15	52
	Unpaved road	8	16	53	85	61
Access to extension services	Yes	39	76	10	16	49
	No	12	24	52	84	64
Market information	Yes	40	78	12	19	52
	No	11	22	50	81	61
Trust based credit from traders	Yes	3	6	25	40	28
	No	48	94	37	60	85

The farmers who participated in the urban market 84% said that they had paved road connection from farm location to market, while 15% of farmers participated in the local market said that they had paved road connection from farm location to market. This understood that road quality was an important factor for participating in the urban market.

In case of access to extension services, 76% participants of urban market had access to extension services and only 16% of local market participant got extension services. In addition, 78% of farmers participated in the urban market they contacted to get about the market price information to participate in the market, while only 19% farmers participated in the local market communicated to get about the market price information. Among the farmers who participated in the urban market only 6% farmer said that they got trust-based credit from traders for temporary period in the time of cultivation or before harvesting period or before next selling, while the 40% farmers participated in the local market got trust-based credit from traders who had trade in the local market.

5.2 Factors that affect the participation decision to urban market by farmers.

The results in table 5 indicate the factors that influenced the probability to participate in the urban market by the brinjal farmers in Jashore and Narsingdi district. The equation of Linear probability model (LPM) showed that road quality from farm to market, access to extension services, farmer price was significant at a 1% level. Farm size, distance from farm to urban market and market information were significant at a 5% level and yield was significant at a 10% level.

Farm size: Farm size had a positive sign as expected, and it had positive impact on the participation of urban market and significant at 5% level. It implied that the probability to participate by the farmers in the urban market increased by 24.07% if one acre farm size increased. The farmer who had more land allocation for brinjal cultivation positively affected to participate in urban market due to it turned more yield and might have multiple crop cultivation and long-term relationship with urban market. This finding confers with Xaba and Masuku (2012) that farmers who had more land positively affected to choose the large sales channels by the vegetable's farmers in Swaziland.

Distance from farm to urban market: Distance from farm to urban market had a negative sign as expected, and it had negative correlation on the participation of urban market, and it was significant at a 5% level. It indicated that the probability to participate by the farmers in the urban market decreased by 8.29% if one kilometer's distance increased from farm location to urban market. According to Kyaw et al. (2018), distance to market was an indicator of travel time and transportation cost. Therefore, the larger the distance from farm to urban market, the lower the participation of urban market by the farmers.

Road quality from farm to market: Road quality from farm location to market expected to have positive relationship with the participation in urban market. This result indicates that it increased the probability to participate in the urban market by 22.07% if the road quality improved from unpaved to paved which was positively significant at 1% level.

Table 5: Factors that affected the urban market participation decision by Brinjal farmers.

Variable	Coefficient	Std. Err	Significance
Years of Schooling	.008366	.0076861	0.279
Farming experience	.0043514	.0026561	0.104
Farm size	.2407101**	.096765	0.014
Distance from farm to urban market	-.0829823**	.0335732	0.015
Road quality from farm to market	.2207144***	.0644565	0.001
Access to extension services	.2190758***	.0570181	0.000
Market information	.154703**	.0596671	0.011
Trust based credit from traders.	.0626802	.0652564	0.339
Yield	0.0000426*	0.0000218	0.053
Farmer price	.0509876***	.0145648	0.001
Constant	-1.432387	.4229092	0.001
R-squared	0.7741		

*Note: Significance at ***1 percent, ** 5 percent, * 10 Percent*

Access to extension services: Access to extension services increased the probability to participate in the urban market by 21.90% if they had accessed to extension services, and it was statistically significant at 1% level. It implies that farmers who had access to extension services like training and advisory services, market linkages facilities with the buyers through the aid of government project support positively influenced to participate in urban market.

Market information: The coefficient on market information showed positive impact on the participation on urban market, and it was increased the probability to participate in urban market by 15.47% which was significant at a 5% level. The positive result of market information means the farmers used market price information, operational activities like opening days of market

through communicating with his fellow farmers those who participated already in the market as a relationship of social networking and use of mobile phone to know about the price information on the market for searching premium price. Its emphasis on the importance of social networking with the fellow farmers and use of technology to get market information. This result was positive relationship with some studies that availability of market information positively influenced to choose market and channel participation (Chiv et al., 2020; Kyaw et al., 2018; Bindu and Chigusiwa, 2013; Panda and Sreekumar, 2012; Jari and Fraser, 2009). But it was different in context that market information gathered by farmers itself and previous studies found positive aspects of availability and sources of market information.

Yield: The total production of brinjal had a positive effect on the participation of urban market, and it was statistically significant at 10% level. The positive coefficient implies that the probability to participate on the urban market increased by 0.0000426, if one kilogram of brinjal increased per acre. It implied that farmers with higher yield of brinjal searched large wholesalers that were present in urban market, and it was positively affected to participate on urban market.

Farmer price: Farmer price had positive sign as expected and significant were at 1% level. It implies that the probability of farmers participation in the urban market increased by 5.09% if price increased by BDT. 1 per kilogram for brinjal. A similar positive relationship between producer price and participation in urban market found positively in smallholder vegetables farmers in Zimbabwe (Mukarumbwa et al., 2018).

Out of 10 independent variables three were not significant but had positive relationship with the participation of urban market. Among them coefficient was positive in case of farming experience, years of schooling and trust-based credit from traders. It indicates that farming experience, years

of schooling were positively correlated with the participation of urban market but not significant difference between the participants of two market. The distance from farm to urban market had a negative coefficient on the urban market participation, and it was significant at 5% level. This illustrates that the longer the distance from farm location to urban market, the less likely the proportion to participate in urban market. In contrast, the coefficient was positive surprisingly for trust-based credit from traders, though it was not a significant difference, but it was expected as the negative sign. It might be reasoning that 40% of participants of the local market got trust-based credit from traders before harvesting, next selling or in the time of cultivation but only 6% participants of the urban market got trust-based credit from traders. Due to the major differences between the participants of two market, the coefficient might be positive. In the study areas, there were informal agreement between the farmers and traders in the local market that was fully trust based where traders lent money to farmers for temporary period for his cultivation activities which was one kind of liability that influenced negatively to participate in urban market, and they were limited to sell at local market.

6. Conclusions

Marketing of vegetables are important for ensuring better income, sustainable agriculture and promote farmers in the local areas. This study found that market participation by brinjal farmers was affected by several factors for both in urban and local market. Urban market participation was positively affected by farm size, road quality from farm to market, access to extension services, market information, yield, and farmer price. But most importantly road quality from farm to market, access to extension services and farmer price positively affected to participate in urban

market. On the other hand, local market participation was affected positively by distance from farm to urban market. This study is different from previous studies in that sense it was different method of market information gathered by farmers, access to extension services received that positively affected to participate in urban market. As price is directly related to farmer's income, the farmers can get better price by selling brinjal in the local market through increasing the efficiency of local market and ensuring equality of positive factors of urban market participation applied in the local market. So, this study seems to a space to recommend policy to improve the market participation by the farmers.

7. Recommendation

The results of this study recommend the government can adopt inclusive policy for improving the farmer's participation in the market. As distance from farm to urban market, road quality from farm to market, access to extension services, market information, yield and price are an important factor, the government should improve the road quality from farm location to market, ensure access to extension service and market information for the farmers to decide their participation in urban market. Besides, the market should be organized to reduce the price differentials between the urban and local market and increase the efficiency of the local market. In addition, to increase farmer's skill and marketing ability it needs to ensure regular access to extension services, availability of market information for the farmers in the local areas. Another factor that trust-based credit from trader's custom should be agreed in the way that it would positively affect the farmers freedom of choice to participate in market, or it would manage formally that can strengthen long term relationship with traders and farmers but no effect on farmers price and participation decision to choose the market.

8. Limitation of the study:

This study includes only the few factors to identify the probable relationship with the participation decision in the market. But there are many other unobservable factors like other socio-economic factors, physical and institutional factors that might have the probable relationship with the participation decision in the market. To check the robustness relationship with the participation decision of market, this study did not employ any casual inference approach that could address the unobserved bias and identify the causal relationship. Moreover, it did not cover the list of the sample in all villages in the study site, so insufficient number of sample size is one of the limitations of this study due to covid-19 pandemic situations.

References

- Abebe, G. K., Bijman, J., & Royer, A. (2016). Are middlemen facilitators or barriers to improve smallholders' welfare in rural economies? Empirical evidence from Ethiopia. *Journal of Rural Studies*, 43, 203-213.
- Ahmad, M., M. and Feher, P., (2009). "Supply Chain of Fruits and Vegetables and Correlated Impact of Managing the Quality" *Supply Chain Management: Intl. J.* 7(1):20–33.
- Alene, A.D., Manyong, V.M., Omany, G., Mignouna, H.D., Bokanga, M. and Odhiambo, G. (2008), "Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya", *Food Policy*, Vol. 33 No. 4, pp. 318-328.
- Asfaw, S.; Shiferaw, B.; Simtowe, F.; Muricho, G.; Abate, T.; Ferede, S. Socio-economic Assessment of Legume Production, Farmer Technology Choice, Market Linkages, Institutions and Poverty in Rural Ethiopia: Institutions, Markets, Policy and Impacts Research Report No. 3. *Field Crops Res.* 2010, 36, 103–111.
- Azam, M. S., Gaiha, R., & Imai, K. (2012). Agricultural supply response and smallholders market participation: the case of Cambodia. School of Social Sciences, University of Manchester.
- Bindu, S., & Chigusiwa, L. (2013). Examining the sources of smallholder horticultural farmers exclusion from formal urban markets in Zimbabwe: the case of Chihota communal areas. *Int. J. Eco. Res*, 4(6), 1-12.
- Birthal, S.P., Joshi, P.K. and Gulati, A. (2005), Vertical Co-Ordination in High Value Food Commodities: Implications for Smallholders, Working Paper [85], International Food Policy Research Institute, Washington D. C, April 2005.
- Chiv, R., Nie, F., Wu, S., & Tum, S. (2020). Analysis of Factors Influencing Marketing Channel Choices by Smallholder Farmers: A Case Study of Paddy Product in Wet and Dry Season of Prey Veng Province, Cambodia. *Journal of Sustainable Development*, 13(4).
- Department of Agriculture Extension (DAE). 2018. Annual Report. <http://www.dae.gov.bd/>

- Jari, B. and Fraser, G.C.G. (2009), "An analysis of institutional and technical factors influencing agricultural marketing amongst smallholder farmers in the Kat River Valley, Eastern Cape Province, South Africa", *International Journal of Agricultural Marketing*, Vol. 4 No. 11, pp. 1129-1137
- Karim, R., & Biswas, J. (2016). Value stream analysis of vegetable supply chain in Bangladesh: a case study. *International Journal of Managing Value and Supply Chains*, 7(2), 41-60.
- Kassa, G., Yigezu, E., & Alemayehu, D. (2017). Determinants of smallholder market participation among banana growers in bench Maji Zone, Southwest Ethiopia. *Int. J. Agric. Policy Res*, 5, 169-177.
- kherallah, m., & kirsten, j. f. (2002). The New Institutional Economics: applications for agricultural policy research in developing countries: "New institutional economists are the blue-collar guys with a hearty appetite for reality." Oliver Williamson, 2000a. *Agrekon*, 41(2), 110
- Knowler, D., & Bradshaw, B. (2007). Farmers' adoption of conservation agriculture: A review and synthesis of recent research. *Food policy*, 32(1), 25-48.
- Kuma, B. and Getnet, K. (2011), "Determinants of participation decisions and level of participation in farm level milk value addition: The case of smallholder dairy farmers in Ethiopia", *Ethiopian Journal of Applied Science Technology*, Vol. 2 No. 2, pp. 19-30.
- Kyaw, N. N., Ahn, S., & Lee, S. H. (2018). Analysis of the factors influencing market participation among smallholder rice farmers in magway region, central dry zone of Myanmar. *Sustainability*, 10(12), 4441.
- McNamara, P. E., & Tata, J. S. (2015). Principles of designing and implementing agricultural extension programs for reducing post-harvest loss. *Agriculture*, 5(4), 1035-1046.
- Makhura, M.N., Kirsten, J. and Delgado, C. (2002), "Transactions costs and smallholder participation in the maize market in the northern province of South Africa. Integrated Approaches to Higher Maize Productivity in the New Millennium", *Proceedings of the Eastern and Southern Africa Regional Maize Conference 5-11 February 2002*,
- Mariano, M.J., Villano, R. and Fleming, E. (2012), "Factors influencing farmers' adoption of modern rice technologies and good management practices in the Philippines", *Agricultural Systems*, Vol. 110, pp. 41-53.

- Mamo, T., Tefera, T., & Byre, N. (2014). Factors influencing urban and peri-urban dairy producers participation in milk value addition and volume of milk value added in Welmera Woreda, West Shewa Zone of Oromia Regional State, Ethiopia. *International journal of livestock production*, 5(9), 165-172.
- Mannan, M. A., & Rahman, M. (2017). Situation of Vegetable Cultivation in the Khulna Region of Bangladesh Due To Climate Change and Shrimp Farming. *International Journal of Psychology and Behavioural Science*, 4(2), 555635.
- Maspaitella .M, Garnevska .E, Siddique .M.I, Shadbolt .N (2018). Towards high value markets: a case study of smallholder vegetable farmers in Indonesia. *International Food and Agribusiness Management Review* 21(1): 73-87
- Mukarumbwa, P., Mushunje, A., Taruvinga, A., Akinyemi, B., & Ngarava, S. (2018). Analysis of factors that influence market channel choice of smallholder vegetable farmers in Mashonaland east province of Zimbabwe. *International Journal of Development and Sustainability*, 7(1), 734-754.
- Ochieng, D.O., Veetil, P.C. and Qaim, M. (2017), “Farmers’ preferences for supermarket contracts in Kenya”, *Food Policy*, Vol. 68, pp. 100-111.
- Osmani, A. G., & Hossain, E. (2015). Market participation decision of smallholder farmers and its determinants in Bangladesh. *Economics of Agriculture*, 62(1).
- Panda, R. K., & Sreekumar. (2012). Marketing channel choice and marketing efficiency assessment in agribusiness. *Journal of international food & agribusiness marketing*, 24(3), 213-230.
- Poole, N. (2017). Smallholder agriculture and market participation. Food and Agriculture Organization of the United Nations (FAO).
- Rao, E.J.O. and Qaim, M. (2011), “Supermarkets, Farm Household Income, and Poverty: Insights from Kenya”, *World Development*, Vol. 39 No. 5, pp. 784-796.
- Rahman, M. M., Zhou, D., Barua, S., Farid, M. S., & Tahira, K. T. (2020). Challenges of value chain actors for vegetable production and marketing in North-East Bangladesh. *Geo Journal*, 1-11.

- Shelton, A. M., Sarwer, S. H., Hossain, M. J., Brookes, G., & Paranjape, V. (2020). Impact of Bt brinjal cultivation in the market value chain in five districts of Bangladesh. *Frontiers in Bioengineering and Biotechnology*, 8, 498.
- Shephard, S., Kefasi, N., Diagne, A., Fatunbi, A. O., & Adekunle, A. A. (2011). Determinants of cereal market participation by sub-Saharan Africa smallholder farmer learning publics. *J. Agric. Environ. Stud*, 2(1), 180-193.
- Siziba, S., Nyikahadzoi, K., Diagne, A., Fatunbi, A. and Adekunle, A. (2011), “Determinants of cereal market participation by sub-Saharan Africa smallholder farmer”. *Journals of Agriculture & Environmental Studies*, Vol. 2 No. 1, pp. 180-193.
- Stamm, A., Jost, C., Kreiss, C., Meier, K., Pfister, M., Schukat, P., & Speck, H. A. (2006). Strengthening value chains in Sri Lanka's agribusiness: A way to reconcile competitiveness with socially inclusive growth? (No. 15). *Studies*.
- Tarekegn, K., Asado, A., Gafaro, T., & Shitaye, Y. (2020). Value chain analysis of banana in Bench Maji and Sheka Zones of Southern Ethiopia. *Cogent Food & Agriculture*, 6(1), 1785103.
- Zamasiya, B., Mango, N., Nyikahadzoi, K., & Siziba, S. (2014). Determinants of soybean market participation by smallholder farmers in Zimbabwe. *Journal of Development and Agricultural Economics*, 6(2), 49-58.
- Vakis, R., Sadoulet, E., & De Janvry, A. (2003). Measuring transactions costs from observed behavior: market choices in Peru.
- Xaba, B. G., & Masuku, M. B. (2013). Factors affecting the choice of marketing channel by vegetable farmers in Swaziland. *Sustainable Agriculture Research*, 2(526-2016-37887).
- Yearbook of Agricultural Statistics, 2019. Bangladesh Bureau of Statistics (BBS) <http://www.bbs.gov.bd/>