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## MULTIDIMENSIONAL POVERTY INDEX (MPI) FOR URBAN AND RURAL REGIONS OF PAKISTAN

Rifat Mahmood<sup>1\*</sup>, Ijaz Hussain<sup>1</sup>

<sup>1</sup> Department of Economics, Gomal University, DeraIsлами Khan, Khyber Pakhtunkhwa, PAKISTAN.

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### ABSTRACT

Poverty has a multidimensional aspect in recent years. It includes not only income or expenditure but also covers basic needs and living standards. Consequently, poverty assessment during its valuation phase should incorporate all the above aspects. The multidimensional poverty index is composite by taking all the above considerations. Thus, the new methodology of poverty assessment captures these deficiencies/deprivations that people face. This paper estimates the multidimensional poverty index (MPI), by considering the five dimensions i.e. quality of housing, health facility, education, basic needs, and living standards, with eleven indicators. The theme is to consider all the dimensions right at the time of poverty assessment, not to consider after the poverty assessment (as effects of poverty). For this, this study uses the micro-level data from Pakistan Social and Living Standard Measurement Survey (PSLM) Round VII (2013-14), collected by the Statistics Division, Pakistan Bureau of Statistics, Islamabad. The round-VII has covered 17989 households. It has provided all the required information on households at the regional level. A 76% share of MPI to the country is contributed from the rural region.

**Disciplinary:** Economic Sciences, Poverty Studies.

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## 1 INTRODUCTION

In all over the world, 1129 million humans are suffering from acute income poverty with a certain disparity in magnitude. While the dilemma of poverty has become a leading challenge in the history of the developing world, due to its extensive impact on the developmental process (United Nations Development Program, 2013). Income for poverty measurement is a conventional measurement. Their justification of using the income as determine to poverty is supported by the philosophy that money is obtained by income, which is used to fulfill the basic needs (Christiaensen et al., 2002). By absolute poverty, we mean the situation that indicates an acute deficiency of basic needs like housing, provision of sanitation, water, food, health, information, safe drinking, and

education, therefore, poverty not only depends upon income but also depends upon access to services and basic needs (Robyn & Kevin, 2008). According to most economists' poverty is a multidimensional phenomenon, yet in practice for poverty assessment, the majority of the researchers use the unidimensional index to analyze an individual's wellbeing by per capita income or usually expenditures (Duclos et al., 2006).

But poverty has a variety of signs, like shortage of income and lack of productive resources which should be sufficient for ill health, livelihoods, hunger, malnutrition, and lack to access of educational facilities (Ahmed and Khan, 2020) and mortality from illnesses, social judgment, insufficient shelters and insecure environment (Sen, 1976). Laderchi (1997) characterized it based on a lack of contribution in decision making in social, civil, and artistic life, which have introduced the concept of capabilities like good health and education. Poverty is a link between income and wellbeing which includes such as school enrolment, mortality, and malnutrition. The researcher argued that for a complete picture of poverty, only revenue did not give all the essential data. Therefore, to check the image for absolute poverty, additional dimensions should also be added along-with income (Dercon, 2005). Similarly, the World Bank report on poverty, focus on three dimensions of poverty in combination with income poverty i.e. education, health, voice less-ness and vulnerability (World Bank, 2000-01)

For the estimation of Multidimensional Poverty Index (MPI), the dimensions along with indicators include

- o Housing Quality - Occupancy status (If not Own Occupied then 1, otherwise 0), Dwelling type (having independent compound/flat/house/apartment then 0, otherwise 1), Room density (If the three or more persons having one room then 1 otherwise), Sanitation facilities (If a house has no such facility then 1 otherwise).
- o Health dimension along with one indicator - (If in the family any child in the age of 0-5 has died then 1, otherwise 0).
- o Education dimension - Dropout (If a family member hasn't finished 05 years of schooling then 1, otherwise 0), Attendance of School (If a child having school-going age (4-8 years) is out of the educational system then 1, otherwise 0).
- o Basic Needs Dimension - two indicators including Nutrition (if a family is a malnutrition then 1 otherwise), Drinking water (if drinking water is not available to a family then 1, otherwise 0).
- o Living standard - Cooking fuel (if cooking fuel is not available then 1, otherwise 0), Electricity (if electricity is not available then 1, otherwise 0), Assets (If a family has no any three out of these facilities i.e. PC/Refrigerator /Freezer/Air cooler/Washing machine/Geysers/Dish antenna/Cable then 1, otherwise 0).

## 2 LITERATURE REVIEW

This paper explains the self-evident basis of the multidimensional poverty indices (MPI) instead of the earnings approach i.e. poverty by predetermined poverty income line and took the basic need approach into account. This work also depicts the facts in the design of the multidimensional poverty indices that the local limitations which may have a crucial role (Tsui, 2002). Rosa and Kumar (2008) suggest that an individual's poverty can be seen in their deprived situation from many dimensions such as sanitation, nutrition as well as health, not only in his income. Thus, a complete measurement of deprivation should be taken by taking multiple dimensions of an individual. Poverty vulnerability confines the probability of an individual falling into poverty. Unlike poverty, it indicates the status of an individual, whereas nature vulnerability is

predictive. Sabina and Maria (2014) implemented the first direct technique for measurement of poverty that consists of more than a hundred developing nations; she has also analyzed robustness after measurement of the multidimensional poverty index and its scope, by considering the data constraints and issues of methodological which were engaged in estimation and construction.

Various robustness tests show that the MPI is reliable which harmonizes the worldwide income poverty estimation. Ramya (2014) built MP (multidimensional poverty) measurement on an individual level that indicates the significant weaknesses in the existing poverty discussion. The study found that a greater part of poor women and men belongs to non-poor families. Also, in household-level poverty measurement, households are misclassified as a non-poor individual, particularly females, are ignored in the traditional poverty measure approach. The result concluded that differences in gender in poverty do not exist. In the poverty measurement at the individual level, a major portion of poor individuals is females. Families 25% are classified as multidimensionality poor. The individuals 22% are found multidimensional poor when they assign poverty value to these households. Families headed by males indicate to some extent upper poverty at 25%, while the female-headed family is 23%. However, individual-level analysis indicates a dissimilar image of the gender disparity in poverty, as 64% of the rate in poverty among females is almost double than the rate of poverty among the men which is 30% with the consequence that the women are a majority in the poverty. Thomas et al. (2009) have compared the deprived people, who are suffered by the policies. They took livelihood insecurity as the key determinant of poverty for identification of poor households where families were classified into four different groups based on livelihood which are poor (hungry households), poor (agricultural labors/other casual laborers/fish workers'/construction workers), non-poor (government service, gulf migrants (semi-skilled or unskilled), farmers /traditionally well off families, skilled migrants. The study indicates basic needs (clothing, food, sanitation, and housing), assets (consumer goods, debt & land), potential i.e. school attendance & literacy & livelihood (livelihood means, labor status, and migration). For Kerala city, the study took basic needs (water, food, sanitation, and housing) and capabilities (education), stress on socio-cultural factors.

Jean et al. (2013) evaluates not only the nature of the multidimensional poverty of children but also to classify the children group which is most vulnerable in Darfur. It shows the child deprivation that may attract the interventions on a humanitarian basis to improve child welfare by improving nutrition, access to clean water and shelter, sanitation, health, and education. For humanitarian agencies and policymakers, this paper shows four important issues that declare an emergency. First, in Darfur, poverty is noticeably high; almost all children, boys, and girls, are disabled and nondisabled, Secondly, poor children do not consist of a uniform group. More, he has found disabled children, especially disabled girls, which shows the highest level of poverty. This gap of multidimensional poverty between nondisabled and disabled, children with disabilities are significantly worse than non-disabled children. Thirdly, disable children are significantly worse off.

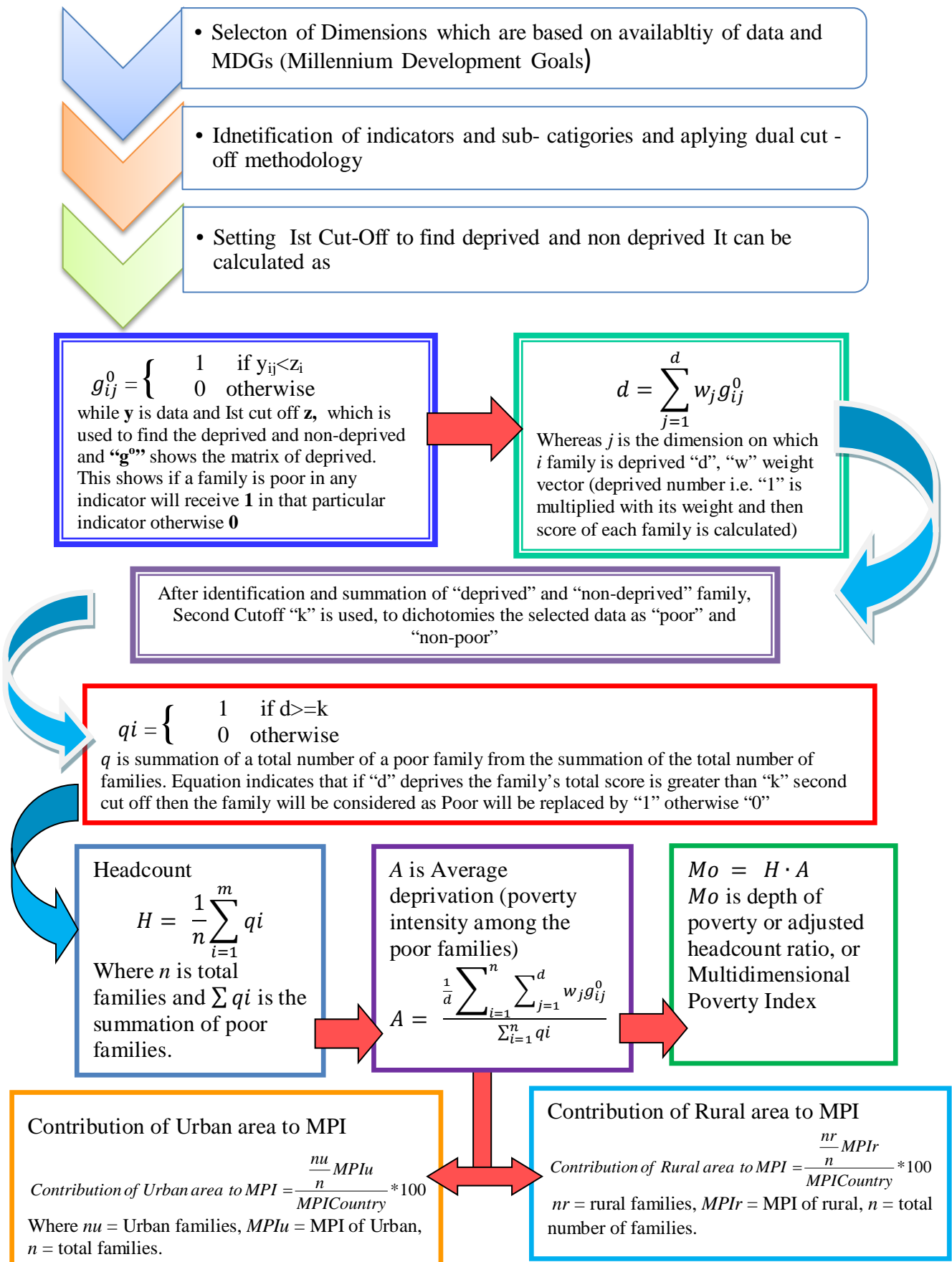
### 3 METHODOLOGY

#### 3.1 IDENTIFICATION, ESTIMATION FORMULAE & DATA

For estimation of the regional Multidimensional Poverty Index (MPI), the methodology of Alkire and Foster (2007) is used.

### 3.2 IDENTIFICATION OF POOR AND NON-POOR & ESTIMATION FORMULAE

To find the share of regions in MPI, this work has decomposed the population by rural and urban areas (see Flowchart 1).



**Flowchart 1:** Study methodology MPI process and computation.

### 3.3 DATA SOURCE

For this study, Pakistan Social and Living Standards Measurement (PSLM), Round VII (2013 – 2014) which is (a unit record) micro-level data is used, consists of 17989 families, collected by the Pakistan Bureau of Statistics (PBS), Statistics Division, Islamabad. Data is available online.

## 4 RESULTS AND DISCUSSION

This section expresses the main characteristics of the investigation of the article. Analysis under this section is made within the regions (rural and urban) and the outcome of the first cut off of poverty splits the families separately into not-deprived and deprived, if they receive “0” score then the family will be considered as non-deprived otherwise the family will be considered as deprived if the family obtains “1”. Likewise, the researcher has discussed the regions of Pakistan which are Urban and Rich. After the discussion of frequencies (1st cutoff), weighted dimensions are discussed and finally, the multidimensional poverty index at the regional as well as at the country level is estimated accordingly.

### 4.1 POVERTY DIMENSION WISE (1<sup>ST</sup>CUT OFF)

This part identifies deprived and non-deprived families by taking five dimensions i.e. Quality of Housing, Child Mortality, Education, Basic Needs, and Living Standard along with eleven indicators. If a family did not qualify the above indicator, then the family will be considered as “deprived” otherwise “non-deprived”.

#### 4.1.1 QUALITY OF HOUSING DIMENSION

Occupancy status, dwelling type, room density, and sanitation are incorporated in this dimension for analysis on a regional basis. According to Quality of Housing (Tables 1), in “occupancy status” about 92% of families living in a rural area are “non-deprived” against the 18% of deprived. Likewise, urban area families 71% have their independent housing (non-deprivation) while 29% are deprived. In the dwelling type category (having independent house/compound/apartment/flat), 79% of rural families are non-deprived against 21% of deprived families. Similarly, 87% of families of urban areas have their independent housing which is greater than those of deprived families.

**Table 1:** Quality of Housing (Calculations based on PSLM 2013-2014)

Region	Occupancy Status		Dwelling Type		Room Density		Sanitation	
	Non-Deprived	Deprived	Non-Deprived	Deprived	Non-Deprived	Deprived	Non-Deprived	Deprived
Rural	10828	927	7732	4023	7732	4023	686	11069
Urban	4433	1801	4589	1645	4589	1645	2976	3258

In the case of room density, the majority of families living in rural and urban areas are non-deprived (two or one people per room) with 66% and 74%. The sanitation situation is poor in the rural areas which indicate that only 6% of houses have sanitation facilities while 94% of houses have not such facilities or deprivation. In the same indicator, in the case of the urban region, 48% of houses have sanitation facilities while 52% of houses are not attached to sanitation.

#### 4.1.2 HEALTH DIMENSION

The health dimension has only one indicator that is child mortality with 0-5 years' age. Total families are 17989 whereas child mortality is 14100 and 3889 of families have either no children or the age of their children at the time of their death was more than 05 years or their child is alive. Table 2 depicts “not-deprivation” is more than “deprivation” as per Table among rural families’ child survival rate (non-deprivation) is 73% and child mortality is 27%.

**Table 2:** Child Mortality (Calculations based on PSLM 2013-2014).

Region	Not deprived	Deprived
Rural	6841	2502
Urban	3925	832

Likewise, child mortality among the urban region is 17% and the child survival rate is about 83%. This indicates that in urban areas child mortality is lesser than rural.

#### 4.1.3 EDUCATION DIMENSION

The “school attendance” and “drop out” are two indicators in this dimension. Table 3 portrays that in rural region school attendance (any child of school-going age 4 to 8 is out of school) in both regions is lower while this deprivation in the rural areas is higher which is about 91%. Likewise, “deprivation” in the urban region is 65%.

**Table 3:** Education (Calculations based on PSLM 2013-2014)

Region	School Attendance		Drop Out Ratio	
	Not deprived	Deprived	Not deprived	Deprived
Rural	1095	10660	3255	4601
Urban	2187	4047	3320	2260

Similarly, those who were enrolled but did not complete their education are considered dropouts (any family member who has not completed 05 years of schooling). The dropout indicator illustrates that “deprivation” in the rural region is about 41% whereas this condition is opposite in urban regions where “non-deprivation” is 59% and “deprivation” is about 41%.

#### 4.1.4 BASIC NEEDS DIMENSION

The basic needs dimension consists of nutrition and access to clean drinking water. Table 4 identifies that 56% of families of rural areas are using a balanced diet (non-deprived) against 44% of families who are malnutrition. Similarly, families living in the urban regions are also “non-deprived” with 52% while “deprivation” over here is about 48% which is more than a rural area.

**Table 4:** Basic Needs Dimension. (Calculations based on PSLM 2013-2014)

Region	Nutrition		Access to clean drinking water	
	Not deprived	Deprived	Not deprived	Deprived
Rural	6554	5201	9733	2022
Urban	3227	3007	6070	164

Access to the “clean drinking water” indicator illustrates that the majority of families in both regions have this facility while the majority of families living in urban than the rural region. In Table 4 about 83% of families living in rural areas and 97% of urban families are “non-deprivation”.

#### 4.1.5 LIVING STANDARD DIMENSION

It consists of “Gas availability”, “electricity facility” and assets. The Gas availability indicator has a terrible situation in the rural region where 87% of families are deprived of the gas facility. Whereas the situation of urban region families is opposite from rural areas in the urban area only 28% of families are “deprived” from this facility. The condition of the electric facility is good in both regions, where 66% of families of the rural areas and 90% of families of the urban areas are “non-deprived” as shown in Tables 5.

**Table 5:** Living Standard Dimension (Calculations based on PSLM 2013-2014)

Region	Gas Availability		Electricity Availability		Assets Availability	
	Not deprived	Deprived	Not deprived	Deprived	Not deprived	Deprived
Rural	1470	10285	7801	3954	615	11140
Urban	4470	1764	5592	642	1389	4845

The situation of assets is very horrific as the majority families of both regions do not qualify the condition of assets i.e. household heads having any three out of these 08 facilities. According to Table 5, 5% of families of rural areas have at-least three assets out of 08 assets while 95% of families are “non-deprived”. Similarly, 78% of families of the urban region haven’t at-least 03 assets out-off 08 facilities i.e. “deprived”.

#### 4.2 POVERTY INTENSITIES (2<sup>ND</sup> CUT OFF)

Poverty intensities in weighted deprivation in the form of grouping indicate the 2<sup>nd</sup> cut off which ranges from “less than 0.20” to equal to or greater than 0.51. Poverty intensity also depicts the severity of poverty. The second cut-off converts the family from “deprivation” to “poor” if the family received the score greater than or equal to 0.51 similarly if the family’s score is 1 then the family will be perfectly poor. If the family receives “less than 0.20” it will be declared as “non-poor”. According to Table 6 in the case of “non-poor”, only 5% of families belong to the rural region and 29% of urban families are non-poor.

**Table 6** Regional wise Poverty Intensity (2<sup>nd</sup> Cut-Off)

Region	Less than 0.20 (non-p)	0.20- 0.26	0.26- 0.3	0.31- 0.35	0.36- 0.4	0.41- 0.45	0.46- 0.50	>=0.51	Total
Rural	537	547	1357	1142	1864	1486	1414	3408	11755
Urban	1813	874	733	766	599	480	324	645	6234

For those who are in the range of poverty are 10% of families living in the urban region and 29% are from rural areas. Similarly, the percentage of near poverty (0.46-0.50) of the rural and urban regions is about 12 and 5. In poverty intensity “0.41-0.45” and 0.36-0.4”, the majority families belong to rural region i.e. 13% and 16% respectively while urban families have a minimum score. Likewise, in between these extreme cases i.e. “0.31-0.35” here score families of the urban region are more than rural regions, the percentage of urban families is 13% and in rural families is 10%. The equal percentage is observed in both regions by 12% in “0.26-0.3”. One step away from “non-poor” (0.20-0.26), the majority families belong to the urban region which is 14% while rural families are 5%. Poverty intensity from “non-poor” to “poor” in a rural region is although increasing but with fluctuation and at the extreme level it is highest. Likewise, in the same intensity the urban region, its percentage decreases with fluctuation and in extreme cases, it is a little bit

more.

#### 4.2.1 REGIONAL WISE AVERAGE DEPRIVATION

“A” along-with headcount “H” and MPI (M0). “Average deprivation” (A) is the measurement by summing the proportion of total deprived families of all dimensions and divide it by the total number of poor families. “Headcount ratio” (H) is measured by dividing the total poor by the total number of people. MPI is calculated by multiplying the “average poverty” (A) to “headcount ratio” (H) whereas MPI should be between 0 and 1 if the family’s MPI is 0, which indicates that the family is not poor whereas 1 shows perfect poverty.

The result of Table 7 depicts that A (average poverty) among the families of the rural region is 0.45 which is greater than the Urban region where it is 0.37; similarly, A at the country level is about 0.43. Total poor i.e. q in a rural region is 11218 families which become 95% share, out of the total rural population, and in the urban regions, this count is 4421 which is 71% of the total urban population. At the country level, this percentage is about 87%.

**Table 7:** Regional wise Average deprivation, HeadCount, and MPI  
(Calculations based on PSLM 2013-2014)

Region/Country	A	Total Poor (q)	Total Population (n)	H = q/n	MPI= A · H
Rural	0.45	11218	11755	0.95	0.43
Urban	0.37	4421	6234	0.71	0.26
Country	0.43	15639	17989	0.87	0.37

In the case of headcount ratio “H,” this percentage in rural and urban is about 95 and 71 respectively while at the country level it becomes 87%. The majority of multidimensional poor families belong to the rural region (0.43) while MPI in urban regions is 36%. Similarly, the country-wise adjusted headcount ratio (MPI) is 37%.

#### 4.2.2 REGION WISE CONTRIBUTION TO COUNTRY’S MPI

To find the share of regions in the country’s MPI population is divided by Rural and Urban regions and then found the share of rural and urban regions’ by finding region-wise MPI.

$$\text{Contribution of Urban area to Pakistan's MPI} = \frac{\frac{nu}{n}MPIu}{Pakistan'sMPI} * 100 \quad (1).$$

nu = Urban Population and n = Total Population, Contribution of Urban area to Pakistan’s MPI = 24.4%. Whereas the contribution of rural areas to Pakistan’s MPI =75.9%. The result confirms that in Pakistan maximum share in MPI is contributed by the rural region.

## 5 CONCLUSION

MPI multidimensional policy index is an important and interesting effort to find the poverty extent i.e. its coverage as well depth with extensively used poverty indicators. The research analyzed the issues of the deprived dimensions across Pakistani regions (rural and urban) by using a new methodology of MPI, introduces by Alkire and Foster (2007-08) “Counting and Multidimensional Poverty Measures” of identification of poor and non-poor by taking data collected by Pakistan Social and Living Standard Measurement Survey Round vii (2013-14). An estimation of deprived dimensions concerning incidence and depth of poverty has been made. The



result of 1st cut-off indicates that the majority families, especially from rural region, are deprived in “sanitation” from “quality of housing, “school attendance” from “education” and “gas availability” and “assets availability” from “living standard” Similarly, 2nd cut-off represents that about 41% from the rural region and 16% from the urban region is “poor” or at the border of poverty. MPI of the rural region is 43% and in the urban region, it 26% while at the country level it is about 37%. Similarly, a 76% share of MPI to the country is contributed from the rural region.

## 6 AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding author.

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**Rifat Mahmood** is a PhD Scholar at Department of Economics, Gomal University, Dera Ismail Khan. He holds an M.Phil. He is a Lecturer at Department of Economics, Gomal University, Dera Ismail Khan, KP, Pakistan. He is interested in Alleviating Poverty with Experimental Research.



**Dr. Ijaz Hussain** is an Associate Professor at Department of Economics, Gomal University Dera Ismail Khan. He got a PhD degree in Economics. He can be reached [ijazecoqau@gmail.com](mailto:ijazecoqau@gmail.com)

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