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Multidimensional Poverty Measurement in Selected Regions of Mazar-e-Sharif City, Afghanistan

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Abstract

A one-dimensional perspective on the issue of poverty is considered as a prominent factor contributing to the ineffectiveness of programs aimed at reducing poverty. In this manner, poverty is not merely a result of insufficient income or financial resources; rather, it stems from the inability of individuals in poverty to escape the cycle of deprivation. This research uses the Alkire-Foster framework to measure the multidimensional poverty in selected regions of Mazar-e-Sharif city. Data were collected via a questionnaire distributed to 385 households residing in the 1st, 2nd, 4th, 5th, 8th, and 10th regions of Mazar-e-Sharif city. The results reveal that, based on the poverty threshold of 33%, households possess significant poverty in the dimensions of education (47.2%) and housing (41.8%). In contrast, the least deprivation was observed in the dimensions of living standards (17.3%), health (25.23%), and employment (29.95%). Furthermore, the nature of poverty varies significantly across the chosen regions. For example, the 2nd region has faced greater deprivation in terms of housing and living standards, while the 8th region has encountered more difficulties in the employment sector. Moreover, the 4th region faces challenges predominantly in health-related issues, and the 5th region has experienced notable deficiencies in education. Additionally, the results show that the highest level of deprivation is observed in adult literacy, with a rate of 72.4%, whereas the lowest level of deprivation is found in access to electricity, recorded at 1.27%. Consequently, the calculations for the extent, intensity, and multidimensional poverty index (MPI) yield values of 0.34, 0.511, and 0.173, respectively. Which the 2nd and 4th regions exhibit the highest levels of deprivation, while the 10th region demonstrates the lowest levels of poverty in terms of extent and intensity. Lastly, the findings from the Logistic Regression model indicate that the probability of experiencing poverty in households led by an employed and educated person is estimated to be 60% and 15% lower compared to households with an unemployed and illiterate head. Conversely, the addition of an additional member in the household can increase the likelihood of experiencing poverty by 10%.

Keywords: *Deprivation; Multidimensional Poverty; Alkire-Foster Approach; Mazar-e-Sharif City; Afghanistan.*

Introduction

Poverty, as a solemn issue, encounters most of countries with adversity [46] and it is understood as an eminent hurdle for developing nations [39]. Its increasing threat against economic growth led to the imposition of numerous restrictions on the developmental processes of these societies [37]. Therefore, the comprehensive worldwide priority has focused towards omitting this phenomenon [75], as it has been assigned as the first goal of the sustainable development goals [67]. According to the Oxford Poverty and Human Development initiative (OPHI), approximately 1.1 billion people are considered poor in 110 countries, out of a population of 6.1 billion. Most notably, the majority of them, 534 million (47.8%), abodes in Sub-Saharan Africa, and 389 million (34.9%) are concentrated in South Asia [68].

The recent endeavors aimed at defining the concept of poverty, have resulted in a significant expansion of both theoretical and empirical literature, providing new insights and methodologies for its measurement. Despite these initiatives, the majority of research presents a one-dimensional perspective on this phenomenon, attributing poverty primarily to insufficient income [18], [53], [69] or it has characterized as the utilization of goods and services [51]. While, numerous studies have indicated that adopting a one-dimensional perspective on poverty is a primary factor contributing to the ineffectiveness of poverty alleviation programs [29], [39]. This limited perspective not only fails to capture the complexities of societal realities but also distorts the information [54]. Therefore, poverty, in addition to implying lack of income, measures people's deprivation of welfare in terms of education, health and living standards [20]. Over time, scholars have advocated for a multidimensional framework for understanding poverty, moving beyond an exclusive focus on income [39], which has led to a greater recognition of the multifaceted characteristics of poverty [29] , [39]. In this context, Amartya Sen shifted the frame of mind of prosperity and development from income-oriented approach to capability-oriented by illustrating the concept of capability [55]. The capability approach suggests a multidimensional perspective on poverty, taking into account a range of individual, cultural, and environmental factors related to the deprivation of essential capabilities among individuals [22]. Currently, this theory is widely recognized and accepted by many institutions [70].

Therefore, the United Nations Development Program [65] offers a global index which is established to assess multidimensional poverty, contains three dimensions and ten indicators based on the Alkire-Foster approach [7]. This approach presents a different framework in compared to the income-based poverty model, measuring the poverty indicators [3], [4], specifying a poverty threshold [8], and taking weighting and poverty intensity into account [6], [24]. In Afghanistan, based on the income-consumption approach, a survey conducted by the National Statistics and Information Authority (NSIA) from October 2019 to September 2020, demonstrates that the poverty rate was about 47.5%. However, later evaluations sought to investigate the effects of the Covid-19 pandemic illustrated a 70% increase in the poverty rate (SEO, 2023). On the other hand, the first official report on multidimensional poverty in Afghanistan was released in 2019, based on data from the years 2016-2017 and revealed that 52% of the population are categorized as poor according to multidimensional perspective [47].

This article is written into six parts, including introduction, conceptual framework, literature review, research methodology, findings and conclusion. The aim is to assess the multidimensional poverty index using the Alkire-Foster method [7] in selected regions of Mazar-e-Sharif city during the year 2023, as well as to compare these regions based on the multidimensional poverty index. With this knowledge, the questions of this study are: In which dimensions do the households experience deprivation? Do the selected regions have variation in the extent of poverty? Moreover, do the educational attainment and employment status of household head, along with the size of the household, impress on the probability of the household falling into poverty?

Conceptual Framework

As stated in the theoretical literature, the poverty issue can be interpreted by two monetary and non-monetary sights [52]. In most cases, prior theoretical literature, relying on the monetary approach, describes poverty as an inability to equip monetary resources and the basic needs of people [17], scanty household income to acquire the minimum necessities needed to preserve daily physical efficiency [50], likewise, privation of resources to obtain several assorts of diets for the sake of taking part in usual life activities [64] or the low income of individuals and household than the community average income [32]. With this in mind, the monetary standpoint regards poverty as the incapability of individuals and households to present financial resources to satisfy their basic needs [31] and defines poor and non-poor people in reference to the income-consumption index [36].

Although the income-based approach to measuring poverty is smooth in terms of implementation and interpretation, not considering poverty from the point of view of welfare is a major weakness of that [38], [45]. Due to this deficiency, in the recent theoretical literature, a non-monetary manner was proposed that defines poverty based on dimensions and indicators and focused on welfare indicators including access to education and adequate health and standard living conditions [7], [57], [14], [13]. Undoubtedly, this approach was put forth concurrently with Amartya Sen's conceptualization of poverty, which centering on the capability aspect [10], [77], [19].

Amartya Sen posits that poverty is characterized by the lack of essential skills that individuals and households need to perform fundamental life functions [57]. To clarify, he held the belief that functions represent the elements that individuals hold in particular regards, while capabilities consist of a collection of functions that contribute to an individual's well-being through their attainment [56]. In other words, the capabilities approach can be understood as encompassing the various functions related to education, health and shelter, which are deemed essential for promoting human well-being [49]. Thus, poverty can be understood as the lack of essential abilities for individuals. Given that human capabilities encompass various dimensions of life, the procedure for measuring poverty takes into account multiple facets of deprivation that contribute to the experience of poverty [33]. Thus wise, the multidimensional perspective on poverty has supplanted the conventional one-dimensional, income-centric model [39], and the capabilities approach proposed by Sen significantly contributed to the evolution of the concept of poverty and the methodologies employed for its measurement [26].

For the first time in 2010, the multidimensional poverty index was presented as a result of a collaboration between the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Program [27]. Besides the capacity of this index to illustrate the extent of deprivation faced by individuals at a given moment and the overlaps of various deprivations [12], this index offers comprehensive information and momentous tools for policymakers, enabling them to effectively oversee social change processes [34] and represents a crucial role in assessing and measuring poverty [7]. Additionally, this index acts as a way to evaluate poverty for both the household and individual scales, covering three eminent dimensions: health, education and living standards [11]. Within the health dimension, two sub-indices are evaluated: nutrition and child mortality. To assess the education dimension, the duration of educational attainment and the rate of children's enrollment in school are examined. Lastly, the dimension of living standards comprises sub-indices including the type of fuel used, access to sanitation, availability of clean water and electricity, and the quality of housing, such as the roof, flooring and overall condition of the property [15]. The choice of appropriate dimensions and indicators plays a vital role in assessing multidimensional poverty [59], [71]. To date, three distinct methodologies have been introduced for the assessment of multidimensional poverty [30], namely the Multiple Deprivation Index [23], the Human Development Index [72], and the global index developed by Alkire and Foster [7].

In the meantime, the Alkire-Foster [7] criterion exhibits superior attributes, making it applicable for both quantitative and ordinal data types. This criterion utilizes a counting methodology to identify

individuals living in poverty and demonstrates the application of Amartya Sen's capability theory across three dimensions: health, education, and living standards, in order to assess multidimensional poverty [41]. The Alkire-Foster index has gained extensive application across over 100 nations globally, encompassing both developed [60] and developing regions [16], as well as urban and rural areas, to investigate multidimensional poverty [9], [73]. Further details regarding the Alkire-Foster methodology is provided in the research methodology section.

Literature Review

Maket (2024), in research titled “Analysis of incidence, intensity, and gender perspective of multidimensional urban poverty in Kenya”, conducted using the Alkire-Foster methodology, revealed that 8.7% of urban households experience poverty across 33.3% of the dimensions assessed. Furthermore, it was discovered that half of urban households lacked sufficient access to drinking water and sanitary facilities. Along with, the findings indicate that the highest level of intensity, extent and degree of multidimensional poverty are observed in households led by women and elderly individuals, as well as in those residing in suburban areas. Additionally, different factors, such as size of the households, the existence of children under five years old, the age of the household head, gender, marital status, food insecurity, health issues, and living in areas of malaria-endemic, effectively influence the probability of households facing poverty. Conversely, elements such as the education of women, availability of insurance coverage, ownership of agricultural land, and the presence of affluent households with separate residences can significantly effect on alleviating urban multidimensional poverty [40].

Yuheng et al (2022), in their article "Understanding the multidimensional poverty in South Asia", using the Alkire-Foster method to examine the phenomenon of multidimensional poverty in South Asia over the period from 2003 to 2019. Findings indicate the impact of various factors including fuel type, sanitation conditions, housing quality, nutritional status, and educational attainment as major obstacles to the effectiveness of poverty alleviation initiatives [75].

Navvabpour (2021), in a study titled "A Study on Multidimensional Poverty and Contribution of Dimensions in the Provinces of Iran", employing the Alkire-Foster methodology, determined that the provinces of Khuzestan and Qom, along with several eastern provinces, exhibit the highest levels of multidimensional poverty. While, the northern and southern provinces, as well as certain western provinces, have confronted lower levels of poverty. Furthermore, the forms of deprivation experienced by households across various provinces in Iran exhibit significant variation [41].

Akhlaqi et al (2020), in an article titled "Measuring Multidimensional Poverty in Kabul City", explored the education, health, living standards, employment, and housing dimensions and provided a comparative analysis of various regions within Kabul city, through the analytical framework of Alkire-Foster. Based on findings, since the highest level of deprivation observed is less than 40%, households in Kabul city have not been categorized as poor in the sense of the multidimensional poverty dimensions. The most eminent extent of poverty is related to the deprivation in adult literacy, availability of room per capita, and the roof and the wall of the house sub-indices. Conversely, the least severe deprivation is linked to factors such as access to electricity, sanitation facilities, children mortality, disability, potable water, employment status, literacy among children, flooring of the residence, and availability of health services. Furthermore, the fourth region exhibits the highest levels of deprivation and poverty concerning education, living standards, employment, and housing [2].

In 2019, the National Statistics and Information Authority of Afghanistan (NSIA), in collaboration with the Oxford Poverty and Human Development Initiative (OPHI), published a comprehensive report on multidimensional poverty statistics in Afghanistan, based on data from the 2016-2017 census. This study has analyzed five dimensions: health, education, living standards, employment, and shocks, utilizing 18 indicators to investigate the multidimensional poverty rate in

Afghanistan, employing the Alkire-Foster methodology. The results outlined in this report highlight the intricate and varied aspects of poverty in Afghanistan as follows: 52% of the Afghan population experiences multidimensional poverty, whereas 55% is affected by monetary poverty. Notably, only 36.3% of individuals fall into both categories of poverty. The estimated poverty rate for children under the age of 17 is 56.4%, accounting for 58% of the overall poor population. Conversely, the poverty rate for individuals aged 18 and above is indicated to be below 49%. Within the context of urban and rural demographics, 18% of the poor population abodes in urban centers, whereas a substantial 61% is located in the rural villages of Afghanistan. This data indicate that multidimensional poverty in Afghanistan is predominantly present as a rural issue. Furthermore, regarding socio-economic characteristics, the most significant incidence of poverty is observed in households led by illiterate heads, as well as in larger households. In particular, the poverty rate for households with fewer than four members is 33.2%, while the rate rises to 60.2% for households with fifteen or more members. The analysis of provincial data reveals that Kabul province exhibits the lowest multidimensional poverty rate at 14.7%, while Nuristan and Badghis provinces report the highest rates at 80.2% and 85.5%, respectively. Additionally, Balkh province, with a multidimensional poverty rate of 45%, comes in eighth place out of 34 provinces in Afghanistan and shows comparatively lower level of poverty than other provinces. The findings point out that the dimension of education, specifically concerning girls' education, exhibits the highest deprivation rate at 47.9%. Contrariwise, the living standards dimension, particularly the electricity access indicator, reflects the lowest deprivation rate at 4.2%. Overall, Afghanistan's multidimensional poverty index stands at approximately 0.272, suggesting that individuals classified as poor endure 27.2% of different deprivations [44].

Eshaqzai et al (2017), has carried out a study entitled "Measuring Multidimensional Poverty in Kabul City", utilizing the Alkire-Foster methodology across four dimensions: income, health, education, and housing. According to findings, the 16, 9, 12, 18 and 20 regions were identified as the most impoverished in the city, based on a multidimensional perspective. In the context of health dimension, the 7 and 8 regions are specifically noteworthy. Regarding education dimension, the regions of 10, 5, 21, 22 and 15 are emphasized. From a housing standpoint, regions 16, 9, 12, 18, and 20 are again noted, while the income analysis points to regions 7 and 8. And the regions of 1, 2, 3, and 4 have possessed the lowest rates of poverty [25].

Trani et al (2016), in a research paper entitled "Multidimensional poverty in Afghanistan: who are the poorest of the poor?", applying the Alkire-Foster methodology, in order to improve the understanding of poverty and identifying the most deprived and disable individuals within Afghanistan utilized 13 indicators across seven dimensions, including health, living conditions, education, employment, social participation, mental health, and physical health. The findings of this study affirmed that nearly all adults experience deprivation in at least one dimensions of poverty. In addition, compared to other groups, those who live in rural area, belonging to ethnic minorities, women, and elderly and disable individuals are disproportionately affected by multidimensional poverty [63].

Trani et al (2013), in an article titled " The Multidimensionality of Child Poverty: an Empirical Investigation on Children of Afghanistan", which employed the Alkire-Foster method, reveals that among Afghan children, adolescents, rural youth, girls, and those with disabilities are the most deprived groups [61].

According to literature review, the Alkire-Foster approach has appeared as a more comprehensive method for assessing and quantifying poverty, efficaciously supplying a more exact image of the multifaceted essence of poverty in many regions globally. The dimensions and sub-indices of this study are the same as other research, yielding congruous results. Most studies flaunt deprivation in contexts such as education, housing and health, concentrating upon sub-indices like adult literacy, access to medical care, room floor, unemployment, room per capita and property possession. The education and employment status of the household head, along with the size of household, are the eminent factors impressing the probability of a household being classified as poor. Furthermore, previous findings show

that poverty and deprivation differ in their distribution, extent, intensity, dimensions and sub-indices across the communities assessed, as well as in selected regions of Mazar-e-Sharif city. A notable aspect that makes this research distinguished from other studies is its reliance on the localization of dimensions and indicators of multidimensional poverty based on the social and economic characteristics of Afghanistan, particularly in Mazar-e-Sharif city. Additionally, this research presents one of the few studies in Mazar-e-Sharif which was implemented several months after the Taliban's takeover, while the welfare of the people had remarkably diminished due to the collapse of the Islamic Republic of Afghanistan's government and the cessation of international aid, the dysfunction of the country's financial institutions, and the restrictions on production and service activities.

Research Methodology

1. Alkire-Foster Approach: The framework for measuring multidimensional poverty has been conceptualized since Amartya Sen's work in 1976. This methodology comprises a two-phase process of identifying and aggregating data on poor individuals. During the identification phase, individuals classified as poor are determined based on the extent of deprivations they encounter across various dimensions. While, in the aggregation phase, the one-dimensional Foster-Greer-Thorbecke (FGT) method is adapted and applied to multidimensional contexts, thereby consolidating the data pertaining to the poor population [10].

1.1. Notation: In a given society, the matrix X^(n×d)=[x_ij] signifies the individuals' accessibility, where n denoting the total number of individuals and d ≥ 2 representing the number of indicators used to assess poverty levels. The Xij ≥0 shows the level of achievement reached by individual i(i= 1,…n) in relation to indicator j(j=1,…n). The scope of the achieving matrix is defined as X={x ϵR_+^nd :n≥1}. The vector

z=(z1,….,zd) delineates the threshold levels of deprivation, where zj≥0 indicates the deprivation threshold for index j. Furthermore, the vector w=(w1, ..., wd) denotes the weight vector is linked to the indicators, where the condition wj≥0 means that the weight of each indicator is equal to ∑_(j=1)^d⁣〖w_j=1〗. For a specified amount of x, the deprivation matrix is denoted as g0=[g0ij], where the g0ij=0, it follows that if xij≥zj, otherwise, g0ij=wj. In the subsequent phase, the column vector representing the weighted sum of deprivations, denoted as c= ci, is derived from the deprivation matrix, where the ci=∑_(j=1)^d⁣g_ij^0 and 0≤ci ≤1 and ci signifies the weighted count of deprivations encountered by individual i [10].

1.2. Identification: At this stage, poor individuals identified based on the established poverty threshold k. The identification function ρ=R_+^d×R_(++)^d →{0,1} implement to identify individuals classified as poor within y society, based on the deprivation threshold z, the weight w, and the poverty threshold k. in this context, z∈R_(++)^d , 〖 y〗 _i∈R_+^d. The matrix y=[y_ij] is an n*d matrix and this represents the access levels of n individuals (i=1,2,…,n) across each of the d dimensions (j=1,2,3,…,d). In this matrix, each row corresponds to the access level of individual i, while each column signifies dimension j, consequently, yij denotes the access level of person i within dimension j. As a result, when an individual is in a state of poverty, the identification status is designated as (ρ(y_i;z)=1); otherwise, the status is recorded as (ρ(y_i;z)=0) [27].

1.3. Aggregation: Upon determining individuals living in poverty based on the designated threshold vector C, it becomes possible to establish a range of multidimensional criteria for assessing poverty. An important criterion involves the detection of the quantity of deprivations which is faced by each individual. It is assumed that Q is an n-dimensional vector characterized by a generic entry, then:

$$q_i = \begin{cases} 1 & \text{if } d_i \geq c_{(d+1)} \\ 0 & \text{Otherwise.} \end{cases} \quad (1)$$

Consequently, the equation H=1/n ∑_(i=1)^n▒q_i which signifies the ratio of the poor population within society, can be derived. For a poor person i, H remains constant despite di changes, unless the person i is reclassified as non-poor. The H index provides a more accessible comprehension of poverty; however, it does not satisfy the consistency of the dimensions. The subsequent section defines the G0* matrix, which illustrates the extent of deprivation encountered by poor individuals:

$$g_{ij}^{(0*)} = \begin{cases} g_{ij}^{0} & \text{if } q_i = 1 \\ 0 & \text{Otherwise.} \end{cases} \quad (2)$$

Following this, one can calculate the average extent of deprivation (A=(1/d ∑_(i=1)^n▒∑_(j=1)^d▒g_ij^(0*))/(∑_(i=1)^n▒q_i)) experienced by the poor. This index reflects the average relative dimensions d in which individuals experiencing poverty face deprivation. Finally, the adjusted head-count ratio (M0) can be determined through the following calculation:

$$M_0 = 1/nd \sum_{(i=1)}^{n} \sum_{(j=1)}^{d} g_{ij}^{(0*)} = H \times A \quad (3)$$

Which is M_0∈ [0,1] and can be interpreted as the all dimensions in which poor individuals experience deprivation, divided into its highest possible value of those dimensions. Furthermore, M0 possess the characteristic of uniformity in dimensions, as it increases in response to the growing in number of deprivations encountered by a poor person. Moreover, the M0 index remains unaffected by variations in deprivation levels among non-poor individuals across different dimensions, as they continue to be classified as non-poor [61].

2. Statistical Population, Statistical Sample and Source of Data: This study adopts a descriptive-analytical methodology, utilizing the questionnaire created by Akhlaqi et al. (2020) for data collection. The questionnaire comprises 53 questions about the education, health, employment, living standards, and housing conditions dimensions along with sixteen sub-indices. The reliability of the questionnaire was assessed through Cronbach's alpha, which resulted in a value of 0.793%. Furthermore, its validity was examined by academic professors and reviewers, considering the context of the research. The research's statistical population comprises the first, second, fourth, fifth, eighth and tenth regions of Mazar-e-Sharif city, chosen for their varying income levels, as well as their distinct social and cultural characteristics. The population of Mazar-e-Sharif city is estimated to be around 584,884 people based on the most recent reports [2021]. Since the research unit focuses on households rather than individuals, and with an average of 7.2 individuals per urban household [43], the total population can be divided by this figure to yield a statistical population of 81,234 households. Using the Cochran's sample size formula, the calculated statistical sample size amounts to 382.36 households at a 5% level of error. Additionally, the two-stage cluster type random sampling method is utilized for data collection. In the initial stage, six regions of Mazar-e-Sharif city were selected as the research population. Following this, in the second step, sub-areas from each selected region were chosen, and questionnaires were randomly shared with households. In total, 391 questionnaires were distributed for data collection, of which 385 contained complete and valid responses, whereas the rest of them were recognized as either missing value or incomplete responses. The collected data was subsequently organized and analyzed using Excel, SPSS, and STATA software.

$$n = ((z^2\ pq\ )/d^2\ )/(1+\ 1/N\ \{(z^2\ pq\ )/d^2\ -1\}\ ) \quad (4)$$

$$n = ((\ 〖1.96〗^2\ 0.5*0.5\ )/\ 〖0.05〗^2\ )/(1+\ 1/81234\{(\ 〖1.96〗^2\ 0.5*0.5\ )/\ 〖0.05〗^2\ -1\}\ ) = 382.36 \quad (5)$$

3. Extent, Intensity and Multidimensional Poverty Index: The multidimensional poverty index (MPI) is derived by multiplying the values of extent (H) and the intensity of poverty (A), represented mathematically as (MPI= H × A). The extent of poverty is illustrated by the ratio of poor households to the total number of households in a community, which can be determined using the equation H=q/N. The intensity of poverty refers to the average portion of deprivation faced by households that live below the poverty threshold. This is determined using the formula:

A=(∑_(i=1)^N▒C_i (k))/q, in which C_i (k) represents the extent of concealed deprivation among poor households [35].

4. Deprivation Threshold and Weighting: The vector of deprivation thresholds, denoted as z=(z1,...,zd), determines the deprived people in each dimension. A person is considered deprived in dimension j if their access level falls below the corresponding deprivation threshold (zj). Conversely, if their access level meets or exceeds this threshold, the individual is not deemed deprived in that dimension. Furthermore, the weight vector w=(w1,…,wd) shows the relative significance of each criterion (Fotros & Ghodsi, 2015). In this model, five dimensions, namely education, health, living standards, employment, and housing are considered, with each dimension assigned an equal weight of 1/5. Consequently, the dimensions of education, housing, and employment are each comprised of two sub-indices, with each receiving a weight of 1/10 (1/5÷2). The health dimension, which encompasses three sub-indices, is assigned a weight of 1/15 (1/5÷3). Additionally, the dimension of living standards, including seven sub-indices, is given a weight of 1/35 (1/5 ÷7). According to the criteria established by Alkire and Santos [5], a household is classified as poor if the total of its deprivations surpasses 33%, or if the cumulative weight of deprivations across all dimensions reaches 0.33.

Table (1): Research Conceptual Model

Dimensions	Sub-Indices	A household experiences deprivation if...	Weighting
Education	Children Literacy	One child in the age group of 6-18 is not enrolled in school.	$\frac{1}{10}$
	Adult Literacy	An illiterate adult person resides in the household.	$\frac{1}{10}$
Health	Children Mortality	A household member, under 5 years old, has passed away.	$\frac{1}{15}$
	Disability	One household member has a mental or physical disability.	$\frac{1}{15}$
	Health Services	Household needed to visit a doctor during the past year, but they skipped it due to financial issues or no available doctor.	$\frac{1}{15}$
Living Standards	Drinking Water	No access to a permanent water source.	$\frac{1}{35}$
	Electricity	No access to electricity at least for 6-12 hours daily.	$\frac{1}{35}$
	Property Possession	At minimum, no access to TV, fridge, and iron.	$\frac{1}{35}$
	Type of Fuel	Utilizing wood or animal waste as fuel.	$\frac{1}{35}$
	Bathroom	No access to in-house bathroom.	$\frac{1}{35}$
	Wastewater System	At least, no access to a regular Wastewater well.	$\frac{1}{35}$
	Cooling/Heating Facilities	At least, No access to a fan in summer and a basic heater in winter.	$\frac{1}{35}$
Employment	Unemployment	There is at least one adult individual (aged 18 or older) who has been unemployment for six months.	$\frac{1}{10}$

	Child Labor	There is at least one child (aged 6-18) engaged in work, either at home or elsewhere, excluding typical household chores.	$\frac{1}{10}$
Housing	Room Per Capita	At least, more than three individuals reside in a single room.	$\frac{1}{10}$
	Building Material	Raw clay or mud have been utilized for the house walls, while the roof is made of wood or features a dome and the floors of the rooms consist of soil or chaff-flower.	$\frac{1}{10}$

5. The Logistic Regression Model: The linear logistic regression model is expressed as: $\{\ln f_0 〖 \pi_i/(1-\pi_i)=\beta_0+ \beta_1 x_{i1}+...+\beta_k x_{ik} 〗 \}$, where π_i denotes the probability of households experiencing poverty, while $1-\pi i$ signifies the likelihood of households not experiencing poverty. In addition, $\beta 0$ represents the intercept, while the parameters $\beta 1$ through βk denote the regression coefficients of the model, and the variables xi1 to xik serve as the explanatory variables within the model [28]. The logistic regression model utilized in this study can be expressed in the following manner:

$$\ln f_0 〖(〖Poverty〗_i/〖1-Poverty〗_i)=\beta_0+\beta_1 〖Education〗_i 〗+\beta_2 〖Employment〗_i+\beta_3 〖HouseholdSize〗_i+u_i \quad (6)$$

$$〖poverty〗_i \begin{cases} =1 \text{ if } S_i \geq 0.33 & \text{Household is dimensionally poor} \\ =0 \text{ if } S_i < 0.33 & \text{Household is dimensionally non-poor} \end{cases} \quad (7)$$

In the aforementioned model, the variable "Poverty" serves as the dependent variable, characterized as a dummy variable that takes on values of 0 or 1. Specifically, if a household's access level meets or exceeds the poverty threshold, denoted as $Si \geq C$ (0.33), it is classified as poor, receiving a value of 1; otherwise, it is characterized as non-poor and assigned a value of 0. The variable "Education" is defined as an explanatory variable and is categorized within the framework of ordinal measurement, pertaining to the educational attainment of the household head. The "Employment" variable refers to the job status of the household head, whereas the variable "Household Size" indicates the total number of individuals residing within the household. Both of these variables serve as explanatory factors.

Poverty Analysis – Results

Examination of the Extent, Intensity and Multidimensional Poverty Index: Table (2) presents the findings related to the extent (H), intensity (A), and the multidimensional poverty index (MPI) for selected regions within Mazar-e-Sharif city. According to findings, the second region has the highest poverty level, reflected by a multidimensional poverty index of 0.224 and extent of 0.43, while the fourth region shows the greatest intensity of poverty, recorded at 0.547. On the other hand, the tenth region of Mazar-e-Sharif city exhibits the lowest levels of poverty overall, with an extent of 0.185, an intensity of 0.46, and a multidimensional poverty index value of 0.085. As a result, the computed averages for the extent of poverty, the intensity of poverty, and the multidimensional poverty index across the examined regions are 0.34, 0.511, and 0.174, respectively.

Table (2): The Extent, Intensity and Multidimensional Poverty Estimation

Regions	Multidimensional Poverty (MPI)	Intensity (A)	Extent (H)
First	0.192	0.463	0.415
Second	0.224	0.522	0.43
Fourth	0.186	0.547	0.34
Fifth	0.2	0.535	0.37
Eighth	0.16	0.522	0.303
Tenth	0.085	0.46	0.185
Mean	0.173	0.511	0.34

The Level of Deprivation on Each Sub-Indices: The average percentage of deprivation categorized by each sub-indicator is presented in Table (3) and illustrated in Figure (1). The findings

indicate that the most significant level of deprivation is associated with the sub-indicator of "Adult Literacy", which stands at 72.4%, whereas the sub-indicator of "Access to Electricity" reflects the least degree of deprivation, recorded at 1.26%. Consequently, results show that households in the chosen regions of Mazar-e-Sharif city face significant levels of deprivation across various dimensions, with education at 47.2%, housing at 41.8%, employment at 29.95%, health at 25.23%, and living standards at 17.3%.

The Level of Deprivation in Each Region: The findings presented in Table (4) reveal that the levels of household deprivation vary across distinct regions. Specifically, the second region exhibits the greatest deprivation concerning housing and living standards, while the eighth region shows the highest deprivation regarding employment. In terms of health, the fourth region exhibits the highest level of deprivation, while the fifth region is the most deprived in terms of education. Furthermore, the average deprivation across different dimensions for the chosen regions, ranked from highest to lowest, is as follows: the second region 31.31%, the fourth region 29.52%, the first region 27.9%, the fifth region 25.9%, the eighth region 25.76%, and the tenth region 21.95%.

Table (3): The Level of Deprivation on Each Sub-Indices

Dimensions	Sub-Indices	1st Region	2nd Region	4th Region	5th Region	8th Region	10th Region	Sum of Deprivation in Sub-Indices	Mean of Deprivation in Dimensions
Education	Children Literacy	1.8%	2.56%	7%	4.36%	22.3%	1.53%	5.13%	47.2%
	Adult Literacy	11.76%	11.25%	12.8%	11.76%	72.4%	10.23%	14.58%	
Health	Children Mortality	2.55%	3.06%	2.04%	2.3%	14.3%	1.28%	3.06%	25.23%
	Disability	1.8%	2.3%	2.3%	2.3%	11.8%	1.54%	1.54%	
	Health Services	9.35%	8.94%	7.15%	9.97%	49.6%	6.13%	7.92%	
Living Standards	Drinking Water	4.58%	8.67%	3.57%	5.87%	26.8%	0.254%	3.82%	17.3%
	Electricity	0	0.25%	0.25%	0	1.26%	0	0.76%	
	Property Possession	7.4%	9.6%	8.6%	9.4%	46%	5.3%	5.6%	
	Type of Fuel	1.01%	1.01%	0.5%	0.25%	3.3%	0.25%	0.25%	
	Bathroom	1.02%	2.3%	0.5%	1.78%	7.4%	1.53%	0.25%	
	Wastewater System	3.81%	3.06%	3.57%	6.63%	22.7%	3.57%	2.04%	
	Cooling Facilities	0.77%	0.77%	0	2.06%	4.9%	0.26%	1.03%	
	Heating Facilities	9.37%	8.61%	0	6.6%	26.1%	0.25%	1.26%	
Employment	Child Labor	3.08%	1.28%	3.08%	2.56%	13.6%	1.28%	2.31%	29.95%
	Unemployment	7%	8%	7.67%	5.11%	46.3%	8.44%	10.23%	
Housing	Room Per Capita	6.14%	5.11%	3.6%	6.65%	28.9%	3.32%	4.1%	41.8%
	The Floor	10.74%	12.27%	11%	12.02%	64.2%	10.74%	7.42%	
	The Roof	8.7%	13.3%	1.53%	8%	38.1%	4.85%	1.8%	
	The Wall	6.14%	11.77%	2.05%	8%	36.1%	7.17%	1.02%	

Figure (1): The Level of Deprivation on Each Sub-Indices

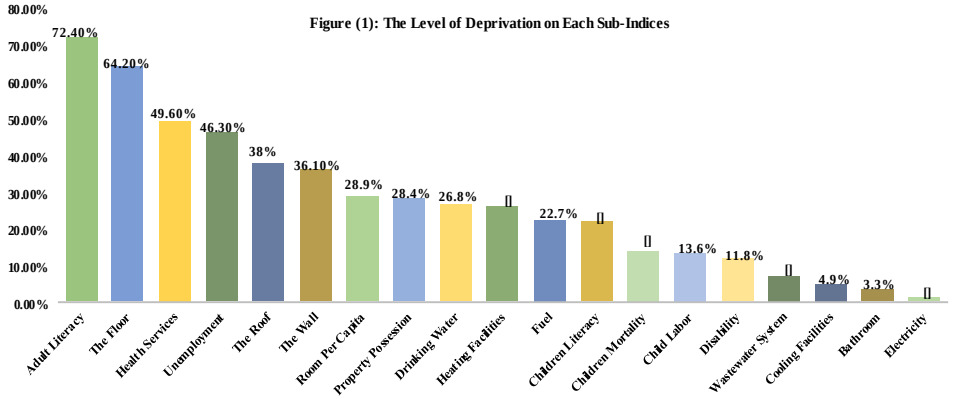
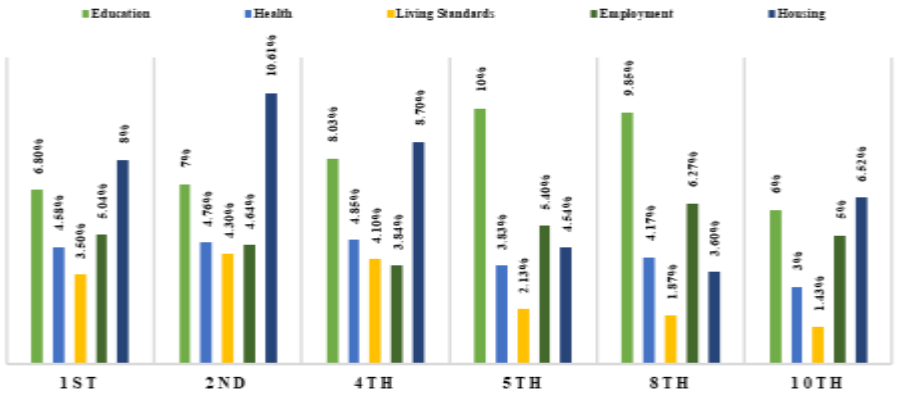


Table (3): The Level of Deprivation in Each Region

Regions	Education	Health	Living Standards	Employment	Housing	Mean of Deprivation in Dimensions
First	6.8%	4.56%	3.5%	5.04%	8%	27.9%
Second	7%	4.76%	4.3%	4.64%	10.61%	31.31%
Fourth	8.03%	4.85%	4.1%	3.84%	8.7%	29.52%
Fifth	10%	3.83%	2.13%	5.4%	4.54%	25.9%
Eighth	9.85%	4.17%	1.87%	6.27%	3.6%	25.76%
Tenth	6%	3%	1.43%	5%	6.52%	21.95%

Figure (2): The Level of Deprivation in Each Region



Conclusion

In contrast to the income-based perspective on poverty, a multidimensional poverty approach provides a deeper comprehension of the fundamental causes and contributing factors of poverty. This approach uncovers both the visible and hidden aspects of deprivation and poverty present in society. Given that human well-being is influenced by various dimensions and factors beyond mere income and economic considerations, relying solely on household income and expenditures is insufficient for accurately assessing the well-being of individuals and households within the community. The relevant dimensions encompass housing, education, health, employment, social relationships, living standards, life expectancy, adequate nutrition, and other factors that differ based on the particular social, cultural, and economic circumstances of various communities. In conclusion, multidimensional poverty is defined by the absence of capabilities and opportunities that hinders individuals or households from realizing their potential for meaningful functions when such capabilities are absent. For instance, education represents a capability, and its application is a function that enables individuals to generate income and access various opportunities. Conversely, individuals lacking this capability (education) are hindered from realizing its potential benefits. This research tends to measure multidimensional poverty within selected regions of Mazar-e-Sharif city and to clarify the determinants influencing household poverty levels. Overall, the findings of this study indicate that 1) the multidimensional poverty index, along with the extent and intensity of poverty in the selected regions of Mazar-e-Sharif city, are estimated at 0.174, 0.34, and 0.511, respectively. Notably, the second region exhibits the highest extent of poverty and a multidimensional poverty index at 0.43 and 0.224 respectively, while the fourth region demonstrates the highest intensity of poverty, recorded at 0.547. 2) Deprivation levels differ Substantially across regions and dimensions. For instant, the second and fourth regions experiencing the highest deprivation rates at 31.3% and 29.5% respectively, whereas the tenth region has the lowest at 21.95%. Moreover, the most deprivation in housing and living standards are observed in the second region, while the eighth region is more deprived in employment, the fourth region in health, and the fifth region in education. And, it can be declared that the dissimilation social, cultural, economic, and geographical properties are the crucial factors accompanying the diversity in poverty and deprivation levels across the selected regions of Mazar-e-Sharif city. Meanwhile, these results are accordant to the findings of [2], [25] and [48]. 3) The most significant deprivation is observed in the education dimension at 47.2% and housing dimension at 41.8%, whereas the living standards dimension reflects the least deprivation, recorded at 17.3%. Furthermore, the adult literacy and room flooring sub-indices indicate the highest levels of deprivation at 72.4% and 64.2% respectively, while access to electricity, at 1.27%, and bathroom facilities, at 3.3%, show the lowest levels of deprivation. These observations are consistent with previous studies [2], [44] and [1]. With this in mind, it can be asserted that the high incidence of housing deprivation may be influenced by factors such as the lack of determined construction standards and the exorbitant cost of durable building materials. Additionally, the existence of notable deprivation in the education dimension, especially in adult literacy,

which is observed an average of 1.4 illiterate adults per household in this research, can be stemmed from different factors, including the illiteracy or low literacy of parents, household prejudices and gender discrimination that restricts women's educational access, lack of interest and insufficient opportunities for participation in literacy programs, as well as scarcity of educational features for adults, especially for women. 4) The research illustrates that the probability of experiencing poverty in a household that is led by an employed and educated head is 60% and 15% respectively, lower compared to households with an unemployed and illiterate head. Conversely, due to the addition of a new member to the household, the probability of facing poverty raises by 10%. These factors have been recognized in various studies as efficacious determinants of poverty [15], [40], [44], [58], [74] and [76]. Ultimately, the results of this research demonstrate that it is essential for governmental, private, and international policy makers — particularly those operating in Mazar-e-Sharif city—to first obtain precise statistics and data regarding the prevalence, intensity, and geographic spread of multidimensional poverty. Additionally, understanding the regional differences in poverty and deprivation is also a crucial issue. With this knowledge, these organizations ought to set up well-informed plans that correspond with the available resources and facilities. In the effort to reduce poverty and deprivation, particularly regarding education and housing, the governmental and private organizations and international agencies in Mazar-e-Sharif city can pursue strategies including establishing free educational institutions, incepting adult literacy initiatives, supplying durable construction materials to deprived households and offering guidance on house construction and design. And to address poverty related to health, employment, and living standards, it is essential to develop health services, support small investments, and enhance infrastructure, such as establishing a standardized water supply system and regulating fuel prices.

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