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Factors Determining Women's Empowerment in Rural Areas: An Ordered Logit Model-based Analysis

BY

Abhinanda Bordoloi[1], Pranita Goswami[2], Lipi B Mahanta[3,*]

[1]Department of Statistics, Gauhati University, Guwahati, Assam, INDIA
[2]Pragjyotish College, Guwahati, Assam, INDIA
[3]Mathematical and Computational Sciences Division, Institute of Advanced Study in Science and Technology, Guwahati, Assam, INDIA

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Abstract

Women's empowerment is one of the momentous issues of contemporary development policies in developing countries. This research study delves into the determinants of women's empowerment in rural areas of Lower Assam, India, employing statistical techniques such as logistic regression. Drawing on data collected from 201 respondents, the study examines the influence of education, income, and gender inequality on women's decision-making abilities within the family context. The findings reveal that education emerges as a significant predictor of women's empowerment, consistently impacting their decision-making autonomy across various models. Specifically, higher levels of education are associated with increased empowerment, highlighting the critical role of educational empowerment in fostering women's agency and autonomy. Furthermore, gender inequality within the household also exerts a notable influence on women's decision-making, underscoring the need for addressing patriarchal norms and promoting gender equity. However, women's income does not emerge as a significant predictor in the models, suggesting that economic empowerment alone may not suffice to enhance women's decision-making abilities. Overall, the study contributes valuable insights into the multifaceted nature of women's empowerment and underscores the importance of educational empowerment in promoting gender equality and women's rights in rural India.

Keywords: *Women empowerment; Rural area; Determinants; Statistical Analysis; Ordinal logit model*

Introduction

Gender inequality: Gender equality remains an elusive goal worldwide, with no country having achieved full parity. However, Scandinavian nations such as Iceland, Norway, Finland, and Sweden stand out for their notable strides in narrowing the gender gap. These countries boast a comparatively fair distribution of income, resources, and opportunities between men and women (*Global Issues: Gender Equality and Women's Empowerment*, n.d.). "If you educate a man, you educate an individual; if you educate a woman, you educate a nation" - Originally introduced by Malcolm X, this concept has since become prevalent in the discourse surrounding development.

The most significant gender gaps are identified primarily in the Middle East, Africa, and South Asia (*Home | Human Development Reports*, n.d.). However, several countries in these regions, including Lesotho, South Africa, and Sri Lanka, outrank the United States in gender equality. India has made significant progress in the gender inequality index, rising from 135th (in 2022) to 127th out of 146 countries in the report's 2023 edition, indicating an improvement in its ranking. Women's empowerment is a key mechanism for achieving gender equality, and through achieving gender equality, we can address numerous societal challenges, paving the way for progress. This research study may help the Government bodies get some idea of the present scenario of rural areas of Lower Assam and take action for the betterment of our nation.

Women Empowerment: Empowerment is a multi-dimensional social process enabling individuals to control their lives, communities, and society by addressing significant issues (Pipada & Khedar, 2022). Specifically, for women,

*Corresponding Author: **Lipi B Mahanta**

empowerment signifies their newfound ability to make life-defining choices, a capability previously denied to them. This empowerment is vital at personal, household, community, and societal levels, involving actions like literacy, education, training, and awareness-raising to enhance women's status.

Empowerment can be defined as a process by which the powerless are given selective preference in areas they do not have adequate access. The aim of this process is to provide a due share of power to the powerless. Women in India, who have always been considered second to men, have suffered millennia-long oppression and have been discriminated against so as to stay long away from the power center (Bhat, 2015). This has seriously harmed the growth of women in India. Several social reformers have warned that this sorry state of women, who form half of humanity, would harm the growth of the nation as a modern state and have worked for the betterment of women. Therefore, empowerment of women aims to provide women with greater access to knowledge and resources, greater autonomy in decision making, greater ability to plan their lives, greater control over the circumstances that influence their lives, and free them from shackles imposed on them by custom, belief, and practice. The number of shackles that women need to break is numerous.

Women's empowerment aims to create a society and political environment where women can live without the fear of oppression, exploitation, discrimination, or persecution often experienced in male-dominated structures. It enriches human resources for development, making it a crucial consideration in promoting human rights and overall development.

Women constitute almost 50% of the world's population, but India has shown a disproportionate sex ratio whereby the female population has been comparatively lower than males (933 females for every 1000 males) (*2011 Census of India - Wikipedia*, n.d.). As far as their social status is concerned, they are not treated as equal to men in all places. In Western societies, women have equal rights and status with men from all walks of life. However, gender disabilities and discrimination are found in India even today. The paradoxical situation is such that she is sometimes considered a Goddess and, at other times, merely a slave. Women's health is linked to the status of women in society and the culture that brews within this structure (*Hope in Hard Times: Women's Empowerment and Human Development - Manisha Desai - Google Books*, n.d.). There are a lot of health issues that mushrooms from the socio-economic scenario. These include death during childbirth, illiteracy and ignorance, violent attacks on women, etc. Overall, these factors adversely impact women's health and mental and physical well-being. Further, a woman's ill health affects not only her as an individual, but her family suffers too. Ultimately, it will hamper the society.

Literature Review

To conduct our study, we thoroughly reviewed several papers authored by both national and international researchers, which are cited below:

Few studies have implemented the Structural Equation Modelling (SEM) to investigate the determinants of women's empowerment, In India, a group (Chakrabarti & Biswas, 2012) conducted a study using data from the Third National Family and Health Survey. Findings suggest that education and employment policies have been ineffective in promoting women's empowerment, highlighting the need for behavioral change initiatives and awareness campaigns to challenge patriarchal norms. Additionally, regional disparities underscore the importance of tailored interventions, with recommendations for involving non-governmental organizations (NGOs) to address these issues effectively. Again another group (Ballon, 2018) conducted a study in Cambodia rooted in the Capability Approach and gender economics to measure and elucidate female empowerment in Cambodia. By integrating resources, values/traditions, and decision outcomes, the model offers a comprehensive framework to assess women's decision-making abilities across strategic and non-strategic life choices. The study uses stochastic dominance analysis to compare women's empowerment levels across various life choices, contributing to a deeper understanding of empowerment dynamics in the Cambodian context.

In one study (Sell & Minot, 2018), the authors investigated the factors influencing women's empowerment, specifically focusing on decision-making among small-scale farmers in Uganda. This study employs a mixed-methods approach to analyze factors influencing women's empowerment in agricultural contexts in Uganda. The research utilizes both household-level questionnaires and a modified Women's Empowerment in Agriculture Index (WEAI) module, administered individually to both male and female household members. The focus is on decision-making regarding productive activities and income use. A decision-making index (DI) is constructed based on participation and input in various economic activities. The conceptual framework considers individual, household, and community characteristics influencing empowerment levels, while the empirical specification involves regression analysis using the aggregated empowerment variable. Covariates include individual, household, and community-level factors, and tests for multicollinearity and heteroscedasticity are conducted.

An analysis of gender inequality is essential to understanding women's empowerment levels in Indian society. Gender inequality in India refers to health, education, and economic and political inequalities between men and women. Gender inequalities and their social causes impact India's sex ratio, women's health over their lifetimes, their educational attainment, and economic conditions (*Reports and Publications | Human Development Reports*, n.d.). Gender inequality in India is a multifaceted issue that concerns men and women alike. Some argue that some gender equality measures place men at a disadvantage. However, when India's population is examined as a whole, women are at a disadvantage in several important ways.

It has been shown that education, economic participation of women, poverty, and economic opportunity available for

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women increase their empowerment (Bushra & Wajiha, 2015). This paper investigates the socio-economic determinants of women's empowerment in Pakistan. Employing quantitative research methods, it analyzes factors such as education, employment, income, and cultural norms to understand their impact on women's empowerment levels. The study uses statistical techniques like regression analysis to uncover relationships between these determinants and women's empowerment, providing valuable insights for policy interventions to promote gender equality and women's rights in Pakistan.

Socio-economic and demographic factors shape women's empowerment. Women's control over their own earnings and their participation in household decision-making is associated with empowerment. A study (Wiklander, 2010). explores the determinants of women's empowerment in rural India. It adopts a mixed-methods approach, combining qualitative and quantitative techniques to investigate various factors influencing women's empowerment. The study includes surveys, interviews, and focus group discussions to gather data on socioeconomic factors, cultural norms, access to resources, and participation in decision-making processes. Quantitative analysis techniques such as the binary choice probit model are employed to examine the relationships between these determinants and women's empowerment levels. The study aims to contribute to the existing literature by providing insights into the contextual factors shaping women's empowerment in rural India and informing policy recommendations to enhance gender equality and women's rights.

According to a study (Thandar, Mya, Win Naing, and Hlaing Hlaing Moe, 2019) (Thandar, Mya, Win Naing, and Hlaing Hlaing Moe, 2019), studies on women empowerment indicate that women play a more significant role in decision-making, leading to improvements in household well-being. Women's empowerment is multi-dimensional and may have different needs at different stages of the empowerment process. This study uses data from the 2015-16 Myanmar Demographic and Health Survey to explore married women's empowerment in Myanmar. It focuses on dimensions like earnings control and household decision-making, combining them into an empowerment index. Binary logistic regression is applied to assess the relationship between empowerment and socio-demographic factors. Results indicate that higher empowerment is linked with women's employment, older age, urban living, higher education, wealth, and fewer children. The study highlights the significance of creating job opportunities and educating women, especially in rural settings.

A study by a group in South Africa (Sharaunga et al., 2019) introduces a novel method for quantifying women's empowerment by employing principal component analysis (PCA) on measures of agency and resources. Through PCA, dominant dimensions of empowerment were identified, providing quantitative insights into the levels of empowerment across various dimensions among rural women in Msinga Local Municipality, South Africa. The findings suggest that women's empowerment is best understood as an increase in capabilities, and PCA effectively captures these dynamics across different dimensions.

The study by (Menon et al., 2020) investigates the status of women's empowerment in urban Bangalore, India, through surveys and interviews. The study found that employed women exhibit higher empowerment levels in work-related matters, home affairs, and personal freedom compared to non-working women. Empowerment tends to increase with age, with women aged 51 and above showing the highest empowerment, followed by those aged 36-50. In terms of decision-making at home, married women, especially those in joint families, often defer to their in-laws, while single women have less influence over household decisions. However, married women generally have more empowerment at home than single women. In workplace empowerment, single women tend to have more autonomy than married women, as they face fewer restrictions on mobility and decision-making.

A chronological review of the prior art is presented in **Table 1** below. These observations and study gaps suggest areas for further research and intervention to enhance our understanding and promotion of women's empowerment across different contexts.

Table 1. Prior Art

Sl	Reference	Methodology	Observations	Study Gaps
1	(Wiklander, 2010)	Mixed-methods approach combining surveys, interviews, and focus group discussions; Employed binary choice probit model.	Socio-economic factors and cultural norms significantly influence women's empowerment in rural India.	Potential challenges in integrating qualitative and quantitative methods to provide a holistic understanding of empowerment dynamics.
2	(Chakrabarti & Biswas, 2012)	Third National Family and Health Survey data; Binary logistic regression analysis.	Education and employment policies in India have been ineffective in promoting women's empowerment.	Limited focus on addressing regional disparities and the need for behavioral change initiatives and awareness campaigns.
3	(Bushra & Wajiha, 2015)	Quantitative research methods, including regression analysis, are employed to	Education, economic participation of women, poverty alleviation, and	Limited focus on cultural norms, scope for qualitative exploration, and the need for longitudinal

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		analyze the socio-economic determinants of women's empowerment in Pakistan.	economic opportunities available for women positively impact women's empowerment levels in Pakistan.	analysis highlight potential gaps in understanding women's empowerment dynamics in Pakistan.
4	(Ballon, 2018)	Utilized a model rooted in the Capability Approach and gender economics; Employed stochastic dominance analysis.	The model provided a comprehensive framework for measuring and elucidating female empowerment in Cambodia.	Potential lack of consideration for cultural nuances and the effectiveness of specific interventions targeting empowerment.
5	(Sell & Minot, 2018)	Mixed-methods approach using household-level questionnaires and modified Women's Empowerment in Agriculture Index (WEAI) module; Employed regression analysis.	Decision-making among small-scale farmers in Uganda is influenced by various factors, including participation in productive activities and household dynamics.	Potential limitations in capturing nuanced aspects of decision-making and empowerment among diverse farming households.
6	(*Reports and Publications | Human Development Reports*, n.d.)	Various datasets used for gender inequality analysis in India.	Gender inequality in India persists across health, education, and economic domains, impacting women's empowerment.	Limited focus on exploring intersectionalities and the potential impacts of gender equality measures on both men and women.
7	(Thandar, Mya, Win Naing, and Hlaing Hlaing Moe, 2019)	Utilized Myanmar Demographic and Health Survey 2015-16 data; Employed binary logistic regression analysis.	Higher empowerment levels among married women in Myanmar are associated with factors such as employment, education, and household characteristics.	Limited exploration of contextual factors shaping empowerment beyond socio-economic and demographic variables.
8	(Sharaunga et al., 2019)	Employed principal component analysis (PCA) on measures of agency and resources.	PCA effectively captures dimensions of empowerment among rural women in South Africa.	Potential limitations in addressing contextual nuances and the broader socio-economic and cultural factors influencing empowerment.
9	(Menon et al., 2020)	The collected data, comprising 30 statements, underwent Factor Analysis using the Principal Component Analysis (PCA) method, employing varimax rotation for component extraction.	Highlighted the correlation between educational attainment and empowerment indicators. Explored women's participation in the workforce and their decision-making autonomy within households.	May not have fully addressed the complex interplay of socioeconomic, cultural, and institutional factors influencing women's empowerment in urban settings.

Objective of the study

The specific objective of the study is:

- To make an exploratory analysis of the determinants of women empowerment using statistical techniques like logistic regression (**Figure 1**).

Methodology

Study Flow: The essential data for this research study was obtained through a structured sample survey involving the sequential steps depicted in **Figure 2**.

Detail discussion:

Population: The population selected to be sampled for the study is women from rural areas of Lower Assam. We chose the districts of Lower Assam randomly. Out of 12 districts, four districts are selected, viz Kamrup, Kokrajhar, Udalguri, and Dhubri district. The female rural population of Assam, according to census 2011, is 13,128,045. Especially the population under study for the selected districts is 669,008 (Kamrup), 407,755 (Kokrajhar), 391,652 (Udalguri), and 851,643 (Dhubri).

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Sampling Design: Given that the data within districts are homogeneous and between districts are heterogeneous, a Stratified Sampling Technique is deemed to be appropriate. In stratified sampling, you divide the population (in this case, the districts) into homogeneous subgroups (strata) based on specific characteristics (homogeneity within districts). Then, you can randomly sample from each stratum to ensure representation from each district while taking into account their inherent heterogeneity. This approach allows for a more precise representation of both within-district homogeneity and between-district heterogeneity in the sample.

Sample size: Sample size (*n*) is a crucial statistical concept for making inferences about a population based on a sample. It involves determining the number of observations in the sample and relies on factors like the margin of error (ε) and confidence level. Sample size calculations can be performed to ensure that the estimate closely approximates the true population proportion. Adjustments are necessary for finite populations to account for dependencies among individuals in the sample. The size is determined by using the traditional technique. In our case, we have adopted the following formula:

$$\textbf{unlimited population}: n = \frac{z^2 \times \hat{p}(1-p)}{\epsilon^2}$$

$$\textbf{finite population}: n' = \frac{n}{1 + \frac{z^2 \times \hat{p}(1-p)}{\epsilon^2 N}}$$

where,

z is the z score

ε is the margin of error

N is the population size

$\hat{\mathbf{p}}$ is the population proportion

In our case, we fixed confidence interval = 0.95; z = 1.96; ε = 0.049; N = 13,128,045 and $\hat{p}$ =0.5.

The sample size obtained was 385 from the female population of rural areas of Assam, 13,128,04. Since 50% to 60% of the total population of females from rural areas of Assam belong to rural areas of Lower and Middle Assam, we took 50% of 385, which comes out to be 193. This is how we considered our sample size to be 201.

Hypotheses framed: Based on the three determinants, the null hypotheses framed are as follows-

H_1: α_i=0 (i=1,2,3), where α_1=Education, α_2=Gender, and α_3= Income

Versus alternate hypotheses

H_1: $\alpha_i \neq 0$ (i=1,2,3)

i.e., H_0: (The determinants have no significant impact on women's empowerment) versus

$H_{1:}$ (The determinants significantly impact women's empowerment).

Sample Framework: The primary data for this study was collected through a survey method. The chosen respondents for the survey comprised both married and unmarried women aged 15 to 65 years. As detailed earlier, the data were collected from the districts [Kamrup, Kokrajhar, Udalguri, and Dhubri districts] as shown in the map below (**Figure 3**) (*List of Districts of Assam - Wikipedia*, n.d.).

Questionnaire: The data collection process involved a structured questionnaire designed specifically for this study. It included questions related to Education, Economic Conditions, Gender Inequality, and Decision-Making sections. The questionnaire encompassed three to four closed-ended questions for each variable, focusing on measuring women's empowerment in Assam, which were taken to analyze this study. The variables in the questionnaire were categorized into two main aspects:

I) Dependent Variable:
Decision making
II) Independent Variables:
Education
Income
Gender Inequality

For a comprehensive assessment, a three-point scale was utilized to measure the high and low dimensions of both independent and dependent variables, where:
1 was designated as Always
2 was indicative of Sometimes
3 was marked as Never

Furthermore, the independent variable education was gauged using a scale with the following numerical values:
0 for No Education
1 for Under Matric
2 for Matric
3 for HS (Higher Secondary)
4 for Graduate
5 for Post-graduate
6 for PhD
7 for Post-Doc

This carefully designed questionnaire allowed for a systematic evaluation of women's empowerment, considering critical factors such as decision-making, education, income, and gender inequality within the context of Assam.

Statistical Technique Used for Analysis:

Logistic Regression: Logistic regression is a statistical analysis method to predict a binary outcome, such as yes or no, based on prior data set observations. A logistic regression model predicts a dependent data variable by analyzing the relationship between one or more existing independent variables. For example, logistic regression could be used to predict whether a political candidate will win or lose an election or whether a high school student will be admitted or not to a particular college. These binary outcomes allow straightforward decisions between two alternatives. Here, in this study ordered logit model is used.

Ordered logit model: In statistics, the ordered logit model also ordered logistic regression or proportional odds model) is an ordinal regression model—that is, a regression model for ordinal dependent variables — For example, if one question on a survey is to be answered by a choice among Always, Sometimes and Never, and the purpose of the analysis is to

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see how well that response can be predicted by the responses to other questions, some of which may be quantitative, then ordered logistic regression may be used. It can be thought of as an extension of the logistic regression model that applies to dichotomous dependent variables, allowing for more than two (ordered) response categories.

We applied two models to analyze the collected data.

Model 1: Including all variables (Education, income, and gender inequality)

$$WE_{fit} = \beta_0 + \beta_{1t} Edu_{it} + \beta_{2it} Gendin_{it} + \beta_{3it} Inc_{it} + \varepsilon_i \quad (1)$$

Model 2: Ordered logit regression: empowerment to make decisions about oneself

$$WE_{oit} = \beta_0 + \beta_{1t} Edu_{it} + \beta_{2it} Gendin_{it} + \beta_{3t} Inc_{it} + \varepsilon_i \quad (2)$$

For all values of i=1 to n (n=201). Here, WE_{fit} represents women empowerment (family issues) at a time 't', Edu represents Education, Gendin represents gender inequality, and Inc represents income at a time 't'. β_0 is the intercept of the regression equation, and ε_i represents the error term, which is random in nature and expected due to uncertain events.

Platforms used for analysis: The hardware and software platforms used were a Laptop (HP, Model-RTL8723DE) and SPSS (IBM SPSS, Version 26).

Results and Discussion

Following the method and questionnaire mentioned above, the data were collected from a total of 201 respondents. Further, due to careful selection and collection, there were no inconsistencies or redundancies in the data or missing values, outliers, or erroneous entries. The data were carefully entered into SPSS using designated formats and codes. Hence, no preprocessing of the data was done.

Model 1: In this model, the dependent variable is the equal rights of women and men in the family to make decisions. In contrast, the independent variables include the woman's level of education, her income, and the extent of gender inequality in her home.

Table 2. Case Processing Summary (equal rights)

		N	Marginal Percentage
Equal rights as male	Always	101	50.2%
	Sometimes	50	24.9%
	Never	50	24.9%
Home Inequality	Sometimes	58	28.9%
	Never	143	71.1%
Cat_month_her	15000 to 30000	4	2.0%
	30000 to 45000	4	2.0%
	Below 15000	111	55.2%
	No income	82	40.8%
Level of Education	No education	45	22.4%
	Undermatric	46	22.9%
	Matric	17	8.5%
	HS	26	12.9%
	Graduate	57	28.4%
	Post-graduate	9	4.5%
	PhD	1	0.5%
Valid		201	100.0%
Missing		0	
Total		201	

Table 2 presents the data for 201 respondents with no missing values. It illustrates the distribution of respondents by dependent and independent variables. The dependent variable Decision Making, denoted as Equal Rights as male, reveals that out of 201 women, 101 Always, 50 Sometimes, and 50 Never have equal decision-making rights in the family. The independent variable Gender Inequality, referred to as Home Inequality, indicates that no women have Always, 58 have Sometimes, and 143 have Never experienced gender inequality at home. The economic condition, denoted as Cat_month_her, shows that four women earn Rs. 15,000-30,000, four earn Rs. 30,000-45,000, 111 earn below Rs. 15,000, and 82 have no income. The last independent variable, education represented by Level of Education, demonstrates that 45 women have No education, 46 are Undermatric, 17 have completed Matric, 26 have HS qualifications, 57 are Graduated, nine are Post-graduated, and one holds a PhD.

To test the suitability of the model we run a few tests. First, a likelihood ratio chi-square test (**Table 3)** is used to assess the significance of the improvement in fit between the Final model and the Intercept-only model. In this case, there is a significant improvement in fit, indicated by a *p*-value less than 0.001, confirming that our model is an excellent fit. Next, we test the goodness of fit of the model using two methods **(Table 4)**. The Pearson method measures the difference between observed and expected values, while the Deviance method is used to compare model fit between a complex model and a simpler one. These methods are essential in model evaluation and selection in statistical analysis. Both tests — Pearson and Deviance — reject the null hypothesis since the *p*-value for both is greater than our chosen alpha, suggesting that we do not have enough evidence to reject the null hypothesis and indicating that the observed data fits the expected distribution.

Table 3. Model Fitting Information (equal rights)

Model	-2 Log Likelihood	Chi-Square	Sig.
Intercept Only	307.861		

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Final	79.169	228.692	.000

Table 4. Goodness-of-Fit (equal rights)

	Chi-Square	Sig.
Pearson	83.859	.512
Deviance	53.974	.993

Finally, in **Table 5**, we check whether the relationship between the independent variables and the dependent variable is consistent across all levels or categories of the dependent variable. The Test of Parallel Lines is a crucial diagnostic tool in ordinal regression that helps assess the validity of the proportional odds assumption, which is important for understanding how independent variables influence ordered categorical outcomes. In our case, since the *p*-value is greater than our chosen alpha, it indicates that there is insufficient evidence to reject the proportional odds assumption. This suggests that the relationship between the independent variables and the dependent variable remains consistent across all dependent variable levels.

Table 5. Test of Parallel Lines (equal rights)

Model	-2 Log Likelihood	Chi-Square	Sig.
Null Hypothesis	79.169		
General	58.853	20.316	.026

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

Model 2: In this model, the dependent variable is the decision about her own, while the independent variables include the woman's education level, income, and gender inequality in her home. As in the previous model, we present and discuss **Tables 6-9**.

Table 6: Case Processing Summary (making decision)

		N	Marginal Percentage
Decision on own education, health etc.	Always	100	49.8%
	Sometimes	52	25.9%
	Never	49	24.4%
Home Inequality	Sometimes	58	28.9%
	Never	143	71.1%
Cat_month_her	15000 to 30000	4	2.0%
	30000 to 45000	4	2.0%
	Below 15000	111	55.2%
	No income	82	40.8%
Level of Education	No education	45	22.4%
	Undermatric	46	22.9%
	Matric	17	8.5%
	HS	26	12.9%
	Graduate	57	28.4%
	Post-graduate	9	4.5%
	PhD	1	0.5%
Valid		201	100.0%
Missing		0	
Total		201	

For the dependent variable, Decision Making, denoted as Equal right as male to make decisions, out of the 201 women, 100 women Always have equal rights, 52 women Sometimes have these rights, and 49 women Never have equal rights as males in the family to make decisions. Regarding the independent variable Gender Inequality, represented by Home Inequality, which signifies the absence of gender discrimination in the home, we observe that 0 women experience it Always, 58 women experience it Sometimes, and 143 women have Never experienced gender inequality in their homes. The independent variable Economic Condition, denoted as Cat_month_her, reflecting the monthly income of women, shows that four women earn Rs. 15,000-30,000, another four women earn Rs. 30,000-45,000, 111 women earn below Rs. 15,000, and 82 women have no income. Lastly, the independent variable Education, denoted as Level of Education, reveals that 45 women have No education, 46 are Undermatric, 17 have passed Matric, 26 have passed HS, 57 have Graduated, nine have Post-graduated, and 1 holds a PhD.

From **Table 7**, we assess whether there exists a substantial improvement in the fit of the final model when compared to the intercept-only model. The *p*-value, which is less than 0.001, underscores the substantial evidence supporting the superior fit of our model. Consequently, this suggests that our model is a robust and highly suitable fit for the data, substantiating its statistical strength and reliability. In **Table 8**, the Goodness of fit statistic indicates the model's fit quality. In this context, an insignificant *p*-value indicates that there are no substantial differences between the observed data and the accepted model, reaffirming the model's appropriateness in explaining the data.

Table 7: Model Fitting Information (making decision)

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Model	-2 Log Likelihood	Chi-Square	Sig.
Intercept Only	289.781		
Final	81.569	208.212	.000

Table 8: Goodness-of-Fit (making decision)

	Chi-Square	Sig.
Pearson	73.593	.569
Deviance	53.204	.989

Finally, in **Table 9**, since the *p*-value is greater than our chosen alpha, it indicates that there is insufficient evidence to reject the proportional odds assumption. This suggests that the relationship between the independent variables and the dependent variable remains consistent across all dependent variable levels.

Table 9: Test of Parallel Lines (making decision)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	81.569			
General	.000[b]	81.569	10	.000

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

Hence, it is evident that education exerts a consistently positive and statistically significant influence on women's empowerment in both Model 1 and Model 2. These findings underscore the pivotal role of education, highlighting that women's decision-making ability is significantly dependent on their level of education, emphasizing the critical importance of educational empowerment.

Conclusion and Future Implications

The primary objective of this study is to investigate and understand the determinants of women's empowerment, specifically focusing on their decision-making abilities. By analyzing factors such as education, income, and gender inequality, this research sheds light on the crucial components that influence women's empowerment in rural areas of lower Assam, addressing a pivotal dimension of contemporary development policies in developing countries. The outcomes of this study align consistently with the research conducted by (Bushra & Wajiha, 2015). Education is revealed to maintain a positive and significant relationship with women's empowerment in decision-making. In the context of Assam, India, where societal norms often limit women's decision-making abilities due to entrenched patriarchal structures, our findings emphasize that the level of education plays a critical role. Moreover, the impact of income and gender inequality is observed to influence women's empowerment moderately.

In light of these results, it becomes apparent that educational empowerment is a key catalyst for enhancing women's decision-making capabilities, particularly in rural areas of Assam. To address the existing barriers to women's empowerment, particularly in patriarchal societies, government bodies must institute new policies and initiatives aimed at educating women in remote rural regions. By focusing on education, policymakers can make significant strides in promoting gender equality and empowering women to take charge of their decisions and, by extension, their lives. This underscores the urgency of bridging educational gaps and addressing gender disparities to advance women's empowerment and societal progress.

Statements and Declarations

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Human Ethical Clearance for the study: Obtained from Human Ethical Committee of the Institute of Advanced Study in Science and Technology, Guwahati, Assam, INDIA

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Figure captions

Figure 1: Determinants of study

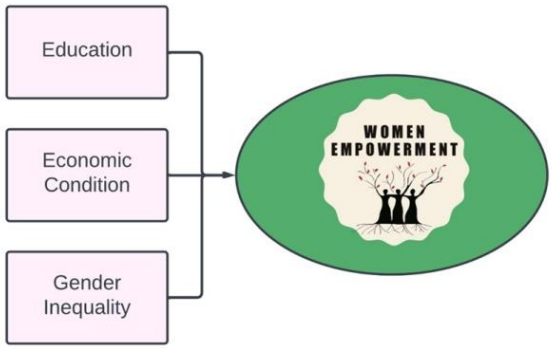

Figure 2: Map of districts of Assam, colored by division: Green: Lower Assam, Purple: North Assam, Yellow: Central Assam, Orange: Barak Valley, Red: Upper Assam

*Corresponding Author: **Lipi B Mahanta**

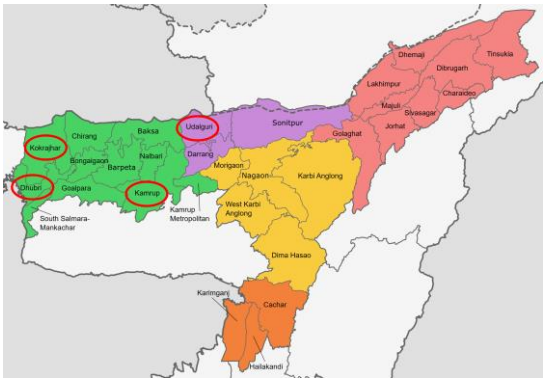

Figure 3: Study flow

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*Corresponding Author: **Lipi B Mahanta**