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# Determinants of Poverty in Rural Punjab, Pakistan

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## Abstract

Despite being one of the most agriculturally productive regions in Pakistan, rural Punjab continues to grapple with persistent poverty and income inequality. This study aims to investigate the multifaceted determinants of poverty in rural Punjab, shedding light on the interplay of factors such as access to education, healthcare, land ownership, employment opportunities, and infrastructure development. A sample of 300 households from the rural areas of Punjab was selected conveniently. A well-structured, pretested questionnaire was used to collect the primary data. The Ordinary Least Squares (OLS) regression model was used for the analysis. According to the results of the study, the variable of family members has a significant positive effect on household income. Variables of agricultural land have a significant negative effect on household income. Variables of other land have a significant positive effect on household income. The variable of the region has a significant positive effect on household income. The variable of the number of livestock has a significant positive effect on household income. Variables in the use of technology have a significant positive effect on household income. Variables of market availability have a significant positive effect on household income. It is recommended that the government should Encourage family-oriented policies and support systems to strengthen household income and Develop programs promoting skill development and employment opportunities for family members. The government should Periodically review and update policies to adapt to changing economic and social conditions.

Keywords: Determinants, Poverty, Rural Punjab, Household, Pakistan

## Introduction

Poverty is a complicated issue that goes beyond just income and spending (money-related aspects). It includes things like lack of shelter, malnutrition, limited access to education and healthcare, uncertainty about the future, gender inequality, and contaminated water supply (Alkire & Foster, 2011; Bhuiya et al., 2007). Poverty is influenced by various factors, not only economic but also social, political, cultural, and geographical, which collectively impact people's lives, defining them as poor. Developing countries face a more severe poverty situation compared to developed ones. In these developing nations, over 30% of the population earns less than $2 a day, while this percentage is nearly zero in developed (industrialized) countries (Alvaredo & Gasparini, 2015). The United Nations Sustainable Development Goals (SDGs) prioritize ending all forms of poverty by 2030. Therefore, for countries like Pakistan, it is crucial to measure the extent of poverty and identify the factors contributing to it. Khan et al. (2015) conducted research related to the relationship of socioeconomic empowerment with household poverty. They collected primary data from a household survey in rural areas of Bahawalpur, Pakistan. The results showed a significant negative relationship between empowerment and household poverty. Haq et al. (2012) conducted a study on income determinants using primary data from Bahawalpur, Pakistan. Their findings showed that education and socioeconomic factors majorly affect poverty reduction (Haq et al.,2015).

Ali et al. (2018) investigated the impact of trade openness on employment and the subsequent effect on poverty. They used annual macroeconomic data to evaluate the effect of different variables on trade openness. They used distinct methodologies, like Johansen Co-integration, Error Correction Model (ECM), and Granger Causality, for the short-term and long-term analysis. Their results suggested a negative short-term relation between trade openness and macroeconomic variables, while employment and inflation showed a positive relationship. In the long run, these variables have a positive correlation, and labor force and inflation were inversely related. Iqbal et al. (2018) examined factors of rural poverty in Pakistan by using survey data which was collected from 480 farm households. They used the FGT technique to assess poverty and logistic regression to find the effect of different factors. The results showed that about 50 percent of the population was impoverished by agriculture, which was a primary source of basic necessities for the poor.

Arshed et al. (2017) investigated the root causes of poverty in Pakistan using data from the Labor Force Survey 2010. By employing factor analysis and logit modeling, they found that education levels, household size, and job characteristics significantly impact poverty. Abrar-ul-Haq and Jali (2016) focused on rural poverty causes and reduction strategies in southern Punjab, Pakistan, using primary data and cluster sampling. Their research emphasized the importance of improving social setups, market access, and empowering rural households to alleviate poverty. Cheema and Sial (2014) analyzed poverty using various indicators based on the Pakistan Social and Living Standard Measurement data in 2010-2011. Ordinary Least Squares analysis revealed a negative correlation between education and poverty and a positive relationship between poverty and family size. Tahir et al. (2014) explored the connection between Gross Domestic Product (GDP) and poverty in Pakistan using secondary data from 1980-2012, suggesting that significant changes in GDP can potentially mitigate poverty. Mumtaz et al. (2019) conducted research on impact of psychological consequences on poverty and found

All the socioeconomic and demographic variables have a strong association with the level of income. Malik et al. (2019) analyzed the determinants of intra-household income inequality and found a negative relationship between intra-household inequality and household size. Said et al. (2011) examined poverty patterns in Pakistan from two dimensions—asset accumulation and basic needs—using data from Pakistan's Standard of Living Measurement in 2008-2009. Regression analysis highlighted the role of infrastructural and industrial developments in shaping poverty at the district level.

Despite the high agricultural productivity in rural Punjab, Pakistan, persistent poverty and income inequality remain significant challenges. This study investigates the complex factors affecting poverty in the region, exploring elements like education access, healthcare, landownership, job opportunities, and infrastructure development. Through thoroughly examining these factors, the research aims to provide a comprehensive understanding of the hurdles rural households face. Ultimately, the goal is to offer evidence-based policy recommendations that can effectively address and reduce poverty in Punjab, Pakistan.

## Methodology

A sample of 300 households from the rural areas of Punjab was selected conveniently. A well-structured, pretested questionnaire was used to collect the primary data. The Ordinary Least Squares (OLS) regression equation for predicting the dependent variable (DV) based on the given independent variables (IVs) can be written as follows:

$$DV = \beta_0 + \beta_1 * F\_structure + \beta_2 * f\_mem + \beta_3 * Fmgovtjob + \beta_4 * Disablep + \beta_5 * Agriland + \beta_6 * Otherland + \beta_7 * Age\_HH + \beta_8 * Eduhh + \beta_9 * Genderhh + \beta_{10} * Region + \beta_{11} * no\_livestock + \beta_{12} * edu\_facility + \beta_{13} * USE\_technology + \beta_{14} * Infrastructure + \beta_{15} * market\_availability + \varepsilon \quad (1)$$

In this equation:

DV represents the dependent variable you are trying to predict.

$\beta_0$ is the intercept (constant term).

$\beta_1$, $\beta_2$, $\beta_3$, ... $\beta_{15}$ are the regression coefficients for the respective independent variables F_structure, f_mem, Fmgovtjob, Disablep, Agriland, Otherland, Age_HH, Eduhh, Genderhh, Region, no_livestock, edu_facility, USE_technology, Infrastructure, and market_availability.

ε represents the error term, which accounts for the unexplained variance in the dependent variable.
The coefficients (β1, β2, β3, etc.) are estimated from the OLS regression analysis to quantify the relationship between each independent and dependent variable.

Table 1. Description of variables used in the model.

| Variables | Description | Unit |
|---|---|---|
| H_income | Total income of household per thousand | Thousand rupees |
| F_structure | Family stracture | Single=1 joint=0 |
| F_mem | Total family members | Numbers |
| Fmgovtjob | Number of family members doing govt job | Numbers |
| Disablep | Disable persons in family | Numbers |
| Agriland | Ownership of agricultural land | Acres |
| Otherland | Other land (home, plot, or commercial) | marla |
| Age_HH | Age of household head (decision maker) | Years |
| Eduhh | Qualification of household head | Schooling years |
| Genderhh | Gender of household head | Male=1<br>female=0 |
| Region | region | Urban=1<br>rural=0 |
| No_livestock | Number of livestock | Number of cows, goats |
| Edu_facility | Education facility in your area | Yes=1<br>no=0 |
| Use_technology | Use of technology in your area | Low=1<br>medium=2<br>high=3 |
| Infrastructure | Infrastructure in your area | Bad=1<br>good=2<br>very good=3 |
| Market_availability | Market availability | Yes=1<br>no=0 |

Explanation of variables are as under:
H_income: Total income of the household per thousand. It represents the total income of the household in thousand rupees.
F_structure: Family structure. It is a binary variable where "Single" is represented as 1 and "joint" is represented as 0, indicating whether the household has a single-family structure or a joint-family structure.
F_mem: Total family members. It represents the number of individuals in the household.
Fmgovtjob: Number of family members doing government jobs. It indicates the count of family members who are employed in government jobs.
Disablep: Disabled persons in the family. It represents the number of individuals in the family who have disabilities.
Agriland: Ownership of agricultural land. It represents the size of agricultural land owned by the household in acres.
Otherland: Other land (home, plot, or commercial). It represents the size of other land types in Marla, such as residential land, plots, or commercial land.
Age_HH: Age of the household head (decision maker). It represents the age of the person in the household who makes important decisions.
Eduhh: Qualification of household head. It indicates the number of schooling years completed by the household head.
Genderhh: Gender of the household head. It is a binary variable where "Male" is represented as 1 and "Female"

is represented as 0, indicating the gender of the household head.
Region: Region. It is a binary variable where "Urban" is represented as 1 and "Rural" is represented as 0, indicating whether the household is located in an urban or rural area.
No_livestock: Number of livestock. It represents the count of livestock, including cows and goats, owned by the household.
Edu_facility: Education facility in your area. It is a binary variable where "Yes" is represented as 1 and "No" is represented as 0, indicating the presence or absence of an education facility in the area.
Use_technology: Use of technology in your area. It is a categorical variable with values "Low" represented as 1, "Medium" as 2, and "High" as 3, indicating the level of technology usage in the area.
Infrastructure: Infrastructure in your area. It is a categorical variable with values "Bad" represented as 1, "Good" as 2, and "Very Good" as 3, indicating the quality of infrastructure in the area.
Market_availability: Market availability. It is a binary variable where "Yes" is represented as 1 and "No" is represented as 0, indicating the availability of markets in the area.

## Results and Discussion

Table 2 shows that the variable H_income represents the total income of households per thousand rupees. The minimum income observed in the dataset is 5.00 thousand rupees, the maximum is 287.00 thousand rupees, and the mean income is approximately 37.25 thousand rupees. F_structure is a binary variable representing family structure. A value of 1 indicates a "Single" family structure, and 0 indicates a "Joint" family structure. The minimum is 0 (joint family), the maximum is 1 (single family), and the mean is approximately 0.4133. F_mem represents the total number of family members in each household. The dataset's minimum number of family members is 1, the maximum is 19, and the mean is approximately 5.7033.

Table 2. Descriptive statistics of variables used in the model.

| Variables | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| H_income | 300 | 5.00 | 287.00 | 37.2533 | 32.73358 |
| F_structure | 300 | .00 | 1.00 | .4133 | .49325 |
| F_mem | 300 | 1.00 | 19.00 | 5.7033 | 2.27727 |
| Fmgovtjob | 300 | .00 | 7.00 | .6600 | 1.09929 |
| Disablep | 300 | .00 | 4.00 | .2282 | .69748 |
| Agriland | 300 | .00 | 40.00 | 5.1367 | 5.13607 |
| Otherland | 300 | .00 | 20.00 | 1.7667 | 3.61420 |
| Age_HH | 300 | .00 | 70.00 | 35.3267 | 9.85106 |
| Eduhh | 300 | .00 | 18.00 | 13.5633 | 3.46207 |
| Genderhh | 300 | .00 | 1.00 | .8067 | .39557 |
| Region | 300 | .00 | 1.00 | .0567 | .23159 |
| No_livestock | 300 | .00 | 30.00 | 2.8000 | 3.89923 |
| Edu_facility | 300 | .00 | 1.00 | .8600 | .34757 |
| Use_technology | 300 | 1.00 | 3.00 | 2.5167 | .71514 |
| Infrastructure | 300 | 1.00 | 3.00 | 2.6421 | .61499 |
| Market_availability | 300 | .00 | 1.00 | .8933 | .30920 |

Fmgovtjob represents the number of family members engaged in government jobs within each household. The minimum is 0, indicating no family members in government jobs; the maximum is 7, and the mean is

approximately 0.6600. Disablep indicates the count of disabled persons in each household. The minimum is 0 (no disabled persons), the maximum is 4, and the mean is approximately 0.2282. Agriland represents the size of agricultural land owned by each household in acres. The minimum is 0 acres, the maximum is 40 acres, and the mean is approximately 5.1367 acres. Otherland represents the size of other land types (e.g., residential land, plots, commercial land) owned by each household in Marla. The minimum is 0 Marla, the maximum is 20 marla, and the mean is approximately 1.7667 Marla.

Age_HH represents the age of the household head (decision maker) in years. The minimum is 0 years, the maximum is 70 years, and the mean is approximately 35.3267 years. Eduhh indicates the number of schooling years completed by the household head. The minimum is 0 years, the maximum is 18 years, and the mean is approximately 13.5633 years. Genderhh is a binary variable indicating the gender of the household head. A value of 1 represents a male household head, and 0 represents a female household head. The mean is approximately 0.8067, indicating a predominance of male household heads. The region is a binary variable indicating the region where the household is located. A value of 1 represents an urban region, and 0 represents a rural region. The mean is approximately 0.0567, suggesting that the majority of households are in rural areas. No_livestock represents the number of livestock (e.g., cows, goats) owned by each household. The minimum is 0, the maximum is 30, and the mean is approximately 2.8000. Edu_facility is a binary variable indicating the presence of an education facility in the area. A value of 1 indicates the presence of an education facility, and 0 indicates the absence. The mean is approximately 0.8600, suggesting that education facilities are commonly available in the area. Use_technology represents the level of technology usage in the area. It is a categorical variable with values ranging from 1 (Low) to 3 (High). The mean is approximately 2.5167, indicating a moderate level of technology usage in the area.

Infrastructure represents the quality of infrastructure in the area. It is a categorical variable with values ranging from 1 (Bad) to 3 (Very Good). The mean is approximately 2.6421, indicating that the infrastructure in the area is generally of good quality. Market_availability is a binary variable indicating the availability of markets in the area. A value of 1 indicates the presence of markets, and 0 indicates the absence. The mean is approximately 0.8933, suggesting that markets are commonly available in the area.

Table 3. Multicollinearity.

| Variable | Collinearity Statistics | |
|---|---|---|
| | Tolerance | VIF |
| F_structure | .558 | 1.793 |
| F_mem | .529 | 1.890 |
| Fmgovtjob | .558 | 1.791 |
| Disablep | .531 | 1.883 |
| Agriland | .609 | 1.642 |
| Otherland | .468 | 2.137 |
| Age_HH | .525 | 1.904 |
| Eduhh | .677 | 1.477 |
| Genderhh | .852 | 1.173 |
| Region | .626 | 1.598 |
| No_livestock | .517 | 1.936 |
| Edu_facility | .688 | 1.453 |
| Use_technology | .465 | 2.153 |
| Infrastructure | .324 | 3.089 |
| market_availability | .452 | 2.214 |

Table 4. Results of the regression analysis.

| Variables | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 13.008 | 15.522 | | .838 | .403 |
| F_structure | 2.519 | 3.730 | .038 | .675 | .500 |
| F_mem | 2.100 | .828 | .146 | 2.535 | .012 |
| Fmgovtjob | 2.133 | 1.669 | .072 | 1.278 | .202 |
| Disablep | -3.562 | 2.703 | -.076 | -1.318 | .189 |
| Agriland | -.970 | .343 | -.152 | -2.830 | .005 |
| Otherland | 1.690 | .555 | .186 | 3.046 | .003 |
| Age_HH | -.046 | .194 | -.014 | -.237 | .813 |
| Eduhh | -.421 | .486 | -.044 | -.868 | .386 |
| Genderhh | -2.906 | 3.778 | -.035 | -.769 | .442 |
| Region | 48.408 | 7.476 | .342 | 6.476 | .000 |
| No_livestock | 3.134 | .489 | .373 | 6.405 | .000 |
| Edu_facility | -8.624 | 4.800 | -.091 | -1.797 | .073 |
| Use_technology | 10.131 | 2.815 | .221 | 3.598 | .000 |
| Infrastructure | -11.685 | 3.923 | -.219 | -2.978 | .003 |
| Market_availability | 26.269 | 6.684 | .245 | 3.930 | .000 |
| R | R Square | Adjusted R Square | | F | Sig. |
| .713a | .508 | .482 | | 19.363 | .000a |

The coefficient for F_mem is 2.100. The t-statistic of 2.535 is statistically significant at common significance levels (p = 0.012), suggesting that F_mem significantly affects the dependent variable. The coefficient for Disablep is -3.562. The t-statistic of -1.318 is not statistically significant (p = 0.189), suggesting that Disablep does not significantly affect the dependent variable. The coefficient for Agriland is -0.970. The t-statistic of -2.830 is statistically significant at common significance levels (p = 0.005), indicating that Agriland significantly negatively affects the dependent variable. The coefficient for Otherland is 1.690. The t-statistic of 3.046 is statistically significant (p = 0.003), suggesting that Otherland has a significant positive effect on the dependent variable. The coefficient for the region is 48.408. The t-statistic of 6.476 is highly statistically significant (p < 0.001), indicating that the region has a significant positive effect on the dependent variable. The coefficient for No_livestock is 3.134. The t-statistic of 6.405 is highly statistically significant (p < 0.001), indicating that No_livestock significantly affects the dependent variable. The coefficient for Edu_facility is -8.624. The t-statistic of -1.797 is marginally statistically significant (p = 0.073), suggesting that Edu_facility may have a negative effect on the dependent variable, but this effect is less certain. The coefficient for Use_technology is 10.131. The t-statistic of 3.598 is highly statistically significant (p < 0.001), indicating that Use_technology significantly affects the dependent variable. The coefficient for infrastructure is -11.685. The t-statistic of -2.978 is statistically significant (p = 0.003), suggesting that infrastructure significantly negatively affects the dependent variable. The coefficient for Market_availability is 26.269. The t-statistic of 3.930 is highly statistically significant (p < 0.001), indicating that market availability has a significant positive effect on the dependent variable.

In summary, this OLS regression model suggests that several independent variables have a statistically significant effect on the dependent variable, while others do not. The p-values and t-statistics are important for assessing the significance of the relationships between the independent variables and the dependent variable.

## Policy Recommendations

It is recommended that the government should encourage family-oriented policies and support systems to strengthen household income and develop programs promoting skill development and employment opportunities for family members. Government should Implement strategies to address challenges faced by households with significant agricultural land, aiming to mitigate the negative impact on income and Provide training and resources to optimize agricultural productivity and income. The government should Support initiatives that enhance the positive impact of other types of land on household income. Explore opportunities for diversified land use that align with economic growth. The government should Invest in regional development projects and infrastructure to capitalize on the positive influence of region on household income. Foster economic activities tailored to regional strengths and resources. Government should Promote livestock-related programs and education to maximize the positive effect on household income. Facilitate access to veterinary services and technology for livestock management. It needs to develop policies to enhance the adoption of technology in various sectors, aligning with its positive impact on household income. The government should Invest in training programs to improve technological literacy among the population. The government should Strengthen market infrastructure and accessibility to boost the positive impact on household income further and Support market-oriented training and initiatives for local businesses. Government should Collaborate with local communities, NGOs, and private sectors to implement and monitor the effectiveness of these policies. The government should ensure inclusivity by addressing the specific needs and challenges of different regions and demographics and periodically reviewing and updating policies to adapt to changing economic and social conditions.

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