
ANALYZING THE MERGING EFFECT OF AGRO-PRODUCTION AND FORMAL TRAINING ON WOMEN-EMPOWERMENT IN RURAL-BANGLADESH

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Abstract

Bangladesh is known as one of the developing countries where agricultural sector has been highlighted as the spine-strength for growing economy. In this agro-sector, women participation has been emphasized as women empowerment, is playing effective role to enhance agro-production significantly. The author considers 4 individual villages in rural Bangladesh with systematic sampling on 200 women through household survey to measure the effect of independent variables on dependent variable (women empowerment in agricultural sector), that is measured as index method. The author run multiple regression to analyze the effect of independent variables on dependent variable (WEIA) where agricultural production (AP), training facility (TF) and media connection (MC) have been proved positive connection with women empowerment. These variables are statistically significant in this model. However, the joint variable (AP*TF) is statistically significant and positive impact on women empowerment in agro-field. From this paper, policy makers can implement connective and associated policies such as sustainable agriculture with women empowerment, agricultural training and women empowerment etc.

Key words: women participation, women empowerment, agricultural production, sustainable agriculture, rural Bangladesh.

Introduction

Around the world's poor live in rural areas, with agriculture serving as their primary source of income and livelihood. Agriculture has the potential to be a significant engine of growth and poverty reduction. However, the sector is underperforming in many countries, owing in part to the fact that women, who are frequently a critical resource in agriculture and the rural economy (FAO, 2022). On average, women make up 43 percent of the agricultural labor force in developing countries. Female farmers produce less than male farmers, but not because they are less efficient; extensive empirical evidence indicates that the productivity gap between male and female farmers is caused by differences in input use (Mostari et al., 2021). Women could increase farm yields by 20–30% if they had equal access to productive resources as men. This has the potential to increase total agricultural output by 2.5-4 percent in developing countries (Bhaumik et al, 2016). It may reduce global hunger. Women make up roughly half of the population in Bangladesh and most of them live in rural areas. Duflo (2012) defined that women contribute to agricultural production, but this is rarely acknowledged. Males generally dominate development activities due to the existence of traditional society. The entire structure of the labor force system is complex, and it only includes visible labor. However, there are many invisible workers who have made an indirect contribution to the national economy (Gates, 2014). These figures are unaccounted for, and contributions are not recognized

because they are not paid. This category includes both male and female labor, with rural female labor accounting for the lion's share. Women's involvement in agriculture is not new (Hosken, 2017). In many parts of Bangladesh agriculture is the primary occupation of women. Many ethnic groups, such as the Santal, Chakma, and Garo, have worked as agricultural laborers for ce2) etc. Women spend much of their time pre-harvesting. They spend an average of 68 hours per week in the home garden, while men spend four to five hours per week. Women play an important role in all aspects of homestead production, from land selection to deciding which crops to grow and harvest (Kabear, 1999). Seymour et al. (2023) developed a project with women empowerment with agricultural index from 2018 to 2023. GIZ (2024) published a report showing the connectivity between boosting finance and women empowerment African perspective, where most of the African-women did not get enough finance to show their expertise in agro-field. UNDP (2023) found a statement that women-empowerment declines the possibility of gender-based violence, empowering women is proved as fecund tool to decline gender-violence in their daily life.

Literature Review

FAO (2015) defined women's role is significant in agriculture. Women comprise 43% of the agricultural labor force globally and in least developed countries, 64.3% of women were employed in agriculture in 2015. In least developed countries, at the community level, women are more likely than men to manage natural resources for agriculture, including soil and water conservation, afforestation, and crop domestication. Despite their role in agriculture, women are often ignored or excluded from agricultural services and systems. Women-empowerment is a multidimensional and complex process that different people can interpret differently. The different dimensions of women's empowerment, which can overlap include financial, human capital, material/physical, socio-cultural, familial/interpersonal, legal, political, psychological and agricultural (Klasen, 2018). Kramer and Lambrecht (2019) said women's empowerment are the ability to make or express strategic and meaningful choices and decisions related to one's own life Generally, the literature suggests at least two ways in which net economic benefits from investing in women's empowerment in agriculture might arise. The first is by equalizing access to productive resources (i.e., access to and control over land, labour, and other inputs) between women and men. The second is by addressing the challenge of differences between women and men that might lead to improved household outcomes. Mook (1976) said there is also a common assumption that women and men, on average, differentially priorities resource expenditures, therefore, increasing a women's share of household decision-making authority would be expected to change household economic outcomes. UN Women (2015), Women Empowerment in Agricultural Index (WEAI) is a composite measurement tool that indicates women's control over critical parts of their lives in the house-hold, community, and economy. It helps identify women who are disempowered and understand how these women can be assisted to increase their autonomy and decision-making both in their households and on the farms. Urdy et al. (1995) found that identifying, evaluating and ensuring enterprising chances is a characteristic nature of entrepreneurship, including in the agriculture sector. Ruben (2001) highlighted that entrepreneurship is not a trade for an individual, since entrepreneurial behavior may only occur during a particular phase of their career and/or concerning a particular part of their activities generating several jobs. Seymour (2017) found that management of the market procedures and structure existing growth with inclusion of new deeds or mercantile should be imposed in existing firm. In contrast, various studies reveal that entrepreneurship activities bestow chances to have numerous products and innovation within the business process, distribution and marketing. Thebe (2018) defined that women-entrepreneurship is vital part of the agricultural sector, complex regulatory policy mechanisms have been ambiguous so far suggest that agriculture is a field must be studied differently from other types of economic activities. Brody (2015) analyzed that farmers are entrepreneurs and decision makers work to gain

profit through cultivation of different crops. As a result, agriculture entrepreneurship can be studied using method developed for nonagricultural sectors. Kenyathulla (2016) found relationship between a grower and his business, but on the other hand, it is a complicated matter because farmer/ grower can be a sole proprietor, leaseholder, supervisor, construction firm, or just a combined effect, suggesting that techniques used to evaluate innovators in other sectors are not easily transferable to the agriculture sector. Kebede (2014) analyzed that women empowerment and intra household's efficiency in Ethiopia, women efficiency can vary from regional basis which determines main indicators for women productive capacity. Gupta et al. (2019) highlighted the connectivity with women empowerment and food-security in Indian perspective. Food security is one of the major concerned in recent times, where people are being affected with fatal diseases like skin cancer, bone cancer, blood cancer etc. Food productivity does vary from country-basis context where organic food production is one of the crucial challenges to cost-benefit ratio. As a layman, we only think food security mean to large volume of food production, but it should main health-security while people consume food in daily life. Ragasa et al. (2023) mentioned that how women-empowerment affect in agro-food governance sector in Nigerian perspective, this paper focus on women-voice to enhance food policy with national food security policy. Nacka et al. (2024) focuses on women-empowerment in agricultural index taking 464 agricultural households in USA, where women-empowerment in agro-index (WEAI) help to allocate risk on food productivity in USA. Njogu et al. (2024) highlighted that the effectiveness of women-empowerment in aquaculture sector in Bangladesh, where women empowering tools can increase fish production and earn local currencies significantly. The researcher groups collect dataset from 1653 households from Rangpur and Rajshahi districts in Bangladesh, women empowerment in aquaculture sector (WEAI) is proved as key-tool to develop fish production significantly in annually.

Data and methods

Research Objective

To investigate the joint impact of agro-production and formal education on women empowerment rural Bangladesh

Research Questions

1. How does agro-production impact on women empowerment in rural Bangladesh?
2. How does formal training influence on women empowerment in rural Bangladesh?

Research Methodology

It is obtained from the original source of information. The primary data were more reliable and had a more confidence level of decision making with the trusted analysis having direct intact with the occurrence of the events. The primary data sources are HHs surveys. The author uses Multiple regression to measure the impact of agricultural production per season (2 times) on women empowerment index. The author considers women empowerment index in agro-production (WEIA) as dependent variables and set of independent variables based on socio-economic condition on these four villages. WEI have five different categories where very low=1 to Very High=5 to measure the independent variables on dependent variable.

Table 1: Estimation of Women Empowerment Index in Agro-production (WEIA)

Indicators	Scoring Index	Required Score
Contribution to Agro-production	1 to 5	The lowest score is 6 and higher score is 30
Decision of Ownership on Agro-assets	1 to 5	
Access to Agro-resources	1 to 5	
Participation in Agro-growing decision-making	1 to 5	
Perception of Agro related pollution	1 to 5	
Coping capacity to Agro- products shocks	1 to 5	

Source: Authors Own compilation, 2024

Maxwell (1995) measures the same procedure to analyze the impact of independent variables on dependent variables (CEI). Following this measurement, the author considers this score of every woman where the score varies from 6 to 30.

Table 2: Estimation of Variables with Expected Sign for WEIA

S.N	Variables Name	Variable Sign	Measurement Scale	Experiential Range	Expected Sign	Literature References
1.	Agricultural Production (Two Times/ Yearly)	AP	Kg/ Year	1600 Kg to 8000 Kg	+	Duflo (2012)
2.	Women Age	WA	In Numbers	0-60 Years	-	Gates (2014)
3.	Distance from Farm to Home	DF	In Kilometers	0.5-3 Kilometers	-	Kabeer (1999)
4.	Family Members	FM	In Numbers	2-8	-	Anderson et al. (2020)
5.	Formal Education	FE	Years of Schooling	1-12	+	Anderson et al. (2020)
6.	Training Facility	TF	Days of Training	30-90 Days	+	Kenayathulla (2016)
7.	Children Number	CN	In numbers	1-6	+ or -	Anderson et al. (2020)
8.	Land Area	LA	Square Feet	14,400 SF to 72,000 SF	+	Parveen and Leonhäuser (2004)
9.	Media Connection	MC	If Yes=1, No=0	0-1	+	Karamba and Winters (2015)

Dependent Variable: Women Empowerment Index in Rural-agriculture (WEIA)

Source: Author Own Compilation based on Field Survey, 2024

Result and Discussion

From the multiple regression model, data are collected by HHs level survey at Satkhira district, Bangladesh. The author selects four villages named: Parulia, Tala, Modonpur, Jamira villages to conduct the study. The author selects 50 women from every village to obtain 200 women for this research work. The author uses systematic sampling procedure to conduct this study. The author considers dependent variables as women empowerment index in agro-fields with scoring index where the author considers nine independent variables to measure the impact on dependent variable (WEIA). The author follows systematic sampling to collect these 200 women databases from household survey. The author considers questionnaire survey making 4 individual teams during 1-month survey. With this method, observation method and focus group discussion (FGD) to recognize actual motives and objectives of this study. The author considers multiple regression model to measure the impact of independent variables on dependent variables (WEIA). The author considers 9 independent variables to measure the women empowerment skills in agriculture in rural Bangladesh. The author collects 200 data of women who work actively in agro-fields.

$$WEIA = \beta_0 + \beta_1 AP + \beta_2 WA + \beta_3 HF + \beta_4 FM + \beta_5 FE + \beta_6 TF + \beta_7 CN + \beta_8 LA + \beta_9 MC + \beta_{9A} AP * TF + u$$

Table 3: Multiple Regression Model to measure the impact of independent variables on WEIA

Variables Name	Variable Sign	t Value	Coefficient Value
<i>Agricultural Production (Two Times/ Yearly)</i>	<i>AP</i>	19.807	2400.582***
<i>Women Age</i>	<i>WA</i>	-0.115	-8.75
<i>Distance from Home to Agro-farm</i>	<i>HF</i>	-2.78	-1.587
<i>Family Members</i>	<i>FM</i>	9.58	0.004
<i>Formal Education</i>	<i>FE</i>	6.58	1.274
<i>Training Facility</i>	<i>TF</i>	9.57	15.434***
<i>Children Number</i>	<i>CN</i>	-12.89	-1.66
<i>Land Area</i>	<i>LA</i>	725.57	0.056
<i>Media Connection</i>	<i>MC</i>	2.139	12.20**
<i>Agro-production*Training Facility</i>	<i>AP*TF</i>	9.73	945.55**
Constant		26.41	7.80***
Observations			188
R ²			0.584
Adjusted R ²			0.562
Significance Level: *p<0.1; **p<0.05; ***p<0.01			
Dependent Variable: Women Empowerment Index in Rural-agriculture (WEIA)			

Source: Author Own Compilation based on Field Survey, 2024

From the table no 3, it is observed that only three variables have significant relation with dependent variables, that is AP has positive connection with women empowerment. When a woman, s decision has been implemented in agro-field, her existing knowledge helps to enrich agricultural production proved beneficial for her family. She can take wise decisions how to plant seeds, how to provide green-fertilizer etc. she can lead the yearly agricultural production following green agricultural policies which is mentioned in SDG goals. AP variable is statistically significant at 1 percent level of significance.

Secondly, training facilities (TF) has positive and significant connection with women empowerment, when a woman gets formal training, she will be highly capable to implement his capability in agro-field. TF is statistically significant at 1 percent level of significance.

Thirdly, media connection (MC) has positive connection with women empowerment, when a woman watches different training program in television and social media, she will be highly capable to implement her efficiency in agro-field. Except for these variables, no other variables have proved themselves to be statistically significant. MC is statistically significant at 5 percent level of significance.

On the other hand, woman age, distance from home to agro-field has negative connection with women empowerment, but this variable is not statistically significant. Moreover, formal education and family members have positive connection with women empowerment, but these are not statistically significant. The value R² is 0.582 that means independent variables has explained dependent variable (women empowerment) as 58 percent in this regression model. From this model, it is analyzed that some variables are influencing dependent variables significantly.

Women's Participation: A few numbers of women participate in the agriculture sector in the SouthWest Coastal Region of Bangladesh. Severely, they are not able to be active in this sector for different reasons.

Challenges Faced by Women in Agriculture: Women are faced in different challenges. There are many socio-economic, cultural, and institutional barriers limiting women's involvement. Those are showing in this analysis.

Empowerment Indicators: Indicators of women's empowerment within the agricultural context, such as access to resources, decision-making power, and control over income are limited.

Government and NGO Initiatives: The effectiveness of government and non-governmental initiatives aimed at promoting women's participation and empowerment in agriculture which gap are showing here. Government involves important to increase their participation.

Policy Recommendation

Capacity Building Programs: For involvement in agricultural sector and implement different activities must be need enhance capacity-building. So, programs targeting women in agriculture to enhance their skills and knowledge.

Access to Resources: Advocate for policies and programs that improve women's access to resources such as land, credit, and technology. All they will get from these.

Community Engagement: Establish community-based forums to openly discuss and challenge prevailing norms contributing to participate in agriculture sector. Engage advance level farmer, buyer, sub lead farmer in different way. Besides, awareness session programs to challenge stereotypes and promote gender equality in agriculture.

Institutional Support: Need to strengthen different institutional support systems for women in agriculture, including extension services and farmer cooperatives. Including support from government is important.

Regular monitoring and Data Collection: Establish a systematic monitoring and evaluation mechanism to assess the effectiveness of interventions over time. Regularly collect and analyze data to track changes in women participation in agricultural side in coastal area.

Conclusion

Women are increasingly becoming involved in the agricultural sector. Women's agricultural employment participation rates are increasing, while men's rates are declining. This decrease in male labor increased the number of women in field work while decreasing women's participation in non-agricultural jobs. The WEAI score for women in Bangladesh's agriculture indicates that, despite increased rates of participation, disempowerment in the domains prevails. Women's participation in agriculture has grown over time. Although their involvement in crop production has decreased to a certain extent, it has gradually increased in poultry, livestock, and homestead gardening. Agricultural activities such as livestock and poultry production, as well as homestead gardening, should be encouraged because women in Bangladesh feel safe engaging in activities within their household boundaries. Women-friendly pre-harvest and post-harvest crop production and processing technologies must be developed in order for women to participate effectively in agriculture. This requires the attention of both researchers and planners.

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Competing interests

The authors declare that they have no competing interests.

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