Asian Journal of Agricultural Extension, Economics & Sociology

39(11): 569-576, 2021; Article no.AJAEES.67476
ISSN: 2320-7027

Factors Influencing Participation of Farmer in Contract Farming in Narsingdi District of Bangladesh

A. Taslim[1*], M. R. Karim[1] and M. S. Rahman[1]

[1]Department of Agribusiness & Marketing, Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Bangladesh.

Authors' contributions

This works was carried out in collaboration among all authors. Authors AT and MSR conceived the main idea and plan of the study. The statistics analyses were conducted by author MSR. The data collection, literature review and manuscript writing were conducted by authors AT and MRK. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2021/v39i1130785
Editor(s):
(1) Dr. Rajesh Kumar, Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), India.
Reviewers:
(1) Kushagra Joshi, ICAR VPKAS, India.
(2) Mubashir Ali Rather, SKUAST-K, Jammu and Kashmir, India.
Complete Peer review History:
https://www.sdiarticle5.com/review-history/67476

Original Research Article

Received 02 February 2021
Accepted 06 April 2021
Published 03 December 2021

ABSTRACT

Aims: Contract farming (CF) has been used extensively to integrate agricultural value chain both in the developed and developing countries. Participation in CF is associated with increased farm productivity and farmer income. Therefore, the purpose of this study was to analyze socio-economic factors affecting farmer's participation in contract farming.
Study Design: The selected 15 socio-economic factors were used to determine the impact on farmer's participation in contract farming. Besides, the socio-demographic profile of the farmers in the study area was discussed.
Place and Duration of Study: The study was conducted upon contract and non-contract farmers of Shibpur upazila under Narsingdi district of Bangladesh. The duration of the study was from July, 2019 to December, 2020.
Methodology: The study used nationally-representative data of smallholder vegetable farmers in Shibpur upazila of Narsingdi district. The data were collected from 75 contract farmer and 125 non-

**Corresponding author: E-mail: anikatasi13@gmail.com;*

contract farmer of Shibpur upazila. Binary logistic regression was used to analyze fifteen factors that potentially affected farmers' decision to participate in CF and descriptive statistics were used to analyze the socio-demographic profile of the farmer.

Results: The study found that farmers education, wife's occupation, family size, labor, fertilizer use, training, savings and income were the significant factors in the model and farmers occupation, other family member's occupation, income source, land type, size of land, experience and storage place were non-significant predictors using P<0.01 and P<0.05 threshold.

Conclusion: Farmer's education, female head's occupation, family size, land type, size of land holdings, labor use, type of fertilizers being used, training or technical knowledge and average monthly income of the respondents had a positive influence on farmer's decision.

Keywords: Contract farming; socio-economics; bean farmer; participation.

1. INTRODUCTION

Bangladesh is a developing country with a large population of 163 million. About 62% of the population is living in the villages [1]. About 20.5% of people in the rural area living below the poverty line [2]. For the majority of rural people, agriculture is the predominant source of livelihood. Linking poor farmers to markets is one way to break this vicious cycle, but it requires overcoming a number of obstacles and market imperfections [3,4]. Smallholder farmers may face significant risks due to the shortage of skill, technology, and financial service to produce a marketable surplus—or to supply the quality, quantity, and types of commodities demanded by buyers [5]. Contract farming is a pre-harvest agreement between farmers and buyers. It is widely regarded as a useful tool to mitigate market failures and lowering the risks [6,7,8]. Studies have been conducted throughout globe to assess the importance of contract farming [6,9,10] and factors that affect the farmer decision to participate in CF [11,7,12,13,14]. A particular study, such as Ntaganira et al. [15], discussed the effects of access to farm service on contract and non-contract dairy farmers in Rwanda. However, the paper did not further discuss its effect on the farmer's decision to participate in contract farming. With this backdrop, the current study was carried out in Narsingdi district with the objectives: To analyze the socio-economic profile of the farmers and to identify the factors affecting participation of farmers towards contract farming.

2. METHODOLOGY

The study was conducted on contract and non-contract bean farmers of Shibpur upazila under Narsingdi district of Bangladesh. Narsingdi District occupies an area of 1140.76 square kilometers, with latitudes ranging from 23'46' to 24'15' north and longitudes ranging from 90'34' to 90'59' east [2]. It is bordered by Kishoreganj district on the north, Narayanganj and Brahmanbaria districts on the south, Brahmanbaria and Kishoreganj districts on the east, Gazipur district on the west. Agriculture is the main source of income for 42.73% of the people of this district [16]. Selected upazila Shibpur is about 206.89 sq km [2]. It has a population of 237246 where Males constitute 50.77% of the population, and females 49.23% [2]. It has an average literacy rate of 32.3% (7+ years), and the national average of 32.4% literate [2]. Farming practices were categorized into 2 groups (Contract farm type & non-contract farm type) to identify the effect of the factors. The research required data from both contract and non-contract farmers and a large number of farmers of Shibpur upazila of Narsingdi district were engaged in contract farming for bean production. That's why the bean producers of the focal areas were selected as targeted respondents to collect data. Data collection instrument indicates through which tools data were collected. For conducting the study data were collected through an interview schedule prepared by the researcher. Data were collected from 125 non-contract grower and 75 contract growers. The semi-structured questionnaires contained a limited number of the set, closed questions, designed to elicit basic quantitative data, and a range of open-ended questions guided by a checklist of discussion topics. To get the desired information direct questions and different scales were kept in the questionnaire. The questionnaire included the education of farmers which were categorized into three categories as no institutional education, primary level of education and above secondary education. Family size were categorized into 1-4, 5-7 and more than 7 members. Major income sources of the farmer were classified into agriculture, agriculture and allied activities and

another category which includes business, salaried employee, farm labor. Average annual savings were categorized as less than BDT 1000, BDT 1000-5000, and more than BDT 5000 per year. Besides, average monthly income was categorized as less than BDT 20000, BDT 20000-30000, DBT 30000-40000, and more than BDT 40000 per month. Farmer's farming-related information like land type, land size, farming experience, type of fertilizers, storage facilities, and having technical knowledge were also classified into suitable categories.

- Descriptive statistics (frequencies and percentage) were used to describe socio-demographic characteristics and farming information.
- Binary logistic regression analysis was used as an analytical procedure to examine how the selected characteristics of the respondents influence the participation of contract farm type.

Following model was fitted to identify the factors:

$Logit(Yi) = ln[P(Yi = 1)/1 - P(Yi = 1)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \varepsilon$ (i=1, 2, 3, 4,….)

Where,

- P (Y_i=1) was the probability of participating in contract farming and $1 - P(Yi = 1)$ was the probability of not participating in contract farming.
- X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, and X_{15} represented as the 'Household head's education', 'Household head's occupation', 'Female head's occupation', 'Other family member's occupation', 'Family size', 'Major income source', 'Land type', 'Size of land holdings', 'No. of years engaged in farming', 'Labor use', 'Type of fertilizers being used', 'Having storage place for crops', 'Training or technical knowledge', 'Average annual savings', 'Average monthly income' respectively.
- β_0 is the intercept,
- β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, β_{10}, β_{11}, β_{12}, β_{13}, β_{14} and β_{15} are the regression coefficient of the independent variables.
- $\varepsilon$is the random error, normally and independently distributed with zero mean and constant variance.

To examine the relationship between some specific indicators of dependent variable, co-efficient of regression was computed. One and five percent level of significance was used for rejecting null hypothesis.

Collinearity diagnostics tests were done using a simple regression matrix of the variables [17]. Variance Inflation Factor (VIF) was used to check for tolerance level of multicollinearity. The average VIF of less than 10, implies that the variables in the model had no serious multicollinearity [17]. In addition, Durbin Watson Test (DW) was employed to test for serial autocorrelation which occurs due to omission of explanatory variables and misspecification of the mathematical model. Statistical Package for the Social Sciences (SPSS) was used to analyze data.

3. RESULTS AND DISCUSSION

The socio-economic background and characteristics of the farmer influence the type of farming to a large extent. So, a description of the characteristics of a farmer is necessary for analyzing the main objective of the present study. Socio-economic characteristics of the farmers included their family size, educational status, farm size, farming experience of the respondents, occupation, income, savings are described in Table 1.

From Table 1, it is observed that 55.5% of respondents were involved with only farming practice, whereas, 44.5% of respondents had other occupations along with farming. 38.0% of respondents were had no institutional education, 41.5% of respondents had primary level education and only 20.5% had secondary and above level education. In the case of female head's occupation, 75.5% of females were housewives and only 24.5% of females were involved with earning activities. At the same time, 28.5% of other family members were engaged with farming and other professions, and 49.0% of members were unemployed. The family size of the bean farmers of the study ranged from 1 to above 7 persons. The bean farmers having family size of 1-4, 5-7 and above 7 were 43.0%, 34.3% and 23.0% respectively.

Table 2 shows the respondent's major sources of income, average monthly income and annual savings. It is seen that 50% of farmers are dependent on agriculture and allied activities for their income whereas, 18.0% of farmers rely on

only agriculture as their earning source. A significant number of respondents (e.g. 32%) were dependent on other activities as their source of income. A substantial number of respondents (57%) average had annual savings between Bangladeshi taka 1000 to 5000 /year, while only 16% of respondents save more than Bangladeshi taka 5000 /year. 27% of respondents saved less than Bangladeshi taka 1000 /year. In the case of average monthly income, 38% of respondents earned Bangladeshi taka 20000 to 30000 per month and the percentage was 28.5 for a monthly income of Bangladeshi taka 30000 to 40000 per month. 11.4% of respondents earned less than Bangladeshi taka 20000 per month whereas, 17.5% of respondents earned more than Bangladeshi taka 40000 in a month.

Table 3 represents the farming information of respondents like land type, land size, years of farming experiences, labor use, the pattern of fertilizer usage. It is observed that 63.5% of respondents used both own and rented land for farming, where 28.5% of respondents used their own land and only 8% of respondents use leased land. Bean farmers were classified into three categories based on their farm size. The numbers of respondents having land size 'below 1 acre','1 to 3 acre', and 'more than 3 acre' were 37%, 58.5% and 4.5% respectively. The farming experience of a respondent was determined based on involvement in the farming activities related to agriculture. Bean farmers were classified into three categories based on their farming experience. The highest portion of the bean farmers (38%) had farming experience of

Table 1. Farmer's personal and family information

Variables	Frequency	Percent
Household head's occupation		
Only Farming	111	55.5
Others with farming	89	44.5
Household head's education		
No institutional education	76	38.0
Primary	83	41.5
Secondary+	41	20.5
Female head's occupation		
Housewife	151	75.5
Others	49	24.5
Other family member's occupation		
Unemployed	98	49.0
Farmer	45	22.5
Others	57	28.5
Family size		
1 to 4	86	43.0
5 to 7	68	34.0
More than 7	46	23.0

Table 2. Percentage distribution of income and savings information

Variables	Frequency	Percent
Major income source		
Agriculture	36	18.0
Agriculture and allied activities	100	50
Others	64	32.0
Average annual savings		
less than 1000	54	27.0
1000 to 5000	114	57.0
More than 5000	32	16
Average monthly income		
less than 20000	32	16.0
20000 to 30000	76	38.0
30000 to 40000	57	28.5
more than 40000	35	17.5

9 - 10 years and 33% of farmers had 7-8 years of experience. At least 8.5% of farmers had less than 7 years' experience whereas 20.5% of farmers had more than 10 years' experience. In the case of labor usage, 75% of respondents used both own and hired labor in their farming activities. Both chemical and organic fertilizers were used by farmers in the study area and 44% of farmers used both fertilizers on their land. 46% of farmers used only organic fertilizers and the percentage of farmers used only chemical fertilizers were 10%.

From Table 4 it is found that a large number of farmers (90%) had no storage place for their crops and only 10% of farmers possess the facilities. Besides, 42.5% of farmers had access to training or technical knowledge where 57.5% of farmers had no possess training.

Table 5 represents Cox & Snell R square was 0.472 and Nagelkerke R square was 0.643 which denotes that the model can explain 47.2% to 64.3% variables properly.

From Table 6, using $P<0.01$ and $P<0.05$ threshold, it was found that 'household head's education', 'female head's occupation', 'family size', 'labor use', 'type of fertilizers being used', 'training or technical knowledge', 'average annual savings' and 'average monthly income' were the significant factors in the model. Besides, factors 'household head's occupation', and 'Other family member's occupation', 'major income source', 'land type', 'size of land holding', 'no. of years engaged in farming', and 'having storage place' were non-significant predictors.

Table 3. Percentage distribution of farming information

Variables	Frequency	Percent
Land type		
Owned	57	28.5
Rented \ leased	16	8.0
Both	127	63.5
Size of land holdings		
Below 1 acre	74	37.0
1-3 acres	117	58.5
Above 3 acres	9	4.5
No of years engaged in farming		
Less than 7 years	17	8.5
7-8 years	66	33.0
9-10 years	76	38.0
Above 10 years	41	20.5
Labor use		
Hired	29	14.5
Owned	21	10.5
Both hired and owned	150	75.0
Type of fertilizers being used		
Chemical fertilizers	20	10.0
Organic fertilizers	92	46.0
Both	88	44.0

Table 4. Percentage distribution of storage facilities and training

Variables	Frequency	Percent
Having storage place for crops		
Yes	20	10.0
No	180	90.0
Total	200	100
Training or technical knowledge		
Yes	85	42.5
No	115	57.5
Total	200	100

Table 5. Binary logistic model fitting with predictors

Step	-2 Log likelihood	Cox & Snell R square	Nagelkerke R square
1	136.930[a]	.472	.643

Table 6. Factors influencing farmer's participation in contract farming

Factors	Coefficient	Standard error	df	p-value
Household head's education	-1.565	.348	1	.000***
Household head's occupation	.990	.529	1	.061
Female head's occupation	-1.356	.541	1	.012**
Other family member's occupation	.338	.306	1	.270
Family size	.887	.410	1	.031**
Major income source	-.311	.399	1	.435
Land type	.438	.259	1	.092
Size of land holdings	.908	.473	1	.055
No. of years engaged in farming	-.076	.167	1	.648
Labor use	1.016	.309	1	.001***
Type of fertilizers being used	.712	.350	1	.042**
Having storage place for crops	-1.188	.817	1	.146
Training or technical knowledge	1.314	.457	1	.004***
Average annual savings	-.923	.397	1	.020**
Average monthly income	-1.369	.344	1	.000***
Constant	1.345	2.800	1	.631

Household head's education (P<0.01) influenced the decision of farmers to participate in contract farming. In the study area 20.5% of the farmer completed their secondary level of education. Coefficient of farmer's education denotes that, 1 unit changes in farmer's education decreases by 1.56 unit the participation in contract farming.

Female head's occupation (P<0.05) had a significant effect on the participation in contract farming decision where 49% of the farmer's wife involved in other occupation like government or private job. In the study area, 1 unit changes in farmers wife's occupation decreases 1.35 unit in the participation of contract farming.

Family size (P<0.05) influenced the farmer's decision where large family members might convert into family labor and it reduces production cost. 1 unit changes in family size increases 0.887 unit contract farming participation.

Rented or own labor use (P<0.01) and type of fertilizers used (P<0.05) influenced farmer's decision to participate in contract farming. Farmers of the area used chemical fertilizer and organic fertilizer. It was seen that most organic fertilizer user engaged in contract farming as contract farming give priority to organic farming. 1 unit changes in labor use and fertilizers use increases the participation of contract farming by 1.01 and 0.71 units.

Training or technical knowledge (P<0.01), average annual savings (P<0.05) and average monthly income (P<0.01) had a significant effect on choosing farm type between contract and non-contract farm. The farmer got trainings from extension services, different government and private NGOs. Trained farmers felt comfort to join contract farming program while other non-trained farmers were not aware about contract farming. From the model it was observed that 1 unit changes in training or technical knowledge increases the participation by 1.314 units while 1 unit changes in average annual savings and monthly income decreases the participation by 0.92 and 1.36 units respectively.

It was observed from the study that among 15 explanatory variables, which were hypothesized to affect households' participation in contract farming, the significant variables included in the model such as farmers education, female head's occupation, family size, land type, size of land holdings, labor use, type of fertilizers being used, training or technical knowledge and average monthly income participation in contract farming. Educated farmers may collect information about the benefit of contract farming which encourages them to participate in contract arrangements.

When the female head is not engaged in income-generating activities, the farmer has to take all the responsibilities of family expenditure. This situation influences them to participate in contract farming. Large family size, owned land and small size of landholding motivate the farmer to engage in contract farming program. When a farmer uses family labor they are mostly involved in contract farming. One of the important requirements of contract farming is organic produces. Therefore, the farmer who uses organic fertilizers during bean cultivation has a better chance to engage in contract farming. Training and knowledge of modern agriculture lead the farmer to involve in contract arrangements.

4. CONCLUSION

This study was aimed at analyzing vegetable contract farming in Shibpur upazila under Narsingdi district. The specific objectives of the study were to identify socio-economic factors affecting smallholder farmers' participation in vegetable contract farming in the study area. Farmers in Narsingdi district generally showed a high desire and willingness to participate in contract farming arrangement with processors as a major partner in order to avoid risks and obtain better price. The factors that influence bean producing farmers to engage in contract arrangements in Narsingdi are basically the need for a reliable market and guaranteed price for their produce. From the study, it can be concluded that by virtue of the very high quality requirements by contractors, farmers who are educated, having a large family, available labor, who possess small farm, higher monthly income, technical knowledge are more likely to participate in contract arrangement.

ACKNOWLEDGEMENTS

All praises to the almighty Allah for his gracious kindness and infinite mercy which creates that opportunity for the author to complete the research work. The author is deeply indebted and grateful to her parents who continuously prayed for her success and without their love, affection, inspiration, and sacrifice this work would not have been completed. The author thankfully acknowledges the contribution of the bean farmers in the Narsingdi district for their kind help and co-operation, without the willingness to provide information this research would not have been possible.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. World Bank. Bangladesh: Growing the economy through advances in agriculture. World Bank. Washington DC, USA; 2016.
2. BBS. Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka; 2019.
3. Barrett CB. Smallholder market participation: Concepts and evidence from Eastern and Southern Africa. Food Policy. 2008;33:299–317.
4. World Bank. World Development Report 2008: Agriculture for development. Washington, DC, USA; 2007.
5. Reardon T, Barrett CB, Berdegué JA, Swinnen JF. Agrifood industry transformation and small farmers in developing countries. World Development. 2009;37:1717–1727.
6. Bellemare MF, Bloem JR. Does contract farming improve welfare? A review. World Development. 2018;112:259–271.
7. Bellemare MF, Lim S. In all shapes and colors: Varieties of contract farming. Applied Economics Perspective Policy. 2008;40:379–401.
8. Grosh B. Contract farming in Africa: An application of the new institutional economics. Journal of African Economies. 1994;3(2):231-261.
9. Narayanan S. Profits from participation in high value agriculture: Evidence of heterogeneous benefits in contract farming schemes in Southern India. Food Policy. 2014;44:142-157.
10. Reardon T, Timmer CP. Five inter-linked transformations in the Asian agro food economy: Food security implications. Global Food Security. 2014;3(2):108–117. DOI: 10.1016/j.gfs.2014.02.001
11. Rondhi M, Aji JMM, Khasan AF, Yanuarti R. Factors affecting farmers' participation in contract farming: The case of broiler sector in Indonesia. Tropical Animal Science Journal. 2020;43(2):183-190.
12. Khan MF, Nakano Y, Kurosaki T. Impact of contract farming on land productivity and income of maize and potato growers in Pakistan. Food Policy. 2019;85:28–39.

13. Mishra AK, Kumar A, Joshi PK, D'Souza A, Gundersen C. Production risks, risk preference and contract farming: Impact on food security in India. Applied Economics Perspective Policy. 2018;40:353–378.
14. Odunze Miyata S, Minot N, Hu D. Impact of contract farming on income: Linking small farmers, packers and supermarkets in China. World Development. 2009;37:1781–1790.
15. Ntaganira E, Shukla J, Mbeche R, Mbabzize M. Determinants of participation in contract farming among small holder dairy farmers in Rwanda. International Journal of Thesis Projects and Dissertation. 2017;5:11-19.
16. BBS. Yearbook of Agricultural Statistics of Bangladesh, Bangladesh Bureau of Statistics, Ministry of Planning, Government of the Peopssle's Republic of Bangladesh, Dhaka; 2019.
17. Gujarati DN. Basic econometrics. Fourth Edition, McGraw-Hill Publishers, New York, USA; 2004.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/67476