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Unveiling Poverty in Pakistan: The Role of Education, Remoteness, and Regional Factors

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Abstract

Poverty is defined as the lack of food, clothing and shelter in a region. Poverty is prevalent in Pakistan, making its measurement and analysis important. This study examines the complex relationship between remoteness, household level characteristics, and regional factors on national poverty. We use a logistic regression model to evaluate these impacts using 2019-20 Pakistan Social and Living Standards Measurement Survey (PSLM) data. The findings show that household head education affects poverty rates. Households led by educated people have lower poverty rates. Poverty is much higher for less educated people. Education is essential to poverty reduction, as this correlation shows. Other household characteristics like size, age of the head, marital status, health status, and remoteness from urban areas, regional disparities, and gender dynamics also affect poverty levels. Based on our analysis, all provinces have positive and statistically significant correlations with poverty rates. This suggests that poverty

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levels vary by region. The study shows that gender roles, provincial differences, and regional characteristics like rural or urban status affect poverty rates. Inadequate government planning and investment in essential services often lead to poor health facilities, educational systems, infrastructure, employment opportunities, and slow economic growth. Despite recent poverty reductions, a large portion of the population remains vulnerable to poverty. The study recommends targeted government interventions to improve healthcare, education, and remote employment. Prioritizing these improvements can boost economic growth and reduce poverty across Pakistan.

Introduction

Poverty can be broadly defined as a condition in which individuals are deprived of the fundamental necessities of life, including shelter, food, and clothing. It is a multidimensional phenomenon that reflects a lack of access to resources essential for survival and well-being. Hunger, malnutrition, and social exclusion accompany poverty in any region. Pakistan, a low-income nation, has a large population living in poverty. This ongoing issue causes chronic hunger and malnourishment, two of the country's most important poverty indicators. Despite efforts, poverty worsens Pakistan's socioeconomic fabric, requiring urgent and sustained interventions.

World Bank (2000) calls poverty “a pronounced deprivation in well-being,” highlighting its complexity. This definition asks what well-being is. Well-being includes access to resources and opportunities that help people live fulfilling lives, not just money. Sen (1987) states that social functioning is key to well-being. This perspective shifts the focus from income to individuals ability to reach their potential and participate meaningfully in social and economic activities. Poverty prevents people from accessing education, healthcare, clean water, and other essentials.

Poverty persists worldwide, especially in developing nations. According to statistics from the UN Millennium Project, approximately 90% of the world poor

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population reside in developing nations across Asia and Africa. Developed nations account for less than 1% of global poverty, with pockets in the Middle East and North Africa. The remaining 7% of the world poor population live in Latin America. These disparities highlight global resource and economic inequality. Nearly one billion people live below the one-dollar-a-day threshold, which is used to measure poverty. A broader measure—two dollars a day—reveals that approximately 2.7 billion people live below this line. These numbers show the devastating effects of global poverty.

The human toll of poverty is staggering. Due to malnutrition and preventable diseases annually 11 million children expires. 114 million children cannot attend primary school, limiting their personal and economic development. Six million children die from malnutrition each year, and millions more are sick and stunted. About 80 million people, including 300 children, go hungry daily. Clean drinking water, sanitation, and healthcare are unavailable to 2.6 billion people worldwide. These statistics demonstrate the need for national and global poverty reduction strategies.

In Pakistan, poverty is not only visible but also deeply rooted in structural inequalities and systemic challenges. As such, its measurement and analysis demand significant attention from policymakers and researchers alike. Economic development should aim to improve socioeconomic well-being by reducing income inequality and improving living standards for marginalized communities. Economic welfare is closely tied to equitable resource allocation; therefore, reducing poverty requires targeted efforts to bridge income gaps and create opportunities for upward mobility.

Over the past three decades, there has been growing recognition of the need for equitable income distribution and poverty alleviation in Pakistan. This awareness comes from the fact that income inequality and poverty persist despite

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moderate national economic growth. Disparities impede sustainable development and social cohesion.

To address these issues, rigorous income distribution and poverty studies using current data are needed. Pakistani poverty includes economic deprivation and limited access to education, healthcare, clean water, and sanitation. These issues require holistic policies that go beyond short-term relief to promote inclusive and empowered development.

Azam and Imai (2009) found that age of household head, gender and academic qualifications are significantly responsible for vulnerability to poverty. Debilities can decrease opportunities of getting jobs. According to the results of 1996 census of South Africa, 2.7 million people in South Africa have disabilities. From these 2.7 million people, 1.6 million are adults between the ages of 20 and 65 Stats SA (2000). Marriage enhance into economic benefits of the household, because married people may attain the same level of utility with combined expenditure due to adding additional earner. Anyanwu (2013) and Waite (1995) enhance wealth accumulation Waite (1995).

Hence, we explore the impact of household level characteristics, locational factors and remoteness on poverty. i.e. region, province (location), gender of household, household education, health status, marital status, household size, age of household heads. These factors of poverty and inequality differ from country to country depending its socio-economic conditions, culture, geography, climate, and so on.

Baulch and McCulloch (2002) investigated poverty transition and status in Pakistan using IFPRI 5-year panel survey data of 800 people. Sex and basic education did not affect poverty status, but district of residence, household head education, secondary education, dependency ratio, and household size did. Geographical variable (district dummy) and basic education did not affect poverty transitions entering and leaving the district, but household size did. Unfortunately,

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poverty and inequality hinder economic growth by causing strains and restrictions among groups, which violates peace and makes human lives valuable.

Literature Gap

Number of country level and regional level studies for example, Glewwe (1990), Gounder (2012) analyzed at regional level (rural urban) while Geda et al (2005), Baulch & McCulloh, (1998), used household size and household dependency ratio, Gounder, (2012), Anyanwu (2013) used household head characteristics and Serumaga-Zake & Naude (2002), Cheema & Sial (2012) used household head education at country level.

But in the case of Pakistan we did not find study, unveiling poverty taking in consideration the role of education, remoteness, and regional factors on poverty so it is important to conduct study on remoteness, household characteristics and regional factors on poverty in the case of Pakistan. Therefore our study analyze the impact of locational factors such as region (urban rural), provinces (location), and remoteness, (basic facilities), gender (male female), household head education, age, household size, health status , marital status of household head (married unmarried) on poverty and income inequality in the case of Pakistan.

Objectives of the Study

The main objectives of this is, to investigate the impact of household level characteristics, regional level characteristics and remoteness on poverty in the case of Pakistan.

Review of Literature

This study analyze the impact of locational factors such as region (urban rural), four provinces of Pakistan (location), and remoteness, (basic facilities), gender (male female), household head education, age, household size, health status , marital status of household head (married unmarried) on poverty in the case of Pakistan using latest data from PSLM 2019-20.

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Poverty in Pakistan is complex, affecting household characteristics, location, and community remoteness. Economic, social, and environmental shocks have exacerbated inequalities and highlighted marginalized populations' vulnerabilities in Pakistan.

In Pakistan, household characteristics determine poverty levels. Poor households tend to have larger families, lower education levels, and limited healthcare and employment. Labor income helps people transition to better-paying jobs and reduce poverty during stable periods, according to the World Bank's 2024 report. During economic crises like the COVID-19 pandemic and inflationary pressures, households often turn to informal employment, which provides a safety net but traps people in low-productivity, low-wage jobs. Profit Pakistan today (2025), World Bank (2025). Due to the lack of updated household survey data since 2019, policymakers have been unable to fully assess the impact of these shocks on household welfare. Profit Pakistan today (2025), World Bank (2025).

Locational factors worsen poverty in Pakistan. Rural areas are hit hardest, with 80% of the poor living there. Rural poverty has been nearly double that of urban areas—36% vs. 18%—for decades. PPAF Strategy Report (2021-25). Balochistan and Khyber Pakhtunkhwa have higher poverty rates due to poor infrastructure and limited services. In 2019, poverty rate in Balochistan was nearly twice the national average, reflecting deprivation in spatial distribution. World Bank Document (2025). Urban poverty has also increased sharply during economic downturns because urban households are more vulnerable to manufacturing and service sector contractions. World Bank Document (2025).

Remoteness isolates communities from economic opportunities and essential services, compounding these issues. Remote areas often lack transportation, schools, and healthcare, making it hard for residents to escape poverty. The Pakistan Poverty Alleviation Fund (PPAF) recommends

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mainstreaming lagging regions through sustainable infrastructure and social capital mobilization PPAF Strategy Report (2021-25). Population pressure and gender inequality impede progress. Women and marginalized groups face additional barriers to resources and opportunities, perpetuating multidimensional poverty. PPAF Strategy Report (2021-25).

Environmental shocks also shaped poverty trends during this time. Many households fell into poverty after 2022 floods destroyed infrastructure and displaced millions. Due to consumption patterns, household-specific inflation rates affect poorer families more, according to the World Bank's micro simulation tool World Bank Document (2025) and World Bank (2025). These findings emphasize targeted interventions for immediate needs and long-term vulnerabilities.

Poverty reduction efforts include social protection and foreign aid. Community empowerment through interest-free loans and poverty graduation programs is the PPAF 2021–2025 strategy PPAF Strategy Report (2021-25). Democratic governance and media openness have raised awareness of social services, reducing poverty despite systemic issues. Afzal et al (2021). Addressing structural inequalities and ensuring inclusive economic growth are necessary for sustainable progress.

In conclusion, household characteristics, locational factors, remoteness, and external shocks shaped poverty in Pakistan between 2020 and 2025. Targeted interventions have worked, but regional disparities and gender inequality remain obstacles. Economic reforms and investments in education, healthcare, and infrastructure are needed to solve these problems.

World Bank (2001) reports that rural Africa and other developing nations have higher poverty rates than urban areas. This is due to rural areas poor infrastructure, jobs, and services. Gounder (2012). In fact, Glewwe (1990) found that rural and urban poverty determinants were significantly different, suggesting that Botswana's poverty reduction strategies should differ. Similarly size and

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dependency ratio are the most common household characteristics. In South Africa, larger households increased poverty risk. Kenya Geda et al. (2005), Pakistan Baulch & McCulloh (1998), and Sekhampu (2013). Larger households decreased household welfare in Fiji (2012), Tanzania (2008), Egypt (2005), Malawi (2003), and Sierra Leone (2007). Fagernas & Wallace (2007), Gounder (2012), and Mukherjee & Benson (2003) found that household size-squared positively correlated with welfare, suggesting consumption economies of scale. Gender of household head affected welfare and poverty in Kenya and Nigeria Geda, Jong, Kimeyi & Mwabu (2005) and Anyanwu (2013). High income inequality and poverty in South Africa are attributed to colonialism and apartheid. (2003), Glaser (2000) & (2001), Ross (1999). Zambia has high rural poverty rates and declining urban poverty rates, according to Chapoto, Banda, Haggblade, & Hamukwala (2011).

This longitudinal study of 4,286 households in 2001, 2004, and 2008 found poverty dynamics by household head education, gender, livestock, geographic dimension, and land ownership. Anyanwu (2013) found that married people boost a country's economy because marriage adds an income to a household. Marriage increases wealth (Waite, 1995). Married people may achieve the same utility with less collective spending than individual consumption if they lived separately. An increase in education would reduce poverty in the above countries. Higher education in Malawi is linked to higher household welfare. Tanzania Litchfield & McGregor (2008), Fiji Gounder (2012), and Mukherjee and Benson (2003). In South Africa, Sekhampu (2013) found that household head employment was negatively correlated with poverty. Accordingly, Benson and Mukherjee (2003) found that formal wage employment increased household welfare in Malawi. Baulch and McCulloch (1998) found that Pakistani households with higher dependency ratios are more likely to be poor. Akerele & Adewuyi (2011) found that rising dependency ratios have hurt Nigerian and Tanzanian households.

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According to May, Woolard, and Klasen (2000), ethnic discrimination in South Africa persists. Geographical factors also contribute to poverty. Using the same data set, 72% of rural residents are below the poverty line, and 71% of rural residents are poor. Poorest provinces like KwaZulu-Natal, Limpopo, and Eastern Cape have the most populous prior homeland areas.

Location of the household also play significant role to remain non poor because this may generate great employment opportunities. The household living in faraway and remote area where less infrastructure and low obtainability of basic facilities may result chronic poverty in that location (province) Arif et al (2011).

Thirtle, Lin and Piesse (2003) found that there exist strong relation between agriculture growth and poverty reduction. A panel of 120 observations was collected and established for Africa, Asia and Latin America it was found that 20% of the world's total population live on less than 2$ per day and 1.2 billion live on less than 1$ per day it showed that 70% people are living in rural areas while 90% live in Asia and Sub-Saharan Africa. With technological improvement in the agriculture sector result large enough changes in production growth and lead to high returns in Asia and Africa its show remarkable impact on poverty reduction by 27 million per annum whereas in it doesn't led any remarkable impact on other sectors. Accordingly per capita cost of poverty reduction in the agriculture research cost were estimated 144$ in Africa and 188$ in Asia or fifty percent per day but output growth of agriculture sector covered these costs. In rich countries of Latin America per capita cost exceed 11,000$. Consequently, this study showed that there exist negative relationship between agriculture growth and poverty rate. And technological innovation has significant effect on the situation of poor people depending on agriculture sector rather than other sectors of economy.

According to this study the lack of proper education and skills causes poverty. A panel survey data was incorporated to study gains and losses obtained from welfare of the household over period of time, mean difference test was used

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to draw results for urban and rural areas. It was observed in that in urban areas human capital doesn't play significant role to effect the level of well-being and welfare level. While in the rural areas physical capital effectively made differences regarding land, farm tools, as compare to human capital. On the other hand level of well-being and welfare has certainly affected by size of the household, structure of the family, and other socio-economic features. The policy implication show that advancement of technology and improvements in agriculture skills along with crops in the agriculture sector, whereas enlargement and improvement in human capital was of core important to reduce poverty (Grootaert et al, 1997).

May (2000) and South Africa Human Development Report (2003) found that South Africa apartheid policies were disreputable. After apartheid ended, South Africa's first democratically elected government created the demonstrative household survey to measure poverty across all communities. In this survey of these households, the richest 7% possess 40% of South Africa total income, while half the population receives only 11% and lives below the poverty line. Neff (2007) changed South Africa racial classification into ethno-linguistic groups because he believed it was artificial and that racial differences in well-being helped examine intra-racial disparities across racial and ethnic groups. He used multiple correspondence analyses instead of order probit regression or probit regression in previous studies. He found no correlation between income or expenditure and subjective well-being of South African ethnic groups using another categorical data analysis method without pre-determined assumptions or causality. He offered several explanations for this finding and stressed the need for proxy analysis to understand South Africa's longstanding inequality. In India caste system, racial, ethnic, and religious stratification strongly influence professions and economic activities. People are forbidden to change occupations between castes. These studies found that scheduled castes, tribes, and other backward classes in India are much poorer.

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This study shows that insufficient food leads a loss in body weight and slackening physical growth of body. This causes malnourishment in the people ling in that region which results increase in poverty rate. When less food is available this causes people to food deprivation and causes loss in weights of people. The households with permanent disabilities fall to chronic poverty persistently. To control persistent and chronic poverty availability of high income and potential earners must be increased to achieve their medical and health expanses (Krishna, 2011).

Remittances received from abroad are considered to be important source enhancing foreign exchange since 1970 in Pakistan. Beside ups and down in the volume of remittances Pakistan has huge inflow of remittances. Inflow of remittances has positive impact on economic growth and lessening current account deficit as well as reducing dependency on borrowing from foreign as a result well-being increases it leads to increase in welfare and reduce poverty rate, (Jawaid et al 2014). They used cross sectional data which range from 1972 to 2010 by using ARDL model for estimation technique. The study presented that inflow of remittances from abroad has significant and positive impact over economic growth and it helps to reduce poverty. Findings of this study elaborated the remittances have positive impact on the economy of Pakistan through a proper channel such as higher level of aggregate expenditures and aggregate investment leads to decrease burden of foreign debts, reducing current account deficit, increase in household literacy rate. Beside this, migration of factors of production such as labor enhances foreign exchange. (Saboor, 2004)

Household head contribution to labor force participation rate showed in the agriculture sector large number of poor people work on low wage rate, accordingly it discuss health status, educational attainments, clean water related to poor workers. Low rate of labor force participation reflects that household heads work in agriculture sector and receive low wage rate. It was observed that 11%

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household heads on average face the problem of under employment in the informal sector. They also face much disease which increases expenditure on medicine as a result individual face low health status. Low health status may cause disease like asthma, tuberculosis, diabetes, diarrhea, and kidney problem are observed in that community, consequently, well-being welfare level would decline it will cause chronic poverty in rural areas. On the other hand in urban areas people are connected with industrial sector which provide many facilities to the worker like health allowances, children education allowance and many more beside this they prefer for treatment private health services. As a result better health status, their welfare level is much higher than rural community and they face low rate of poverty. This would cause income inequality in the society due to different regions (Hina, 2005).

Ravallian, Chen and Sangraula (2007) analyzed, as cost of living standards increases, poverty rate in urban areas would rise. Moreover, as emphasized by Baker (2008), with an economic growth, everyone living in urban areas are not benefited such as destitute people i.e. women, children, elderly people and disabled may be either fully benefited or they may be excluded from obtaining support to rise out the poverty.

Higher ratio of dependent and large size of the household leads to chronic poverty such families experience low income and more number of dependents because of this reason it cause malnourishment in those families. Moreover, large household size and large number of dependents negatively affect achievement of education. Families with female household have more probability to get poor. Urban areas are more facilitated and chances of employment are higher as compare to rural areas where low employment opportunities and less facilitation due to these reason women in rural areas have low access to production factors, resources such as inputs of farming, modern technology, means of information and educational attainments and female households are poorer in rural regions as

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compare to urban. Another reason of female falling in poverty is gender weaknesses both at home and in society. Usually female household heads that possess low income they are unable to attain educational attainments to their complete family and boys go to school till primary level and girls are kept for domestic home works to earn income for their parents (Jayaraman 2005, Ssewayana 2009).

Azam and Imai (2009) Used HIES (2005) data for Bangladesh, found that by calculating expected consumption to estimate vulnerability of poverty by using feasible generalized least square (FGLS) estimation technique and compare it with pre-determined poverty line. This study showed that regional uniformity (urban rural) has significant impact on vulnerability status and poverty level of the households. While other characteristics of household such as source of income (agriculture or non-agri), gender, educational qualification and household age also significantly impact vulnerability to poverty status. Consequently this study suggests to reduce regional diversification and more protection for agriculture sector to promote higher investment and human capital should be made.

Malik (2005) and Kamal (2003) studied which have refuted these arguments and argued that over this period rural poverty rate unchanged and tend be to higher in that particular time period. There have been recorded huge differences in poverty incidence among urban and rural sectors in Pakistan. Pakistan Economic Survey (2006) portrayed level of poverty in urban areas and rural areas raised to 15% and 28% accordingly, it suggest that rural household is twice poor as compare to urban household. While poverty rate in the rural areas observed much increasing than urban counterpart. This has urged a discussion on the productivity and growth trends in the informal sector. There is unease concerning the seeming contradiction of the comparatively good reported and agriculture growth associated by increase in the level of poverty in 1990's.

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Over all the above literature shows that poverty and inequality as a result of locational factors such as region, provinces, and remoteness, gender, size of household, age household, health status, education of household head, marital status due to poverty and inequality remained a severe problem so this needs to be discuss.

Model, Methodology and Data Sources

This section discuss theoretical framework for poverty through various channels, empirical model, methodology used for estimation of poverty and data source used for this study.

Theoretical Framework for Poverty

It is important to know concept associated with Ravallian et al (2007) that increase in the cost of living standards would rise poverty rate in urban areas. Moreover, as emphasized by Baker (2008), with an economic growth, everyone living in urban areas are not benefited such as destitute people i.e. women, children, elderly people and disabled may be either fully benefited or they may be excluded from obtaining support to rise out the poverty.

Higher ratio of dependent and large size of the household leads to chronic poverty such families experience low income and more number of dependents because of this reason it cause malnourishment in those families. Moreover, large household size and large number of dependents negatively affect achievement of education. Families with female household have more probability to get poor. Urban areas are more facilitated and chances of employment are higher as compare to rural areas where low employment opportunities and less facilitation due to these reason women in rural areas have low access to production factors, resources such as inputs of farming, modern technology, means of information and educational attainments and female households are poorer in rural regions as compare to urban. Another reason of female falling in poverty is gender weaknesses both at home and in society. Usually female household heads that

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possess low income they are unable to attain educational attainments to their complete family and boys go to school till primary level and girls are kept for domestic home works to earn income for their parents (Jayaraman 2005, Ssewayana 2009).

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Here we show framework for poverty, the present study is supposed to find out different variables which cause poverty due to locational factors such as region, provinces, remoteness, so different research show that there exist significant relation between poverty and size of household, household heads age, education, health status and marital status, region, gender, province and remoteness. To know how these variables have effects on poverty are shown by several channels.

Table 1: Channels for Poverty

Variables	Channel	Channel	Poverty
Remoteness (Non remote)	↑ Infrastructure and services	↑ Employment opportunities	↓ poverty
↑ Household size	↑ Economies of scale	↑ Income	↓ Poverty
↑ Age of HH head	↑ Work experience	↑ Living standard	↓ Poverty
↑ Education of HH head	↑ Employment opportunities	↑ Income per capita	↓ Poverty

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↑ **Health status of HH head**	↓Medical expenditure	↑ Self-employment opportunities	↓ Poverty
↑ **Marital status of HH head**	↑ Earning hands	↓Collective spending	↓ Poverty
Region (Urban)	↑Employment opportunities	↑ income per capita	↓ poverty
Gender (Male HH)	↑Employment opportunities	↑ income	↓ poverty

Remoteness

This includes benefits arising from basic infrastructure and services facilities i.e. (basic health unit, school, bank, road, drinking water, bus, railway, post office) arises form availing these facilities. If society avail basic infrastructure and services would lead to high employment opportunities, lower poverty ultimately income inequality will decrease and if society lacks such basic facilities, level of employment is low, poverty rate will be high as a result inequality would rise. In other words if individuals use three of the above-mentioned facilities are considered remote and if more than three facilities are utilized is non-remote. Arif et al (2011).

Household Size

The expected size of the poor household up to predicted level helps to increase in prospective earning hands to generate further income and economies of scale in the consumption of goods and services which is obtained from size of the household and if there exist further increase in the size of poor household above predicted level would result to reduce both in consumption and welfare, this happens because the range of children (less than 15 years) tends to be high. Accordingly an increase in the household size up to certain level would increase the strength of earning people, which will expand household income and

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improves standard of living this would leads to reduce the poverty rate. Mukherjee & Benson (2003).

Age of the Household Head

Basically the household head age has significant effect on poverty rate. Age significantly determines the performance of individual toward the work, in Less Developed Countries (LDCs) age of household head play important role to determine income per capita. Household age is positively related to standard of living and welfare, an increase in the household age would reflect increase in work experience, which is connected to increase in both real and nominal income as a result living standard and welfare would increase as a result poverty rate will decline. Thus age of household is reflected to be positively related with income per capita, standard of living and decrease poverty, and age below 14 years is considered to be negatively related with income per capita, standard of living and increase poverty rate. Grootaert (1997), Malik (1996), Cheema & Sial (2012) Datt & Jolliffe (2005) Gounder (2012), Sekhampu (2013).

Education of Household Head

Education significantly improves the living standard of household, enhance opportunities of employment and increase income. The increase in level of education is inversely related to reduce chance of being poor and decrease in poverty rate. Likewise in urban context higher level of education is associated to provide better opportunities of employment which increase income per capita and leads to improve living standard and welfare of households. While in rural framework education improves in the sense of awareness regarding agriculture technology and performance in agriculture sector. Household heads with higher education has more experience of agriculture technology and earns more income which leads to decrease in poverty rate. While household heads with lower education have lesser experience about agriculture technology and higher level of

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poverty. Geda et al (2005) Kenya, Serumaga-Zake & Naude (2002), South Africa and Cheema & Sial (2012).

Health Status of Household

Health status of household also defines the level of poverty, individuals with good health could pay important role to extract out from poverty. An increase in the status of health would infer lower expenditure on disease and no disability. While disabilities can reduce probabilities of finding a job, and it can delay one's pursuit of self-employment in the private sector, disabilities also put health, medical and other costs that one would not have bear in the absence of disability. The unemployment rate with disabilities would be higher, and higher rate of poverty. While unemployment rate with no disabilities would be lower and low rate of poverty.

Marital Status of Household

Marriage increases a potential earner to the household and increases income, which improves living standards and welfare. Married people may achieve the same utility with less collective spending than individual consumption if they lived separately. Marriage improves welfare and reduces poverty. Waite (1995) Anyanwu (2013).

Region of Household

We include variable region to show how poverty status varies by household location, urban or rural. According to studies, rural areas have higher poverty rates than urban areas. Basic facilities, employment opportunities, infrastructure, and services are advanced in urban areas because income is higher than rural areas and poverty is low, resulting in low inequality. Rural areas have fewer basic facilities, employment opportunities, infrastructure, and services than urban areas due to a lack of employment, infrastructure, and quality services, which causes poverty. Gounder (2012), Glewwe (1990).

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Province / Location of Household

Location also play an important role to estimate poverty status, we include location variable that in which province of Pakistan individual is living. In this study location is positively related to poverty status in estimating poverty, because individuals face low employment opportunities which leads to low income over all poverty is decreasing but due to low employment and low income, poverty status is positively correlated to location.

Household Head's Gender

Household head gender has significant impact on household welfare and poverty rate. In Pakistan household head is undeniable decision maker as well as in almost in every circumstances lone earner of the family. In most cases male is considered to be head of household but to some extent female is also head of household in few families, different studies showed that families with male household head experience low poverty while families with female household head experience high poverty this because of lack of proper planning and employment opportunities for female and low labor force participation in rural areas, due to gender discrimination there exist huge disparities in families income as a result it effect employment, welfare and increase in poverty rate, while families with male household head have more employment opportunities which leads to increase in income and decrease in poverty status and inequality. Geda, et al (2005) and Litchfield & McGregor (2008) Akerele & Adewuyi (2011).

Empirical Model

Neff (2007) used multiple correspondence analyses instead of order probit regression or probit regression to estimate the models. Baulch and McCulloch (2002) used logit poverty status and proportional hazards poverty transition models. Azam and Imai (2009) used feasible FGLS estimation. We estimated the poverty model using logistic regression and binary logistic regression in this study.

$$P = \beta_1 + \beta_2 HHS + \beta_3 AHH + \beta_4 EDU + \beta_5 HS + \beta_6 MS + \beta_7 RG + \beta_8 PR + \beta_9 GHH + \beta_{10} RE + \mu \ldots\ldots(1)$$

$$\text{Poverty level} = \beta_1 + \beta_2 \text{Household size} + \beta_3 \text{Age of household} + \beta_4 \text{Education of household} + \beta_5 \text{Health status} + \beta_6 \text{Marital status} + \beta_7 \text{Region} + \beta_8 \text{Province} + \beta_9 \text{Gender of household} + \beta_{10} \text{Remoteness} + \mu$$

Definition of Variables

Poverty (P)

Our dependent variable is poverty. We use income approach because income per capita directly affects poverty. An increase in income per capita lowers poverty and vice versa. Many researchers use income to measure poverty (Sikandar and Rizvi 2013), GM Arif (2011). We use latest poverty line $ 2.15 per day per person given by World Bank (2022). This line is based on the 2017 median national poverty line of 28 low-income countries. World Bank (2022) reported that 712 million people lived in extreme poverty on less than $2.15 per day, the low-income poverty line.

Remoteness (RE)

This includes benefits arising from basic infrastructure and services facilities i.e. (basic health unit, school, bank, road, drinking water, bus, railway, post office) arises form availing these facilities. If society avail basic infrastructure and services would lead to high employment opportunities, lower poverty ultimately income inequality decreases and if society lacks such basic facilities, level of employment is low, poverty rate will be high as a result inequality would rise. In other words if individuals use three of the above-mentioned facilities are considered remote and if more than three facilities are utilized is non-remote. So remoteness show index of infrastructure and services which is made through principal component analysis PCA by combining (basic health unit, school, bank, road, drinking water, bus, railway, post office).

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Principal Component Analysis (PCA)

Principal component analysis linearly transforms a set of variables into a much smaller set of uncorrelated variables that represent most of the original data. The goal is to reduce data dimensionality. A smaller set of uncorrelated variables is easier to understand and use in further analyses. Pearson (1901) conceived and Hotelling (1933) developed the idea.

The following results were obtained from principal component analysis of basic health unit, school, bank, road, drinking water, bus, railway, and post office to calculate the index of remoteness.

Table 2: Principal Component Analysis

Variables	components
BHU	0.0625
school	-0.0013
bank	-0.0045
road	-0.0123
Drinking water	-0.0324
bus	-0.267
railway	-0.2654
post office	0.5725

$$RE = (0.0625)BHU + (-0.0013)SC + (-0.0045)BN + (-0.0123)RD + (-0.0324)DW + (-0.267)BS + (-0.2654)RA + (0.5725)PO \ldots\ldots\ldots\ldots (2)$$

$$\text{Remoteness} = \beta_1 \text{Basic health unit} + \beta_2 \text{school} + \beta_3 \text{bank} + \beta_4 \text{road} + \beta_5 \text{drinking water} + \beta_6 \text{bus} + \beta_7 \text{railway} + \beta_8 \text{post office}$$

From the above equation we come to know that remoteness is the combination of basic health unit, school, bank, road, drinking water, bus, railway and post office which represents index of remoteness which is made with the help of principal component analysis in Stata. We have two methods to construct PCA in Stata i.e. either we can use the command of PCA such as in our analysis first we have combine the relevant variables of remoteness in Stata then we used command (pca

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hhcode bhu school bank road water bus railway postoffice) and then write in command bar 'predict Remoteness' so we get a new column by the name of "Remoteness" which shows the index of remoteness made through principal component analysis, or we can simply go to statistics in Stata then multivariate analysis, factor and principal component analysis and finally principal component analysis (PCA) it will give us the index of remoteness which we have used for our analysis

Size of the Household (HHS)

The expected size of the poor household up to predicted level helps to increase in prospective earning hands to generate further income and economies of scale in the consumption of goods and services which is obtained from size of the household and if there exist further increase in the size of poor household above predicted level would result to reduce both in consumption and welfare, this happens because the range of children (less than 15 years) tends to be high. Accordingly an increase in the household size up to certain level would increase the strength of earning people, which will expand household income and improves standard of living this would leads to reduce the poverty rate.

Age of the Household Head (AHH)

Basically the household head age has significant effect on poverty rate. Age significantly determines the performance of individual toward the work, in Less Developed Countries (LDCs) age of household head play important role to determine income per capita. Household age is positively related to standard of living and welfare, an increase in the household age would reflect increase in work experience, which is connected to increase in both real and nominal income as a result living standard and welfare would increase as a result poverty rate will decline. Thus age of household is reflected to be positively related with income per capita, standard of living and decrease poverty, and age below 14 years is

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considered to be negatively related with income per capita, standard of living and increase poverty rate.

Education of Household Head (EDU)

Education significantly improves the living standard of household, enhance opportunities of employment and increase income. The increase in level of education is inversely related to reduce chance of being poor and decrease in poverty rate. Likewise in urban context higher level of education is associated to provide better opportunities of employment which increase income per capita and leads to improve living standard and welfare of households. While in rural framework education improves in the sense of awareness regarding agriculture technology and performance in agriculture sector. Household heads with higher education has more experience of agriculture technology and earns more income which leads to decrease in poverty rate. While household heads with lower education have lesser experience about agriculture technology and higher level of poverty.

Health Status of Household (HS)

Health status of household also defines the level of poverty, individuals with good health could pay important role to extract out from poverty. An increase in the status of health would infer lower expenditure on disease and no disability. While disabilities can reduce probabilities of finding a job, and it can delay one's pursuit of self-employment in the private sector, disabilities also put health, medical and other costs that one would not have bear in the absence of disability. The unemployment rate with disabilities would be higher, and higher rate of poverty. While unemployment rate with no disabilities would be lower and low rate of poverty. Thus individuals with better health can seek employment opportunities which lead to increase in income and reduce poverty. While individuals with low health status can reduce employment opportunities, decrease in income and increase in poverty rate.

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Marital Status of Household (MS)

Marriage adds a potential earner to the household and increases income, which improves living standards and welfare. Married people may achieve the same utility with less collective spending than individual consumption if they lived separately. Marriage improves welfare and reduces poverty.

Region (RG)

We include variable region to show how poverty status varies by household location, urban or rural. According to studies, rural areas have higher poverty rates than urban areas. Basic facilities, employment opportunities, infrastructure, and services are advanced in urban areas because income is higher than rural areas and poverty is low, resulting in low inequality. Rural areas have fewer basic facilities, employment opportunities, infrastructure, and services than urban areas due to a lack of employment, infrastructure, and quality services, which causes poverty.

Province / Location (PR)

Location also play an important role to estimate poverty status, we include location variable that in which province of Pakistan individual is living. In this study location is positively related to poverty status in estimating poverty, because individuals face low employment opportunities which leads to low income over all poverty is decreasing but due to low employment and low income, poverty status is positively correlated to location.

Household Head's Gender (GHH)

Household head gender has significant impact on household welfare and poverty rate. In Pakistan household head is undeniable decision maker as well as in almost in every circumstances lone earner of the family. In most cases male is considered to be head of household but to some extent female is also head of household in few families, different studies showed that families with male household head experience low poverty while families with female household head experience high poverty this because of lack of proper planning and employment

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opportunities for female and low labor force participation in rural areas, due to gender discrimination there exist huge disparities in families income as a result it effect employment, welfare and increase in poverty rate, while families with male household head have more employment opportunities which leads to increase in income and decrease in poverty status and inequality.

Methodology for Poverty

Neff (2007) used multiple correspondence analyses instead of order probit regression or probit regression to estimate the models. Baulch and McCulloch (2002) used logit poverty status and proportional hazards poverty transition models. Azam and Imai (2009) used feasible FGLS estimation. We estimated the poverty model using logistic regression and binary logistic regression in this study.

Data Source

This study uses data from the 2019-20 Pakistan Social and Living Standards Measurement Survey (PSLM) to examine 870,171 individuals nested within 195,000 households. The analytical framework selectively engages with PSLM data sections that match the variables under investigation, ensuring targeted and relevant model estimation. Based on the inverse relationship between per capita income and poverty rates, the study uses an income-based approach. This method is widely used in poverty research, as shown by Malik (1988), Sikandar and Rizvi (2013), and Arif (2011). The income approach helps assess household economic resources, aligning with the physiological deprivation model, which defines poverty as the inability to buy a basic basket of goods and services. Also, the PSLM survey is used to estimate the Multidimensional Poverty Index (MPI) and track SDGs progress.

Analysis and Findings of Poverty Model

This section discusses findings of our analysis, to provide better analysis of findings, we divide this chapter into two parts. First part shows descriptive analysis and

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number of observations. While second part represents methodology, model and analysis of poverty analysis, result and conclusion.

Descriptive Analysis of Poverty Model

Summary statistics/ descriptive statistics represents detail summary of our variables. Table of summary statistics comprises description of variables and number of observations.

Table 3: Descriptive Analysis

Variables	Observations
Poverty $2.15	870,171
Household size	870,171
Household age	870,171
Young HHA	388,102
Middle HHA	283,530
Old HHA	198,539
Marital status	870,171
Health status	870,171
Region	870,171
Rural	615,276
Urban	254,895
Gender	870,171
Male	447,501
Female	422,670
Provinces	870,171
KPK	184,931
Punjab	423,336
Sindh	176,988
Baluchistan	84,916

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From the above table we see that our dependent variable which is poverty at $2.15 takes values 0, 1 and we have used dummy, 0 if individual is above poverty line and considered as non-poor and we have used dummy, 1 if individual is below poverty line which is considered as poor. Same for household education if household head is educated then we put dummy, 0 and dummy 1 for uneducated household heads. The number household size ranges from 1 – 60 likewise we can see that household age ranges from 15 – 99 throughout the country it is further subdivided into three categories i.e. Young household heads age consist of 15 – 35 years, middle household age from 36 – 60, while old household age ranges from 61 – 99, and dummy 1 is used for reference category and 0 for non-reference category.

Similarly we used dummy, 1 if household head is married otherwise, 0 if unmarried. Likewise 0, is used as dummy if individuals have taken health services in last two weeks else 1 if not taken. If individual belongs to urban area then we put, 1 for rural we put dummy 0, and if gender of household head is male we put, 1 for female household head we 0 is used. Similarly province is a dummy variable where 1 is used for reference category and 0 for the other category.

Table 4: Poverty Status for all Provinces at $2.15 Poverty Line

Pakistan	Poor	Non poor	Frequency	Simple Percentage	Cumulative percentage
Punjab	35.9 %	64.1 %	423,336	48.65 %	44.02 %
Sindh	40.2 %	59.8 %	176,988	20.34 %	67.25%
KPK	55.9 %	44.1 %	184,931	21.25 %	85.78%
Baluchistan	73.9 %	26.1 %	176,988	9.76 %	100%
Total	**51.48 %**	**48.52 %**	**870,171**	**100 %**	**100%**

We have used frequency statistics to calculate poverty rates at $2.15 poverty line in four provinces of Pakistan. The table shows different poverty rates for all provinces such poverty rate in Punjab was estimated 35.9 % while 64.1 % were estimated as non-poor and 423,336 is total sample size for province Punjab.

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Similarly poverty rate in province Sindh was estimated 40.2 % while 59.8 % were estimated as non-poor and 176,988 is total sample size for province Sindh. Poverty rate in province Khyber Pakhtunkhwa was estimated 55.9 % while 44.1 % were estimated as non-poor and 184,931 is total sample size for province Khyber Pakhtunkhwa. Poverty rate in province Baluchistan was estimated 73.9 % while 26.1 % were estimated as non-poor and 176,988 is total sample size for province Balochistan. The total sample size is 870,171 which consist of 195,000 households throughout the country.

Correlation Test

We have used correlation matrix to observe relationship among variables. Correlation matrix is a table which shows correlation coefficients between variables it shows that which pair of variable has highest correlation. To avoid the problem of double estimation or selection of irrelevant variables in the model, the correlation matrix should be neither perfect substitute correlation (-50%) nor complement (50%). The diagonal of correlation matrix is one, because correlation between a variable and itself is always 100%.

Table. 5 correlation Matrix

	POV	HHS	YHA	MHA	OHA	EDU	MS	HS	RG	GN	KP	PN	SN	BL	REM
POV	1.00														
HHS	-0.12	1.00													
YHA	0.05	-0.22	1.00												
MHA	-0.07	0.04	-0.17	1.00											

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OHA	0.03	0.20	-0.21	-0.25	1.00								
EDU	-0.01	-0.02	0.01	-0.03	0.02	1.00							
MS	-0.01	-0.09	0.04	-0.08	0.06	0.41	1.00						
HS	-0.01	0.00	-0.00	0.01	-0.01	-0.05	-0.04	1.00					
RG	-0.04	-0.02	-0.02	0.02	-0.00	-0.13	0.00	-0.01	1.00				
GN	-0.45	0.10	-0.02	-0.00	0.03	0.03	0.05	0.00	0.01	1.00			
KP	0.16	0.13	-0.04	-0.00	0.06	0.01	-0.01	-0.04	-0.10	-0.13	1.00		
PN	0.01	-0.10	-0.03	-0.01	0.05	-0.07	0.03	-0.00	0.04	-0.06	-0.42	1.00	
SN	-0.09	-0.04	0.08	-0.01	-0.08	0.04	-0.00	0.02	0.08	0.11	-0.26	-0.48	1.00
BL	-0.08	0.04	-0.00	0.04	-0.05	0.04	-0.01	0.02	-0.04	0.09	-0.19	-0.36	-0.22	1.00

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REM	-0.03	0.10	-0.07	0.03	0.04	-0.13	-0.00	0.00	0.17	0.00	0.05	-0.00	0.01	-0.07	1.00

In this table, overall result shows that all the values are below 50% which means there is overlapping between variables but it is not very much because up to 50% overlapping is reliable and acceptable but more than 50% is not desirable. This confirms that our data is free from the problem of autocorrelation and multicollinearity.

Empirical Findings and Discussion

Regression Analysis

We have used binary logistic regression model using poverty at $2.15 a day poverty line World Bank (2022) we obtain the following regression equation.

$$P = \beta_1 + \beta_2 HHS + \beta_3 AHH + \beta_4 EDU + \beta_5 HS + \beta_6 MS + \beta_7 RG + \beta_8 PR + \beta_9 GHH + \beta_{10} RE + \mu \quad \ldots\ldots\ldots\ldots (3)$$

$$\text{Poverty level} = \beta_1 + \beta_2 \text{Household size} + \beta_3 \text{Age of household} + \beta_4 \text{Education of household} + \beta_5 \text{Health status} + \beta_6 \text{Marital status} + \beta_7 \text{Region} + \beta_8 \text{Province} + \beta_9 \text{Gender of household} + \beta_{10} \text{Remoteness} + \mu$$

Where P is our dependent variable showing Poverty level, and $\beta's$ expresses coefficients of following independent variables.

Table 6: Logistic Regression results

Variables	Coefficients	Standard Errors
Remoteness	-0.0697279***	0.0133992
Education of HH head	-0.0827545***	0.0041111
Household size	-0.9131145***	0.0817799
Young HHA	-1.172442***	0.097135
Middle HHA	-1.660221***	0.0884349
Old HHA	-0.1642378***	0.002127
Marital status	-0.0748548***	0.0132289

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Health status	-0.1363285***	0.0224191
Region	-0.3715258***	0.0176567
Gender	-2.887227***	0.0142295
KPK	1.901461***	0.1204552
Punjab	0.3491576***	0.0239847
Sindh	0.522812**	0.0273447
Constant	1.485564***	0.0245341

Note: *, ** and *** correspondingly represent level of significance at 10%, 5% and 1%

Results and Discussion

We analyze the impact of household characteristics and locational factors such as region, provinces and remoteness on poverty in Pakistan where we focused on factors determining poverty. This study shows different poverty rates for four provinces of Pakistan where our sample size is 870,171 and 195,000 household throughout the country.

This study focused on household head education, size, age, marital status, health status, region, gender, province, and remoteness, which were selected based on data availability and resemblance to the objectives of the study. We estimated poverty rate using the World Bank (2022) poverty line of $2.15. Living below $2.15 per day are poor, while living on or above this line are non-poor.

Table.6 shows coefficients of variables, standard errors and P-values of each variable. We know that in the logistic regression model, interpretation of coefficient is different from linear regression but the sign of the coefficients represent the nature of relationship between reference category and other categories.

Remoteness consists of, remote and non-remote. Our reference category is non-remote and the other category is remote. Remoteness index includes basic health unit, school, bank, road, drinking water, bus, railway, and post office.

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Remoteness also determines poverty. People who use more than three of the above facilities are considered non-remote, while those who use three or less are remote. The coefficient of remoteness is negative and highly statistically significant, indicating that most people use more than three facilities.

Education has a negative, statistically significant coefficient. Thus, educated household heads have lower poverty rates. For instance, higher education reduces the likelihood of poverty and increases household welfare, while lower education increases poverty.

Household size coefficient is negative and statistically significant. As household size increases, potential income earners increase, which is positively related to household welfare, suggesting economies of scale in household consumption, reducing poverty. Household age coefficients are negative and highly significant for all three categories. It means that household age increases work experience, which increases income, living standard, and welfare, lowering poverty. The absolute values of household head age coefficients increase.

Marital status has a negative, statistically significant coefficient. Married people can achieve the same level of utility with less collective spending than if they lived separately, improving standard of living and reducing poverty. Marriage usually adds an earner to the household and boosts income, improving living standards and welfare. The health status coefficient is negative and highly significant. Better health allows people to work, which raises income and reduces poverty. Low health can reduce employment, income, and poverty.

Since the region variable coefficient is negative and highly statistically significant, households moving from rural to urban areas are less discriminated against in facilities, reducing poverty. Poverty exists in rural areas because they lack productive jobs, infrastructure, and quality services. Male-headed households have more employment opportunities, which increases income and reduces poverty and inequality.

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The household gender variable coefficient is negative and highly statistically significant. While female household heads are thought to be poorer due to lack of planning and employment opportunities for women and low labour force participation in rural areas, gender differences in family income affect employment, welfare, and poverty rates.

Province variable consist of four provinces of Pakistan i.e. Khyber Pakhtunkhwa, Punjab, Sindh, and Balochistan. Here the coefficients of all provinces are positive and highly statistically significant, which shows different poverty rates in all provinces such as poverty rate in Punjab was estimated 35.9 % while 64.1 % were estimated as non-poor and 423,336 is total sample size for province Punjab. Similarly poverty rate in province Sindh was estimated 40.2 % while 59.8 % were estimated as non-poor and 176,988 is total sample size for province Sindh. Poverty rate in province Khyber Pakhtunkhwa was estimated 55.9 % while 44.1 % were estimated as non-poor and 184,931 is total sample size for province Khyber Pakhtunkhwa. Poverty rate in province Balochistan was estimated 73.9 % while 26.1 % were estimated as non-poor and 176,988 is total sample size for province Baluchistan.

Conclusion and Policy Recommendations

This study examines how locational factors like region, provinces, household characteristics, and remoteness affect poverty in Pakistan based on household head education, household size, age, marital status, health status, region, gender, province, and remoteness. Remoteness index includes basic health unit, school, bank, road, drinking water, bus, railway, and post office. People who use more than three of the above facilities are not remote and poor, but those who use three or less are. Poverty rate is estimated using the World Bank (2022) $2.15 poverty line. Living below $2.15 per day are poor, while living on or above this line are non-poor.

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Policy Recommendations

The study found that regional, gender, and provincial disparities increase poverty. Poor government planning and resource allocation cause these differences. The disparities result in poor healthcare, lower education, insufficient infrastructure, unemployment, and low economic growth. These interconnected challenges show severity of poverty, especially its inelasticity to uniform policy across diverse regions. To address these issues, the government should priorities comprehensive strategies to improve essential infrastructure, ensure quality education across all regions, and promote gender-equal employment. Improve healthcare facilities in remote and underserved areas to reduce regional disparities negative effects on public health.

Suggestions for Further Research

In connection to our findings concerning the impact of household level characteristics locational factors and remoteness on poverty in Pakistan, particularly locational factors such as region, gender, provinces and remoteness in the country, which mostly causes poverty and income inequality, some suggestions are as follows for betterment of this study and for further researches. Remoteness is new variable it is an index of (basic health unit, school, bank, road, drinking water, bus, railway and post office) determining the nature of discrimination for poverty is being discussed, it can give better result if the this index is more expanded. Apart from remoteness there exist many other variables like agriculture sector and real assets in possession can be incorporated to estimate the rate of poverty and income inequality. Furthermore this study can be more attractive if data from new census is used conducted recently in the country.

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Appendix

Definition of variables and data source.

variable	Definition	Source
Income per capita	How much money in cash, did he/she earn during last year	PSLM (2019-20)
Region	whether the household is residing in urban area or rural area	PSLM (2019-20)
Province	In which province the household is residing in Pakistan	PSLM (2019-20)
Size of household	What is the size of household	PSLM (2019-20)
Remoteness	0=Remoteness, 1= non- Remoteness	PSLM (2019-20)
Health status	Was he/she sick or injured the last two weeks	PSLM (2019-20)
Household head's gender	Male, Female	PSLM (2019-20)
Age of HH	Young age (15 - 35 years) middle age (36 – 60 years) old age (61 - 99 years)	PSLM (2019-20)
Marital status	Married, unmarried	PSLM (2019-20)
Education status	Individual can read and write, and solve basic Mathematics	PSLM (2019-20)