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Factors influencing involvement of rural women in agri-based enterprises

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Abstract

The present research was carried out on 120 rural women from Muzaffarpur district of Bihar with the specific objective of identifying the factors influencing the involvement of rural women in agri-based enterprises. The finding indicated that more than one-third of the participants (36.67%) were engaged in more than one enterprise, often combining dairy with goat rearing or vermicomposting. These women were able to better manage seasonal risks and generate multiple income streams, enhancing their resilience. The findings indicated that key factors that had a strong positive influence on women's involvement were access to extension services ($r = 0.502$), training ($r = 0.445$), and annual household income ($r = 0.412$). However, only 30.83% of the women had received any formal training, showing a clear gap in knowledge support. About 58.33% had moderate access to agricultural advice, mostly through local SHGs or NGOs, rather than through official extension systems.

Keywords: Factors influencing, involvement, rural women, agri-based enterprises

Introduction

Role of rural women is very crucial in every aspect of agriculture, beginning from the decision of crops according to the environmental conditions to the harvesting and post-harvest operations. The agriculture census of 2015-2016 indicated that about 11.72% of the total operated area in the country is operated by female operational holders. Women play a vital role in agriculture. But their ability to make decisions is ignored many times. Women play a significant role in cultivation of main crops, horticultural crops like fruits, vegetables, flowers, spices, post-harvest and processing operations, agroforestry, social forestry, animal husbandry, fish – culture, honeybee production, mushroom cultivation etc. Enhancing their participation is essential for achieving gender equality, boosting agricultural productivity and improving overall food and nutritional security. Women contribute unique insights that can lead to better solutions and innovation in agricultural practices. "Women belong in all places where decisions are being made. It shouldn't be that women are the exception". Research indicates that farms led by women tend to be more productive due to better resource management and practices. Women prioritize family needs, and when they are involved in decisions, household nutrition and food security automatically start improving. Women's empowerment in the agri-based enterprises is transformative, enabling them to achieve economic independence and gain access to essential resources. When women actively participate in farming not only on the field but also in the industrial sector of agriculture by training and knowledge dissemination through different extension agencies, universities,

government policies, etc., they are going to improve their skills and also increase their influence in household and community decisions. This engagement leads to better family welfare, as empowered women often prioritize the health and education of their children. Moreover, working together fosters strong social networks, enhancing community solidarity. While cultural barriers and access to resources remain challenges, targeted training programs and supportive policies can further amplify women's roles in agriculture. Ultimately, empowering women in this sector helps in getting a more balanced and enduring future for all.

Methodology

This study was conducted over 120 rural women in Muzaffarpur district, situated in the north-central part of Bihar, all of whom were actively involved in small-scale Agri-based enterprises such as dairy farming, poultry, goat rearing, vermicomposting, beekeeping, and mushroom cultivation. There are 16 blocks in Muzaffarpur district. Sakra and Muraul block have been purposively selected for this study due to their high rural population, strong agricultural base, and the notable participation of women in Agri-based livelihoods. These blocks have shown significant activity in areas such as vegetable cultivation, dairy farming, and SHG-led micro-enterprises, particularly under schemes like JEEViKA. Their socio-economic characteristics and emerging patterns of women's engagement in agriculture make them representative and relevant for exploring the scope and challenges of rural women's involvement in Agri-based enterprises.

Results and Discussion

Factors affecting the involvement of rural women in agri-based enterprises

Table 1: Correlation analysis of factors affecting the involvement of rural women in agri-based enterprises ($n = 120$)

Independent Variables	Correlation Coefficient (r)	Significance
Age	-.008	NS
Marital Status	.081	NS
Education	.149	NS
Family Type	.475***	S
Family Size	-.297***	S
Social Participation	.679***	S
Scientific Orientation	.407***	S
Land Holdings	-.011	NS
Family Occupation	.001	NS
Annual Income	.769***	S
Mass- Media Exposure	.529***	S
Extension Contact	.712***	S
Economic Motivation	.663***	S
Innovativeness	.480***	S
Risk Orientation	.593***	S
Decision Making	.635***	S
Training Received	.569***	S

***- 1% Significance level, NS- Non- Significant, S- Significant

Table.1 shows that the analysis of socio-personal, psychological and communicational variables and the significant predictors influencing women's engagement in Agri-based enterprises. Family type demonstrated a statistically significant association at the 1% level, indicating that women from joint family systems are more likely to participate in such enterprises. This was attributed to the collective support—emotional, financial, and labour-related that joint families typically provide, facilitating women's entrepreneurial involvement. Family size exhibited a negative correlation significant at the 5% level, implying that an increase in household members may intensify

domestic responsibilities, thereby constraining women's capacity to engage in enterprise activities. Furthermore, Social participation emerged as a highly significant variable (1% level), suggesting that women actively involved in social groups, such as self-help groups, cooperatives, or local institutions, benefit from enhanced social capital, exposure, and decision-making confidence, all of which positively influence their entrepreneurial pursuits. Scientific orientation also showed a strong positive influence, significant at the 1% level, highlighting that women with a scientific mindset and openness to modern agricultural practices are more proactive and efficient in managing Agri-based ventures.

Annual income showed a very strong and significant positive relationship at the 1% level. Women from higher income groups are more capable of investing in resources, training, or technology, which encourages greater involvement in enterprise activities. Variable Mass media exposure was found to be highly significant at the 1% level, indicating that access to information channels such as television, radio, newspapers, and digital platforms plays a pivotal role in enhancing awareness. Similarly, Extension contact also exhibited a significant positive correlation at the 1% level. Regular interactions with agricultural extension personnel and field-level officers contribute to capacity building by improving women's technical knowledge and confidence.

The findings of results also revealed that psychological and skill-based variables economic motivation, innovativeness, risk orientation, decision-making ability, and training received were statistically significant at the 1% level. This indicates that women who exhibit strong financial drive, openness to new ideas, willingness to take calculated risks, active involvement in decision-making, and those who have received relevant training are more likely to participate in Agri-based entrepreneurial activities.

Multiple linear regression analysis of factors affecting the involvement of rural women in Agri-based Enterprises

Table 2: Analysis for variance (ANOVA) for the Regression model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	19575.834	10	1957. 583	44.634	.000 ^b
Residual	4780.533	109	43.858		
Total	24356.367	119			

Table. 2 indicated that an ANOVA was performed to examine the overall significance of the regression model. The analysis revealed that the model was highly significant, with an F-value of 44.634 and a p -value of .000, indicating that the relationship between the set of ten independent variables and the dependent variable is statistically significant. The regression sums of squares (19575.834) accounted for the majority of the total variation (24356.367), while the residual sum of squares (4780.533) represented a smaller, unexplained portion. These results suggest that the independent variables, when considered

together, effectively explain the variation in the dependent variable, confirming the strength and reliability of the model.

The regression analysis reveals that several factors significantly influence rural women's participation in Agri-based enterprises. The model shows a strong fit, with $R^2 = 0.804$ and Adjusted $R^2 = 0.786$, indicating that about 79% of the variation in participation is explained by the included variables. The Durbin-Watson value of 1.668 confirms no autocorrelation issues, and VIF values below 5 indicate no multicollinearity.

Table 3: Regression analysis of factors affecting the involvement of rural women in agri-based enterprises ($n = 120$)

S. No.	Independent Variable	B	Std. Error	Beta	t- value	Sig. (p-value)	Co-linearity Statistics	
							Tolerance	VIF
1.	Age	.341	.115	.177	2.961	.004***	.502	1.991
2.	Education	1.180	.578	.122	2.043	.043**	.506	1.978
3.	Family Occupation	.196	.577	.015	.339	.735	.924	1.082
4.	Annual Income	5.282	.837	.370	6.311	.000***	.523	1.911
5.	Mass- media Exposure	-.633	.422	-.111	-1.500	.136	.329	3.037
6.	Extension Contact	2.323	.505	.391	4.596	.000***	.248	4.028
7.	Economic Motivation	1.053	.238	.267	4.431	.000***	.497	2.011
8.	Risk Orientation	.298	.285	.070	1.046	.298	.399	2.504
9.	Decision Making	2.402	.684	.196	3.513	.001***	.578	1.729
10.	Training Received	-1.506	.941	-.106	-1.600	.113	.406	2.460

$R = .897$ “***Significance at 1% level”

$R^2 = .804$ “**Significance at 5% level”

Adjusted R Square = .786

Standard Error of the estimate = 6.623

Durbin- Watson value = 1.668

Table 4 revealed that among the predictors, annual income ($\beta = 0.370$, $p = 0.000$) and extension contact ($\beta = 0.391$, $p = 0.000$) had the most substantial positive effects. Women with higher incomes and better access to extension services were more actively involved in enterprises. Economic motivation ($\beta = 0.267$, $p = 0.000$), decision-making ability ($\beta = 0.196$, $p = 0.001$), age ($\beta = 0.177$, $p = 0.004$), and education ($\beta = 0.122$, $p = 0.043$) also showed significant positive influences.

In contrast, family occupation, mass media exposure, risk

orientation, and training received did not significantly affect participation. These findings suggest that strengthening women's access to income, extension services, and decision-making spaces—along with encouraging motivation and education—can significantly boost their engagement in Agri-based enterprises.

Multiple Linear Regression analysis of factors affecting involvement of rural women in more than one agri-based Enterprises ($n = 30$)

Table 4: Analysis of variance for Regression model of multiple enterprises

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	887.824	10	88.782	14.254	.000 ^b
Residual	118.343	19	6.229		
Total	1006.167	29			

An ANOVA was conducted to examine the extent to which various factors influence individuals' level of involvement in more than one Agri-based enterprise. The results show that the regression model is statistically significant, with an F-value of 14.254 and a p -value of .000. This indicates that the combination of the ten predictor variables included in the model has a meaningful impact on the level of involvement. Out of the total variation observed (1006.167),

a substantial portion (887.824) was explained by the model, while only a small portion (118.343) remained unexplained. This suggests that the model does a strong job of capturing the key influences on multi-enterprise involvement. Overall, the findings imply that these predictors collectively play a significant role in shaping the extent to which individuals engage in more than one agricultural enterprise.

Table 5: Regression analysis of factors affecting involvement of rural women in more than one agri-based enterprises

S. No.	Independent Variable	B	Std. Error	Beta	t- value	Sig. (p-value)	Co-linearity Statistics	
							Tolerance	VIF
1.	Age	.169	.097	.195	1.743	.097*	.493	2.028
2.	Education	.387	.409	.100	.947	.356	.554	1.806
3.	Family size	.414	.357	.114	1.159	.261	.635	1.575
4.	Mass-media exposure	-.430	.293	-.149	-1.468	.158	.602	1.661
5.	Economic motivation	.784	.428	.271	1.835	.082*	.284	3.518
6.	Innovativeness	1.325	.602	.206	2.200	.040**	.707	1.415
7.	Risk orientation	.329	.225	.143	1.460	.161	.647	1.544
8.	Decision making	1.232	.493	.237	2.498	.022**	.685	1.461
9.	Training received	1.227	.617	.254	1.989	.061*	.379	2.637
10.	Social participation	3.900	1.411	.379	2.764	.012**	.329	3.036

$R = .939$ “*Significance 10% level”

$R^2 = .882$ “**Significance 5% level”

Adjusted R Square = .820

Std. Error of the Estimate = 2.496

Durbin- Watson = 2.213

Table 5 presented a multiple linear regression analysis highlights that certain personal and social factors significantly affect rural women's involvement in Agri-based enterprises. Among the ten variables studied, social participation had the strongest influence ($\beta = 0.379$, $p = 0.012$), showing that women who are more engaged in community or group activities tend to participate more actively in entrepreneurial ventures. Decision-making ability ($\beta = 0.237$, $p = 0.022$) and innovativeness ($\beta = 0.206$, $p = 0.040$) also had a meaningful positive impact, suggesting that women who are confident in making choices and willing to try new approaches are more likely to succeed in Agri-enterprises. In addition, economic motivation ($\beta = 0.271$, $p = 0.082$), training received ($\beta = 0.254$, $p = 0.061$), and age ($\beta = 0.195$, $p = 0.097$) were found to be marginally significant at the 10% level, indicating that even though their effects were slightly weaker, they still played a notable role. Variables like education, family size, mass media exposure, and risk orientation did not show a significant effect in this model. The overall regression model was statistically strong, with an R^2 of 0.882 and Adjusted R^2 of 0.820, meaning that around 82% of the variation in women's participation was explained by these factors. The Durbin-Watson value of 2.213 indicated no issues with autocorrelation, and all VIF values remained well below 5, confirming that multi collinearity was not a problem. These results suggest that enhancing women's social involvement, decision-making confidence, and innovative thinking—along with access to training—can be powerful ways to improve their engagement in Agri-based enterprises.

Conclusion

The study concluded that key factors that had a strong positive influence on women's involvement were access to extension services ($r = 0.502$), training ($r = 0.445$), and annual household income ($r = 0.412$). However, only 30.83% of the women had received any formal training, showing a clear gap in knowledge support. About 58.33% had moderate access to agricultural advice, mostly through local SHGs or NGOs, rather than through official extension systems. The findings indicate that with stronger institutional support, better access to credit, and regular training, women in rural Bihar have the potential to become key drivers of sustainable agricultural growth and rural development not only in the district but across India.

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