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Glass Ceiling and Sticky Floor in Agriculture: Male Migration and Culture Effects

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ABSTRACT

This study examines the impact of male migration on women's economic positions within agricultural households, focusing on two gender phenomena: the glass ceiling (upper-income barriers) and the sticky floor (low-income trap). Using a balanced panel dataset of 178 households observed across two time periods (pre- and post-migration), the study employs a Difference-in-Differences framework estimated through a Linear Probability Model with robust standard errors to assess changes in women's economic status. The estimation results show that households with male migration have a significantly higher likelihood of women breaking the sticky floor and moving toward higher income levels compared to non-migrant households (coefficient = 0.416; $p<0.001$). However, the interaction between migration status and time period shows no significant evidence of a direct causal effect, suggesting that the observed differences likely reflect pre-existing conditions rather than migration itself. Further analysis

reveals that in male-migrant households, the post-migration period positively affects women's income levels ($p<0.05$), while adherence to traditional cultural norms negatively influences the likelihood of crossing the glass ceiling and attaining upper-income positions. Qualitative findings reinforce these results: women in male-migrant households experience greater economic roles, particularly in managing remittances and small-scale agricultural enterprises, yet remain constrained by patriarchal decision-making structures that limit their ability to overcome the glass ceiling. Overall, male migration enables women to escape the sticky floor by expanding their participation in agricultural and other rural income-generating activities, but has not fundamentally allowed them to break through the glass ceiling within household power relations

Keywords: **Male Migration; Glass Ceiling; Sticky Floor; Traditional Culture; Women**

INTRODUCTION

Indonesia is experiencing a significant out-migration of men of productive age from rural to urban areas, leaving behind the agricultural sector in pursuit of more promising economic opportunities. This phenomenon is primarily driven by socio-economic and environmental factors. According to the International Organization for Migration (IOM), the high demand for low-skilled labor with better wages has pushed many rural men to migrate to cities or abroad, particularly to Malaysia, Singapore, and Brunei Darussalam (International Organization for Migration, 2020; Zhao et al., 2024). In Indonesia, including the province of Aceh, this trend has been reinforced by structural transformation in agriculture that reshapes rural social, economic, and environmental dynamics, including changes in consumption patterns and resource use (International Organization for Migration, 2020; Sufriadi, 2017). Agriculture is often perceived as economically unattractive due to low income, limited access to technology, and minimal social security, threatening long-term sustainability (Wati et al., 2021). Consequently, villages are losing a productive, energetic, and healthy generation, which poses risks to agricultural continuity (Ghebru et al., 2018; Proctor & Lucchesi, 2012; Salau et al., 2020). Evidence shows that many Acehnese migrants in Malaysia were formerly engaged in farming (Wu, 2006). Moreover, chronic underfunding of the agricultural sector has deepened rural backwardness and widened gender gaps in both rural and urban labor markets (FAO et al., 2024; OECD, 2018; Zhao et al., 2024).

The urgency of this research lies in the profound yet understudied transformation of rural agriculture and gender dynamics amid male migration and entrenched traditional culture. Without a clear understanding of women's evolving roles in agriculture, policy interventions risk failing to address structural labor market challenges in the sector. The first problem stems from the changing management of farms due to male outmigration. Many farming households are now left without male heads of household, leading to the "feminization of agriculture" where women increasingly assume tasks once dominated by men (Maulana et al., 2022). In Simpang Mamplam sub-district, one of the most densely populated areas in Bireuen district with 28,555 inhabitants across 21,849 KM^2, agriculture has remained a primary livelihood between 2021 and 2025. Households cultivate rice (318), secondary crops (720), upland rice (35), and horticulture (376) (Badan Pusat Statistik Bireuen, 2025). Women are now at the forefront of agricultural work,

from land preparation to marketing produce. Previous studies show permanent youth migration from Simpang Mamplam sub-district, particularly among married individuals under 20 years of age, mostly to Malaysia (Hadi & Wahyuni, 2024). As a result, agricultural production in this region is increasingly managed by women.

Despite their critical contributions, women do not automatically gain equal recognition or status. This is where the challenges of gender transformation emerge, particularly the phenomena of the "glass ceiling" and the "sticky floor" (Stabridis & Salgado-Viveros, 2023). The glass ceiling refers to invisible barriers preventing women from advancing into leadership positions despite having the skills and experiences (Alabshar et al., 2021; Hou et al., 2022). The sticky floor, meanwhile, traps women in low-level agricultural labor with little opportunity for advancement due to limited access to capital, training, and institutional support (Puspitasari & Putry, 2023). Although women have become the backbone of agricultural production, they remain underrepresented in decision-making processes and often excluded from resources such as credit and technology. The second problem relates to traditional cultural norms that perpetuate these constraints. Men are widely perceived as household heads and landowners, while women are seen as implementers. Even when women manage farms, land ownership is typically registered under husbands or male relatives. Women are also frequently excluded from village forums, farmer groups, and external training due to childcare and domestic responsibilities. Consequently, women's economic contributions are often undervalued and rarely translate into higher social status or equal recognition (Linthon-Delgado et al., 2022; Rincón & Domínguez, 2023; Septiana & Haryanti, 2023; Singh et al., 2023; Srivastava & Nalawade, 2023). A third issue is the heavy dual burden women face. Besides working long hours in the fields, they also shoulder household responsibilities, yet are still considered secondary actors. This double role not only drains them physically and emotionally but also limits their social and economic mobility. Women often receive lower wages for the same work, have restricted access to credit, and face limited opportunities to become leaders in farmer organizations (Wahyuni et al., 2025).

This study builds on migration theories to frame these dynamics. Push-pull theory (Lee, 1966) explains migration as driven by poverty, limited rural employment, and the attraction of

better non-agricultural opportunities elsewhere (De Haas, 2010). Social role theory (Eagly, 1987) highlights that gendered divisions of labor are socially constructed rather than biologically determined (Fitriani et al., 2022). Earlier studies often focused on descriptive accounts of women's agricultural contributions without examining deeper structural barriers, leading to the emergence of the concept of "feminization of agriculture". Later, Gender and Development (GAD) perspectives emphasized structural inequalities and power relations sustaining women's subordination. At the same time, the New Economics of Labor Migration (NELM) reframed migration as a household strategy to minimize risks and overcome market failures. Yet, the implications of the NELM for women left behind in rural areas, and how gender norms mediate resource allocation, remain underexplored (Haque, 2020; Mannan & Frederic, 2015).

Recent scholarship has increasingly moved beyond quantitative measures of women's labor force participation towards examining qualitative barriers. However, little is known about how glass ceiling and sticky floor dynamics specifically interact with male migration and traditional culture in shaping women's agricultural roles (Puspitasari & Putry, 2023; Stabridis & Salgado-Viveros, 2023; Wahyuni et al., 2025). Existing evidence from Brazil, Thailand, and India demonstrates persistent gender barriers across rural and urban sectors (Raj et al., 2025; Statham et al., 2020; Tietz Cazeri et al., 2021), but systematic evidence from Indonesia, particularly Aceh remains scarce. Moreover, the role of the local cultural institutions, ranging from customary norms to religious values, is underexplored despite being critical for either constraining or enabling gender equality (Barooah et al., 2023; Gulati et al., 2025). This study aims to analyze "The Influence of Male Migration and Traditional Culture on Glass Ceiling and Sticky Floor in the agricultural sector.

METHOD

This study employs a mixed-method approach using an explanatory sequential design. Within mixed-method research, there are two main types of sequential designs: the exploratory sequential design and the explanatory sequential design. This research specifically adopts the explanatory sequential design, emphasizing the quantitative phase followed by the qualitative phase (Creswell, 2012; Creswell & Clark, 2017). The explanatory sequential design in this study is

implemented through two main stages. The first stage applies a qualitative approach through in-depth interviews with households in which male family members have migrated for employment reasons, aiming to obtain a contextual understanding of the transformation of women's roles in the agriculture sector within the study area. The second stage employs a quantitative approach, utilizing the Difference-in-Differences (DID) method to measure the impact of male migration and traditional cultural norms on the phenomena of the glass ceiling and sticky floor (Donald & Lang, 2007; Marta et al., 2020).

The primary data collection method in this mixed-methods explanatory sequential approach consists of both quantitative and qualitative data. Data were gathered through a structured questionnaire survey administered to rural households owning agricultural land in Simpang Mamplang Sub-District, including migrant and non-migrant households. The study population comprised 318 households managing paddy fields, and the sample size was determined using the Sloving's formula:

$$n = \frac{N}{1 + Ne^2}$$

$$n = \frac{318}{1 + 318(0.05)^2}$$

$$n = 177.158 = 178$$

With a margin of error of 5% the study obtained a sample of 178 paddy-farming households comprising both male migrant and non-migrant family members. These households were observed across two time periods, before and after male migration, resulting in a total of 356 observations (N=356). The subsequent data analysis was comprehensively designed to address the research question by employing the Difference-in-Differences (DID), formulated as follows:

$$Y_{it} = \alpha_0 + \alpha_1 Post_t + \alpha_2\, Male\ Migration_i + \alpha_3(Post_t x Male\ Migration_i) + \alpha_4 Traditional\ Culture_{it} + \alpha_5 X_{it} + \varepsilon_{it}$$

In this model, Y_{it} represents the dependent variable, namely the *glass ceiling and sticky floor effects*. The variable $Post_t$ denotes the period after male migration, while $Male\ Migration_i$ identifies the group of households affected by male migration. The interaction term $Post_t x Male\ Migration_i$ capture the DID effect, which reflects the causal influence of male migration on gender role outcomes within the house. Furthermore, $Traditional\ Culture_{it}$ is included as a control variable to account for the influence of local culture norms that may shape

gender dynamics in agricultural work. The vector X_{it} represents a set of covariates, including age, years of education, land ownership, and the number of family members, which are considered to potentially affect the outcome variable.

The model is estimated using a Linear Probability Model (LPM) framework with robust standard errors. This specification is appropriate given that the dependent variables, representing the likelihood of women reaching upper-income (*glass ceiling*) or escaping low-income (*sticky floor*) positions are binary in nature. The LPM approach enables a straightforward interpretation of estimated coefficients as marginal effects on the probability of these outcomes.

To strengthen the robustness of the analysis, the data were also processed separately for each household group: male-migrant and non-migrant households. This additional step aimed to identify internal variations and to examine whether the observed effects of migration persist when analyzed within each subgroup. Specifically, separate estimations were conducted for the post-male migration in both groups to isolate changes attributable to migration dynamics rather than broader temporal effects. This model was estimated using the STATA statistical software under the DID-LPM specification with robust standard errors to ensure the reliability of the results.

RESULT AND DISCUSSION

This study involved 178 household observations consisting of two main groups: households with male migration and households without male migration. The data were collected over two time periods, with an equal number of observations for each period, before (pre) and after (post) migration, resulting in a total of 356 observations (N=356). The demographic and socioeconomic characteristics of respondents are presented in Table 1, which provides an overview of the key variables used in the analysis, including age, education level, land ownership, household size, and female income levels:

Tabel 1. Descriptive Statistics of Respondents (N = 356)

Variable	Mean	Standar Deviation	Minimum	Maximum
Age	42.50	10.30	25	59
Education	10.20	3.30	6	16
Land area (hectares)	0.997	0.544	0.02	1.99
Number of household members	2.57	1.63	0	5
Income (IDR)	3,022,996	1,229,171	444,703	7,155,977
Traditional culture	0.33	0.47	0	0
Male migration household (1 =	0.50	0.50	0	0
yes)	0.50	0.50	0	0
Post migration (1 = yes)	0.63	0.48	0	0
Glass ceiling (1 = yes)	0.37	0.48	0	0
Sticky floor (1 = yes)				

Source: Processed data (2025)

Table 1, it can be observed that the average age of respondents is 42.5 years, with an average education level of approximately 10 years, equivalent to secondary education. Most households possess around 1 hectare of agricultural land and have an average of 2 to 3 family members. Income shows considerable variation, with an average of approximately IDR 3,000,000 per month. Interestingly, about 62.6% of respondents fall into the *glass ceiling effect* category (income>IDR 2,500,000), while 37.4% belong to the *sticky floor effect* group (income<IDR 2,500,000). This indicates a substantial economic disparity among households across different households.

Before conducting the regression analysis, a series of classical assumption tests were performed to ensure the validity of the model. The multicollinearity test showed an average *Variance Inflation Factor* (VIF) value of 1.55, with all independent variables having VIF below 3. This indicates that there is no serious multicollinearity issue among explanatory variables (Table 2). The heteroskedasticity test could not be executed using the *hettest* command because the model was estimated with robust standard errors, which automatically correct for potential heteroskedasticity. Therefore, the standard error in the model is already robust to non-constant variance.

Tabel 2. The Multicollinearity Test

Variable	VIF	1/VIF
Post	2.00	0.500000
Male-migration	2.06	0.486169
Post x Male-migration	3.00	0.333333
Traditional culture	1.11	0.904025
Age	1.03	0.973107
Education	1.16	0.858862
Land area (ha)	1.04	0.957678
Number of family members	1.02	0.980943
Mean VIF	1.55	

Source: Processed data (2025)

The autocorrelation test using *xtserial* could not be implemented due to command limitations. However, since the dataset is a strongly balanced panel with only two time periods (pre and post migration) and a clearly defined household identifier (*hh_id*), temporal autocorrelation is not considered a major concern. Nevertheless, for analytical precision, the model is recommended to be re-estimated using clustered standard errors at the household level. Finally, the normality test of residuals using the *sktest* command yielded a *p-value* of 0.000, indicating that the residuals are not normally distributed. However, since the model employs a *Linear Probability Model* (LPM) with *binary dependent variables* (0/1) and *robust standard errors*, this violation of normality does not significantly affect the validity of the inference. Overall, the model can be considered to satisfy the basic regression assumptions, with the results remaining robust to potential heteroskedasticity.

The first analysis aims to examine the determinants and the effect of male migration on the likelihood of women achieving a *glass ceiling effect* position, defined as households with female income above IDR. 2,500,000. The model employed is a linear regression with a binary dependent variable (1 for high-income female and 0 otherwise). The estimation results are presented in Table 3.

Tabel 3. Estimation Results for *Glass Ceiling Effect Model*

Glass Ceiling	Robust					
	Coefficient	Std. Error	t	P>[t]	95% conf. interval	
Post	.0786517	.0727146	1.08	0.280	-.0643652	.2216686
Male-migration	.4162117	.0684022	6.08	0.000***	.2816765	.5507469
Post x Male-migration	.0561798	.0909487	0.62	0.537	-.1227003	.2350599
Traditional culture	-.0869796	.0502268	-1.73	0.084*	-.1857669	.0118077
Age	-.0044401	.0022617	-1.96	0.050**	-.0088884	8.23e-06
Education	.0001746	.0075501	0.02	0.982	-.0146751	.0150242
Land area (ha)	.0330181	.0437374	0.75	0.451	-.0530058	.1190419
Number of family members	.0076294	.0135185	0.56	0.573	-.0189592	.034218
Constanta	.5281144	.1433311	3.68	0.000	.2462073	.8100215
Number of obs	356					
F(8, 347)	16.07					
Prob > F	0.0000					
R-squared	0.2334					
Root MSE	.429					

t statistics in parentheses * p<0.1, ** p<0.05, *** p<0.01

Source: Processed data (2025)

The regression results indicate that households with male migration have a significantly higher probability by 41.6 percentage points of women earning higher incomes compared to non-migrant households (p<0.001). This finding suggests the existence of structural differences between migrant and non-migrant households, where women from migrant households, where women from migrant households are more likely to achieve higher income levels. However, the interaction term between period and migration (*post x male migration*) is not significant (p=0.537), indicating no strong evidence that the *post-male migration* period led to an additional increase in women's likelihood of reaching the *glass ceiling effect*. In other words, the causal effect of migration itself is not significant, and the observed difference may primarily reflect pre-existing disparities between the two household types. Moreover, the variable representing traditional culture exhibits a negative coefficient (-0.087; p=0.084), implying that

older women are less likely to achieve high-income status. In contrast, education, land ownership, and the number of family members are not significant factors.

The second analysis examines the determinants of the *sticky floor effect*, referring to the group of women with incomes below IDR 2,500,000. Since this variable is the complement of the *glass ceiling effect*, the regression results display an opposite pattern of coefficient signs, as presented in Table 4.

Tabel 4. Estimation Results for *Sticky Floor Effect Model*

Sticky Floor	Robust					
	Coefficient	Std. Error	t	P>[t]	95% conf. interval	
Post	-.0786517	.0727146	-1.08	0.280	-.2216686	.0643652
Male-migration	-.4162117	.0684022	-6.08	0.000***	-.5507469	-.2816765
Post x Male-migration	-.0561798	.0909487	-0.62	0.537	-.2350599	.1227003
Traditional culture	.0869796	.0502268	1.73	0.084*	-.0118077	.1857669
Age	.0044401	.0022617	1.96	0.050**	-8.23e-06	.0088884
Education	-.0001746	.0075501	-0.02	0.982	-.0150242	.0146751
Land area (ha)	-.0330181	.0437374	-0.75	0.451	-.1190419	.0530058
Number of family members	-.0076294	.0135185	-0.56	0.573	-.034218	.0189592
Constanta	.4718856	.1433311	3.29	0.001	.1899785	.7537927
Number of obs	356					
F(8, 347)	16.07					
Prob > F	0.0000					
R-squared	0.2334					
Root MSE	.429					

t statistics in parentheses * p<0.1, ** p<0.05, *** p<0.01

Source: Processed data (2025)

The results indicate that households with male migration have a significantly lower likelihood of women belonging to the low-income group (coefficient = -0.416; p<0.001). Similar to the *glass ceiling effect* model, the interaction term (*Post x Male migration*) is not significant, suggesting that there was no meaningful change in women's income status after the migration

period. The traditional culture variable shows a positive association with the *sticky floor effect*, reinforcing the hypothesis that traditional cultural values may restrict women's economic opportunities.

In this study, the effect of male migration can only be observed among households that experienced migration, since the male migration variable does not vary within the non-migrant group. Therefore, the analysis is conducted separately for male-migrant and non-migrant households. The estimation for migrant households reflects how post-migration conditions (*post*) influence gender inequality in the labor market, while the estimation for non-migrant households serves as a control group to identify whether such changes are truly migration-induced or driven by broader external factors.

Tabel 5. *Glass Ceiling Effect Model* by Male Migration Status

Glass Ceiling	Robust					
	Coefficient	Std. Error	t	P>[t]	95% conf. interval	
Male Migration						
Post	.1348315	.0535422	2.52	0.013***	.0291427	.2405202
Traditional culture	-.1347482	.0610506	-2.21	0.029**	-.255258	-.0142384
Age	.0024467	.0027611	0.89	0.377	-.0030036	.007897
Education	.0091798	.0087011	1.06	0.293	-.0079956	.0263552
Land area (ha)	-.0281048	.0561843	-0.50	0.618	-.1390088	.0827992
Number of family	.0080042	.0153069	0.52	0.602	-.0222107	.038219
members	.6239762	.1820348	3.43	0.001	.2646516	.9833008
Constanta						
Number of obs	178					
F(6, 171)	2.33					
Prob > F	0.0347					
R-squared	0.0755					
Root MSE	.35717					
Non-Migration						
Post	.0786517	.0722253	1.09	0.278	-.0639163	.3575008

Traditional culture	-.0067579	.0859601	-0.08	0.937	-.1764375	.1629218
Age	-.0103029	.0034763	-2.96	0.003***	-.017165	-.0034408
Education	-.0071035	.0132371	-0.54	0.592	-.0332326	.0190256
Land area (ha)	.0960328	.0661731	1.45	0.149	-.0345886	.2266542
Number of family	.0039349	.0229528	0.17	0.864	-.0413724	.0492422
members	.7619822	.2049113	3.72	0.000	.3575008	1.166464
Constanta						
Number of obs	178					
F(6, 171)	2.58					
Prob > F	0.0202					
R-squared	0.0782					
Root MSE	.4818					

t statistics in parentheses * p<0.1, ** p<0.05, *** p<0.01

Source: Processed data (2025)

Table 5 shows that the estimation results for households with male migration indicate that the *post* variable (post-migration period) has a positive and significant effect on the likelihood of women achieving a *glass ceiling* position (coefficient = 0.1348; p<0.05). This suggests that after male migration, women in these households are more likely to attain higher income levels, reflecting an increase in their economic autonomy and decision-making power. Conversely, the *traditional culture score* has a negative and significant association with the *glass ceiling* (coefficient = -0.1347; p<0.05), implying that stronger adherence to traditional cultural norms reduces women's likelihood of achieving higher income levels. This finding aligns with previous literature suggesting that patriarchal norms constrain women's economic participation, particularly in rural areas. Other variables (age, education, land area, and number of family members) do not exhibit significant effects in this model. For non-migrant households, the post variable is not significant, indicating that women's economic positions remain relatively stable across the two observation periods. However, age shows a negative and significant effect on the likelihood of reaching the *glass ceiling* (coefficient = -0.0103; p<0.01), suggesting that older women are less likely to achieve higher income levels. This pattern may reflect limited access to emerging economic opportunities among older female workers. The traditional culture variable is also insignificant in this group, reinforcing the notion that changes in women's economic

status are primarily driven by male migration rather than by internal household characteristics.

Tabel 6. *Sticky Floor Effect Model* by Male Migration Status

Sticky Floor	**Robust**					
	Coefficient	**Std. Error**	**t**	**P>[t]**	**95% conf. interval**	
Male Migration						
Post	-.1348315	.0535422	-2.52	0.013***	-.2405202	-
Traditional culture	.1347482	.0610506	2.21	0.029**	.0142384	.0291427
Age	-.0024467	.0027611	-0.89	0.377	-.007897	.255258
Education	-.0091798	.0087011	-1.06	0.293	-.0263552	.0030036
Land area (ha)	.0281048	.0561843	0.50	0.618	-.0827992	.0079956
Number of family	-.0080042	.0153069	-0.52	0.602	-.038219	.1390088
members	.3760238	.1820348	2.07	0.040	.0166992	.0222107
Constanta						.7353484
Number of obs	178					
F(6, 171)	2.33					
Prob > F	0.0347					
R-squared	0.0755					
Root MSE	.35717					
Non Migration						
Post	-.0786517	.0722253	-1.09	0.278	-	.0639163
Traditional culture	.0067579	.0859601	0.08	0.937	.2212197	.1764375
Age	.0103029	.0034763	2.96	0.003***	-	.017165
Education	.0071035	.0132371	0.54	0.592	.1629218	.0332326
Land area (ha)	-.0960328	.0661731	-1.45	0.149	.0034408	.0345886
Number of family	-.0039349	.0229528	-0.17	0.864	-	.0413724
members	.2380178	.2049113	1.16	0.247	.0190256	.6424992
Constanta					-	
					.2266542	
					-	
					.0492422	

		- .1664636
Number of obs	178	
F(6, 171)	2.58	
Prob > F	0.0202	
R-squared	0.0782	
Root MSE	.4818	

t statistics in parentheses * p<.05, ** p<0.01, *** p<0.001

Source: Processed data (2025)

Table 6 shows that a consistent pattern emerges in the *sticky floor effect* model. Among male-migrant households, the *post* variable is negative and significant (-0.1348; p<0.05), suggesting that after migration, the likelihood of women belonging to the low-income group decreases. In contrast, no significant change is observed among non-migrant households. These results collectively strengthen the argument that male migration exerts a positive effect on women's economic positions, although this effect may vary depending on local socio-cultural context.

The quantitative findings are further supported by in-depth interviews conducted with several women from both types of households. The interview results reveal patterns consistent with the regression analysis. In male-migrant households, women tend to experience an increase in both economic and social responsibilities. Many of them manage remittance income to start small businesses, oversee agricultural activities, or engage in other productive economic endeavors near their homes. This situation provides women with greater autonomy in making day-to-day economic decisions, although long-term strategic decisions often continue to involve husbands or other male family members who work outside the region or abroad. This finding is consistent with the statement of Mannan & Frederic, (2015) and Raj et al., (2025), who highlight that male migration often compels women to assume new economic and managerial roles in the absence of men, leading to a partial but not full empowerment dynamic. Meanwhile, in non-migrant households, women's economic roles remain relatively limited. The primary source of household income continues to depend on the husband's employment, while women generally act as supplementary labor without full control over income sources. Local cultural

norms that confine women to the domestic sphere also serve as a major constraint. In several interviews, women expressed difficulties in participating in productive economic activities due to prevailing social norms that perceive "women as unfit to be the primary economic decision-makers within the household". This reflects findings from Haque, (2020) and Maulana et al., (2022), noting that patriarchal values and traditional gender ideologies remain significant barriers to women's full participation in rural economies.

Overall, the interviews suggest that male migration opens new opportunities for women to participate in agricultural production and related economic activities, but it has not fully altered the structure of power within households. In other words, women gain better access to farm-based and rural economic resources, yet they do not necessarily gain full control over them. Similar observations were made by Alabshar et al., (2021 and Marta et al., (2020), indicating that remittance-based improvements in welfare do not always translate into empowerment for women. The quantitative analysis reinforces this pattern, showing clear differences between male-migrant and non-migrant households. Women in male-migrant households are significantly more likely to belong to higher income groups. However, the interaction between migration status and time period is not significant, implying that the difference may have pre-existed migration, indicating a potential selection effect rather than a pure causal relationship. Donald & Lang, (2007) emphasize that observed differences in panel data may reflect pre-existing structural conditions rather than direct causal effects.

The inclusion of traditional cultural values in the model also reveals an important structural constraint. The negative coefficient of the natural variable indicates that stronger adherence to traditional norms reduces women's agricultural and economic participation. These norms, which emphasize women's domestic responsibilities and obedience to male authority, continue to limit women's agency even when they contribute economically. According to Haque, (2020) and Wahyuni et al., (2025) traditional gender norms perpetuate wage gaps and constrain female advancement despite their growing participation in productive sectors. Similarly, the negative but small coefficient of age on the glass ceiling effect suggests that younger women may have slightly greater mobility in the agricultural labor market compared to older cohorts, possibly reflecting generational changes in attitudes toward gender roles. (Barooah et al., 2023)

noted that generational shifts have taken place in rural women's engagement with agricultural innovation and decision-making.

Theoretically, these findings provide further support for the feminization of economic responsibility framework, which posits that economic restructuring and male migration tend to shift financial and managerial burdens onto women in agricultural households. However, the results also demonstrate that this feminization process remains largely adaptive rather than transformative. Women are compelled to take on greater economic and farm-management roles in response to male migration, but these shifts do not necessarily translate into greater decision-making power or autonomy. From this perspective, the study highlights a paradox within the feminization of agricultural labor: economic participation increases without a corresponding transformation in household power relations. This aligns with prior studies showing that women's empowerment often stagnates when structural gender norms remain intact, despite improved access to income. This is consistent with the statements that migration and agricultural restructuring expand women's responsibilities but not their authority, reflecting adaptive rather than transformative change (De Haas, 2010; Maulana et al., 2022).

In terms of policy implications, the findings emphasize the need for interventions that go beyond merely increasing women's participation in economic activities. Remittance utilization programs, for instance, should not only focus on productive investment but also explicitly recognize women as primary financial decision-makers. Strengthening women's financial literacy and entrepreneurial capacity could enhance their control over remittance management and improve long term household welfare. At the same time, cultural and social barriers must be addressed through community-level programs that challenge patriarchal norms and promote shared decision-making between men and women. Integrating these efforts within migration, labor, and gender quality policies would help ensure that the economic empowerment of women in migrant households is both sustainable and transformative.

Taken together, the results underline that male migration indirectly promotes women's economic agency by expanding access to income-generating opportunities. Nevertheless, the persistence of patriarchal social norms constrains the full realization of this potential. Economic feminization has occurred, but empowerment remains partial and conditional. Therefore,

achieving genuine gender equality in migrant sending regions requires a dual strategy that combines economic inclusion with deliberate cultural transformation, linking financial access, education, and social empowerment into a coherent policy framework.

CONCLUSION

This study provides empirical evidence that male migration plays a nuanced yet significant role in shaping women's economic outcomes in rural agricultural households. While the overall effect of male migration on the likelihood of women reaching higher income levels (glass ceiling) is positive, the absence of a significant interaction term suggests that this impact is not purely causal but partly reflects pre-existing structural differences between male-migrant and non-migrant households. In other words, migration alone does not automatically enhance women's economic empowerment; rather, its effects depend on how remittances are managed and how intra-household power relations evolve after men's departure.

The results from disaggregated models reinforce this interpretation. Among male-migrant households, the post-migration period is associated with a significant increase in women's probability of attaining higher income positions and a corresponding decline in the likelihood of being trapped in low-income (sticky floor) conditions. This finding supports the notion of feminization of economic responsibility, where women assume greater financial and agricultural managerial roles in the household economy following male migration. However, this feminization remains largely adaptive rather than transformational; women take on expanded economic burdens without a corresponding shift in decision-making authority or control over key household assets.

Cultural norms remain a critical barrier. The significant negative association between traditional culture and women's high-income status underscores the persistent patriarchal values that confine women to the domestic sphere, even in the context of agricultural work and rural livelihoods. Consequently, while male migration provides a structural opening for women's greater economic participation, the full realization of empowerment is constrained by entrenched socio-cultural factors.

Building on these insights, these findings suggest that intervention should extend

beyond facilitating remittance inflows or labor mobility. Programs aimed at remittance management, women's financial literacy, and entrepreneurship training should explicitly position women as central agricultural economic actors, not merely as recipients or intermediaries. Moreover, sustainable empowerment required integrated approaches that combine economic initiatives with cultural and institutional reforms, such as gender sensitive community programs, awareness campaigns, and a joint household decision-making mechanism.

In sum, male migration catalyzes for the reconfiguration of agricultural household economic roles, but not yet for gender transformation. True empowerment requires that economic participation be accompanied by shifts in power, agency, and social recognition. Future research should thus explore the mediating mechanisms, such as remittance control, farm time use, asset ownership, and local cultural adaptation, that determine whether migration ultimately reinforces or dismantles gender within rural agricultural households.

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