

## Implications of Female Farmer Knowledge and Participation in Bangladesh: Entrepreneurial Propensity and Income Enhancement

**Saanjaana Rahman** (Corresponding Author)

Centre for Enterprise and Society (CES), University of Liberal Arts Bangladesh (ULAB), Dhaka, Bangladesh  
Population Health Sciences, Weill Cornell Medicine, Cornell University, New York, USA  
Email: [saanjaana.rahman@gmail.com](mailto:saanjaana.rahman@gmail.com)

**Sajid Amit**

Centre for Enterprise and Society (CES), University of Liberal Arts Bangladesh (ULAB), Dhaka, Bangladesh

### Article History

**Received:** 3 November, 2021  
**Revised:** 14 December, 2021  
**Accepted:** 30 December, 2021  
**Published:** 5 January, 2022

Copyright © 2022 ARPG & Author

This work is licensed under the Creative Commons Attribution International



CC BY: [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/)

### Abstract

The study hypothesizes that female farmer participation in the local knowledge training provides corn farmers an advantage over non-participants. We planned on determining the amount of influence market participation had on female corn farmers along with entrepreneurial propensity among them and whether there was any change in income or standard of living among them. 600 female corn farmers were sampled in Bangladesh through a multi-stage sampling technique. Mean, standard deviation, and independent-sample t-test were used for data analysis. The findings showed that female participation in training classes gave them an advantage, entrepreneurial propensity ( $p < 0.01$ ), and improved standard of living/income enhancement ( $p < 0.01$ ). There is a continual need to strengthen female farmer participation through improved training for better outcome and economic growth.

**Keywords:** Corn; Female farmer; Training; Income; Entrepreneurial propensity.

## 1. Introduction

Agriculture sector can be a vital tool for sustainable transformation and modernization for developing countries, but little is invested in this sector [1]. The absence of interest for administered agriculture research and innovation here refrains developing countries from benefiting in multiple aspects including economic growth and development. The country's agriculture sector consists of 4 components; farming, livestock, forestry and fisheries, summing together into 39.8 percent of the labor force. The agriculture sector contributes upto 20% of GDP on average every year. Yet, insufficient management capacities, gender biasedness, low research intensities and lack of linkages between research, extension and farmers within the country leads to inefficient allocation of resources, especially within the female farmers. Corn production has gained popularity recently in northern Bangladesh, especially when floods destroyed their livelihood and decreased their standard of living in 1990s [2, 3]. According to the farmers, corn requires less water and provides quick income compared to other stable crop production in the region [2]. After training, female farmers in Lalmonirhat and Rangpur regions of northern Bangladesh has a vibrant and growing marketplace to sell their corn production, through which they have been able to build homes, improve income and standard of living that pulled their families out of poverty. Most of them have TVs and solar panels on their roofs [2, 4]. Despite the merits of corn production in Bangladesh, full advantage of corn have not been reaped. This is because female corn farmers do not utilize business, training and entrepreneurial ideas. A significant portion among the female farmers in corn production still remain within the poverty threshold [5]. They face challenges and barriers in access to input and output markets, where equipment utilized by many remain wasteful, unsustainable and produce low yields.

Growth in corn production among female farmers can be spurred by introducing innovation with training. This can be through imbibing market-oriented approach [6, 7]. There are numerous studies stating that participating in programmes and training activities can offer participants added advantage over non-participants, such as improved income, better standard of living, entrepreneurial ideas and enhanced performance and motivation [8, 9]. In response to advantage of market orientation among female corn farmers, Bangladesh have introduced training as a way to help them take corn farming as a business. They were provided knowledge and training on budget balance, entrepreneurial thought process, sustainable farming practices, and better income strategy among others. The question that needs to be answered is that how female participation within corn farming can provide positional advantage over female non-participants. With limited or no research conducted in this aspect, a study into this issue can possibly revamp the corn production in Bangladesh.

The objectives of the study were as follows:

1. To determine how female corn farmer participation in training can influence entrepreneurial propensity in the corn production.
2. To determine to extend to which female corn farmer participation in training has influences income enhancement.

## 2. Materials and Methods

The study used descriptive statistics for analyses. The design is a scientific method involving observation and description of the behavior among the participants anonymously without influencing them in any way. The subject of interest was local training programme in Northern Bangladesh: Lalmonirhat and Rangpur. As the area of interest was Bangladesh, but the specific focus was on Northern Bangladesh as majority of the corn production occurs there. Specifically, Lalmonirhat and Rangpur were chosen due to sizable female corn farmers in those two regions. A total of 600 female corn farmers were selected for participation and multi-stage sampling tool was utilized in this study. The age of both groups was between 18-50, with a mean age of 27 (standard deviation=0.3) as this age group is termed non-elderly among local farmers and retires from farming after that. The average family size was 5 members (mean=5.2), while most of the farmers had 2 children on average. It takes samples in stages using smaller and smaller sampling units at each stage [10]. The first stage consisted on selection among corn districts (Lalmonirhat and Rangpur in Northern Bangladesh). The second stage involved selecting simple random selection of female corn farmers to make up the sample size of 600. This simple random sampling tool takes a small random amount from the whole population for representation of the entire of the entire data set. This gives external validity in the study as each member has an equal and independent probability of being chosen [11].

In this study, the propensity to act as an entrepreneur was observed in terms of innovativeness, pro-activeness, and risk-taking ability by the female farmers. Entrepreneurial propensity was calculated as a merger of function between the single aggregated mean value of risk-taking, innovativeness, and pro-activeness. These three elements were used to calculate the entrepreneurial propensity index, through the mean aggregate score. Likert scale of 1-5 can be used where 1 means 'least likely to develop entrepreneur skill' and 5 means 'most likely to develop entrepreneur skill'. Individual factors can be incorporated to achieve the highest possible objective level [12]. An aggregate index of entrepreneurial propensity can be characterized as an average value of positive evaluation of individual factors, where the aggregated index of entrepreneurial propensity=mean value of positive evaluation of individual constructs integrated into the index (such as social environment, business support from local/state, quality of training, and personality traits).

$$AI_{EP} = U(SE + BS + QT + PT) / 4$$

Where  $AI_{EP}$  = aggregate index of entrepreneurial propensity

SE = social environment

BS = business support

QT = quality of training

PT = personality traits (how motivated is the participant)

U = mean

Along with that, a partial index of entrepreneurial propensity can be made to calculate the average value of positive responses to the indicators. Theoretically, aggregate index and partial index of entrepreneurial propensity should be the same.

$$PI_{EP} = U(EP_i) / 4$$

Where  $PI_{EP}$  = partial index

EP = Entrepreneurial propensity

U = mean

An independent sample t-test was performed on mean scores to observe the overall entrepreneurial propensity of the female corn farmers (both participants and non-participants). Levene's test is primarily used to check if the sample has equal variances. This is commonly termed as homogeneity of variance because analysis of variance assumes that variances are equal across groups or participants, where Levene's test can help in verifying that claim [13].

The lotteries method was employed to draw samples. The study also employed questionnaires for data collection, where female corn farmers were visited in their farms and homes for data gathering and pooling. Data analyses were conducted through descriptive statistics such as mean, standard deviation and inferential statistics like independent sample t-test. To single out independent sample t-test was important. The inferential test was conducted to compare the means of two independent groups namely participants and non-participants in the training for determining statistical evidence that the relationship between population means are significantly different. The study found it important to do so to understand if the participation in the training had achieved its objectives in true sense by building rich skills and generating knowledge among the participants.

## 3. Results and Discussion

Table 1 provides information on entrepreneurial propensity index score of participants and non-participants of the training.

**Table-1.** Entrepreneurial Propensity Index

<b>Entrepreneurial Propensity</b>	<b>Mean</b>	<b>SD</b>
Participants	3.7	0.7
Non-participants	3.4	0.6

Source: Field data

Entrepreneurial propensity was observed through risk taking, innovation and proactiveness. A mean aggregate score of those elements were employed to calculate the index. The **Table 1** shows comparison of the propensity among the female corn farmers, including both participants and non-participants. The results show how participants are more enriched in terms of entrepreneurial propensity (m=3.7, sd=0.7) compared to the non-participants (m=3.4, sd=0.6). The mean difference was found to be 0.3. The table shows that female corn participants had more tendency towards entrepreneurship (3.7) than the non-participants (3.4). Hence, it can be said that female corn farming participants had higher entrepreneurial propensity than non-participants [14].

**Table-2.** Independent Sample T-Test of Entrepreneurial Propensity Index

<b>Independent Sample t test</b>		<b>Levene's test for equality of variances</b>		<b>T-test for equality of means</b>					
		<b>F</b>	<b>Sig.</b>	<b>t</b>	<b>df</b>	<b>Sig (2-tailed)</b>	<b>Mean diff.</b>	<b>SE diff.</b>	<b>95% CI of diff. Lower, Upper</b>
Entrepreneurial propensity	Equal variances assumed	51.2	0.0	6.1	598	0.0	0.3	0.01	0.2,0.4
	Equal variances not assumed			6.3	541.5	0.0	0.3	0.01	0.2,0.4

Source: Stata 16 was used

**Table 2** shows independent sample t-test on mean scores to compare the overall entrepreneur propensity of female corn farmer participation on the training and non-participation. The table shows significant difference in participation in the participation, providing participants an added advantage over non-participants in entrepreneur propensity aspect. Hence, participating in training provides entrepreneur skill and enhancement of knowledge than those who do not participate.

**Table-3.** Income Index in Categories

<b>Income Outcomes</b>	<b>Mean</b>	<b>SD</b>
Participants	3.1	0.6
Non-participants	2.7	0.7

Source: Field Data

Income enhancement was manifested through physical, human and financial areas. A mean aggregate score of the key income areas were used to calculate the index. **Table 3** shows the comparison of the income enhancement of female corn farmers in both participants and non-participants. The results show that participants have improved income (3.1) compared to non-participants (2.7). Hence, participants who indulged in training had better outcome and non-participants ( $p < 0.01$ ), giving them advantage over non-participants in improved income. Anyone female corn farmer who involves in training will have better income than non-participants.

**Table-4.** Independent Sample T-Test of Income Outcome Index

<b>Independent Sample t test</b>		<b>Levene's test for equality of variances</b>		<b>T-test for equality of means</b>					
		<b>F</b>	<b>Sig.</b>	<b>t</b>	<b>df</b>	<b>Sig (2-tailed)</b>	<b>Mean diff.</b>	<b>SE diff.</b>	<b>95% CI of diff. Lower, Upper</b>
Income Outcomes	Equal variances assumed	0.5	0.4	7.3	598	0.0	0.4	0.01	0.3,0.5
	Equal variances not assumed			7.1	445.6	0.0	0.4	0.01	0.3,0.5

Source: Stata 16 was used

In Table 4, an independent sample t-test shows mean income scores to compare the overall income outcome of the participants of the training and that of non-participants. There was a significant difference in income outcomes among participants and non-participants ( $P < 0.01$ ). Through training they are well informed of farm credit access from banks and microfinance institutions, knowledge on how to utilize money sustainably and generate more profit as well as how to repay loans smartly. This led to poverty reduction, higher quality of life and overall economic development.

#### 4. Conclusion

To conclude, the study found that participating in training gives female corn farmers a positional advantage through entrepreneurial propensity and income improvement. The study recommends to continue training and knowledge spreading to promote overall betterment among the female corn farmers and beyond [15, 16]. It is worth noting that improving agricultural productivity among female will require innovative approaches to provide incentives and funding mechanisms to promote translation of new innovations in agriculture into solid benefits for poor farmers [17]. Government of Bangladesh can identify additional areas for poverty reduction among farmers and improve their overall quality of life.

#### References

- [1] Camacho, C., Torres, J., Jaegler, A., and Gondran, N., 2019. "Sustainability metrics for real case applications of supply chain network design problem: A systematic literature review." *Journal of Cleaner Production*, vol. 231, pp. 600–618. Available: <https://www.sciencedirect.com/science/article/abs/pii/S0309586X869005431>
- [2] Hossain, M., 2021. *Why farmers in northern Bangladesh are turning to corn for food security*. World Economic Forum.
- [3] Harper, L. J., 1986. "Food, nutrition, and agriculture: a liaison for world development." *Journal of the American Dietetic Association*, vol. 86, pp. 345–351.
- [4] Herdt, R. W., 1998. "Assisting developing countries toward food self-reliance." *Proceedings of the National Academy of Sciences of the United States of America*, vol. 95, pp. 1989–1992. Available: <https://doi.org/10.1073/pnas.95.5.1989>
- [5] Huddlestone, B., 1983. "Confronting world hunger." *Care Briefs On Development Issues*, vol. 3, pp. 1–8.
- [6] Von Braun, J., 2010. "Food insecurity, hunger and malnutrition: necessary policy and technology changes." *New biotechnology*, vol. 27, pp. 449–452. Available: <https://doi.org/10.1016/j.nbt.2010.08.006>
- [7] Gopalan, C., 1996. "Current food and nutrition situation in south Asian and south-east Asian countries." *Biomedical and Environmental Sciences: Bes*, vol. 9, pp. 102–116.
- [8] Slater, S. F. and Narver, J. C., 1998. "Customer-led and market-oriented: let's not confuse the two." *Strategic Management Journal*, vol. 19, pp. 1001–1006.
- [9] von Braun, J., 2004. "Contributions and risks to sustainable food security--Berlin statement." *Food and Nutrition Bulletin*, vol. 25, pp. 89–92. Available: <https://doi.org/10.1177/156482650402500106>
- [10] Sedgwick, P., 2015. "Multistage sampling." *BMJ Clinical Research*, vol. 351, p. H4155. Available: [https://www.researchgate.net/publication/281107209\\_Multistage\\_sampling](https://www.researchgate.net/publication/281107209_Multistage_sampling)
- [11] Di Paola, G., Bertani, A., De Monte, L., and Tuzzolino, F., 2018. "A brief introduction to probability." *Journal of Thoracic Disease*, vol. 10, pp. 1129–1132. Available: <https://doi.org/10.21037/jtd.2018.01.28>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5864684/>
- [12] Dvorský, J., Petráková, Z., Zapletalíková, E., and Rózsa, Z., 2019. "Entrepreneurial propensity index of university students. The case study from the Czech Republic, Slovakia and Poland." *Oeconomia Copernicana*, vol. 10, pp. 173–192. Available: <https://doi.org/10.24136/oc.2019.009>
- [13] Wang, Y., Rodríguez de Gil, P., Chen, Y. H., Kromrey, J. D., Kim, E. S., Pham, T., Nguyen, D., and Romano, J. L., 2017. "Comparing the performance of approaches for testing the homogeneity of variance assumption in one-factor anova models." *Educational and Psychological Measurement*, vol. 77, pp. 305–329. Available: <https://doi.org/10.1177/0013164416645162>
- [14] de Haen, H. and Thompson, B., 2003. "Food security in a world without borders." *Forum of Nutrition*, vol. 56, pp. 375–379.
- [15] Howard, L. M., 1991. "Public and private donor financing for health in developing countries." *Infectious disease clinics of North America*, vol. 5, pp. 221–234.
- [16] Tontisirin, K., Nantel, G., and Bhattacharjee, L., 2002. "Food-based strategies to meet the challenges of micronutrient malnutrition in the developing world." *The Proceedings of the Nutrition Society*, vol. 61, pp. 243–250. Available: <https://doi.org/10.1079/PNS2002155>
- [17] Delmer, D., 2005. "Agriculture in the developing world: connecting innovations in plant research to downstream applications." *Proceedings of the National Academy of Sciences Nov*, vol. 102, pp. 15739–15746.