

# Investigating Multidimensional Poverty across the Regions in the Sindh Province of Pakistan

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**Abstract** The concept of poverty has gone beyond the monetary attributes to cover several dimensions directly influencing the level of individuals' socio-economic status. Based on this methodological advancement, this study aims to approximate the deprivation of education, health and housing facilities to analyze the incidence of multidimensional poverty (MDP) at regional levels in the Sindh province of Pakistan. Findings revealed that the magnitude of MDP varies significantly across the regions due mainly to the variation in the deprivation levels of socio-economic aspects. Furthermore, the magnitude of MDP is higher in rural areas than urban areas in each region.

**Keywords** Multidimensional poverty · Deprivation · Education · Health · Housing facilities · Pakistan

## 1 Introduction

Poverty is the major global issue that has been the leading challenge for policy makers in developing countries due to its increased threat towards economic growth. Therefore it is well-accepted fact that in the presence of this constraint, a society cannot develop. Worldwide, around 1.8 billion people in 1990 and 1.4 billion in 2005 were living below the poverty line (income <\$1.25 a day) with multiple trends across the regions and

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countries (UNDP 2010a). However, World Bank (2009) reports that globally around 1.42 million people are poor and cannot meet their basic needs. Importantly, 400 million people out of total global poor population belong to the South Asia, where the volume of poverty has been increasing over the years due mainly to increased income inequality, economic instability and unprecedented disasters. As reported elsewhere (UN Millennium Project 2002), around 584 million woman and 114 million children of the world are unable to get the basic education due to poverty. Majority of those belong to South Asia and Sub-Saharan Africa, which are the most saturated hubs of the poor population. Pakistan has not been an exception and the issue of poverty remained the leading confront in the history of the economy. Although, Pakistan seems to have good progress in the poverty reduction during 1970s, yet this period was also associated with a sharp rise in the income inequality across the regions as well as sectors. The overall national statistics of poverty have revealed a significant decline during 1980s, but it rose again in 1990s and continued rising till 2010 (Amjad and Kemal 1997). The magnitude of poverty in rural as well as urban areas increased significantly. However, some studies (CPRSPD 2008) found that incidence of poverty considerably decreased from 34 to 22 % during the period from 2001–2002 to 2005–2006. Whatsoever the case is, Pakistan has a huge portion of poor population with more serious concerns of rural areas where poverty rate is unacceptably higher.

Debate on the issue of poverty is quite complex in existing literature due mainly to the confusions, which are intrinsic to this issue. Studies indifferently discussed the various factors of poverty as indicators, causes and consequences. Though there is a clear difference in use of factors as indicators, causes and consequences; however they have to be related or indifferent at some point since they go hand in hand. For an example, income and socioeconomic status of an individual move simultaneously. The income develops his/her socioeconomic status through improving basic essentials like education and health, thereby the quality of life and capabilities directly, but they also increase a person's ability to earn more income and be free of income poverty (Sarshar 2010; Dreze 1990). Even, improved food intake may also result in improved working efficiency conducive to increased income of an individual (Stiglitz 1976; Aromolaran 2004; Hussain 2012). Thus, the factors embodied in main socioeconomic dimensions, i.e. education, health and housing, may indifferently be considered as indicators, causes and consequences of poverty, particularly in the case of developing countries where the people depend on household income to improve their health, education and housing since the governments are not able to provide discounted or free of cost facilities. It appears that poverty in developing countries like Pakistan is a cyclic phenomenon where either increased poverty may result in deterioration of socioeconomic status, or deteriorated socioeconomic status may do vice versa. One very important lesson arising from this fact is that governments may target any of these two tails of the issue to cope with both.

Based on the above ambiguities, studies have discussed poverty from different point of views. For an instance, Haq (2004) argued that poverty in Pakistan increased from nearly 31 % in 1990 to 34 % in 2005 due primarily to multiple causes such as lack of education, large household sizes, gender discrimination, cultural and social traditions. Likewise, Awan et al. (2011a) and Sackey (2005) claimed that the improved level of education not only increased the sources of earning but also improved the social wellbeing of individuals. Conversely, some studies claims the socioeconomic factors as indicators. For an example, the World Bank claims that the social indicators such as education and health deteriorated over the time as compared to the other countries indicating large regional disparities (World Bank 2002a). Pakistan is amongst the three least literate Asian countries having literacy rate less than 40 %, and also amongst the rare examples of the world where

illiterate people are increasing over the years as 28 million in 1972 and 46 million in 2005. Lack of education along with some other deteriorated social indicators, i.e. health, housing, household size and gender discrimination, adding to the lethality of the poverty in Pakistan (World Bank 2002b; Amjad and Kemal 1997; Siddiqi 2005). The linkage of socioeconomic indicators with poverty is essential for clear understanding of poverty (Preece 2006). In the view of the above evidences, it is justifiable to use socioeconomic factors indifferently as indicators or causes of the poverty.

Evolution in the concept of poverty started in early 1970s when Townsend (1970) demarcates that poverty is basically perceived as the lack of command over the resources to meet the basic needs and participate in the economic activities for attaining sustainable living standard. Sen (1990) identifies that economic prosperity is one mean to enrich the living standard of the people and merely enhancing average economic lavishness. Moreover, the concept of development has progressed from conventional monetary measures to the various achievements in the quality of human welfare, i.e. life expectancy, education etc., illustrating the example of six countries with the introduction of broad capability approach. Mukherjee (2001) exposes the state of wellbeing as multifaceted phenomena, where the concept of deprivation goes beyond the income denial to the lack of several socio-economic attributes of life. Bourguignon and Chakravarty (2002) explain that the state of poverty arises due to insufficiency of different necessities such as literacy, housing, health, provision of public services, etc., that are large contributor in the subsistence level of living. Alkire and Foster (2007) presented an enlarged methodological framework for the assessment of multidimensional poverty (MDP) that included socioeconomic dimensions, i.e. education, health and housing. This approach took into account the socioeconomic dimensions as the indicators of poverty.

Regarding the assessment of poverty, the most recent studies stated that simply headcount rate based on income standards cannot claim the reliable assessment of poverty. Headcount measure may be the short-run or transitory assessment of the situation of the population but cannot depict the reliable and sustainable state. As discussed deeply in earlier parts of this section, different socioeconomic indicators may collectively represent the clear picture of poverty, justifying the use multidimensional approach to assess poverty in any region or country. Alkire and Foster (2007) presented an enlarged methodological framework for the assessment of MDP that encompasses through the indicators of education, health and housing. In Pakistan, the deterioration of these indicators has resulted in a significant increase in the level of income poverty in the country (Awan et al. 2011b; Niazi and Khan 2012; Chaudary et al. 2010; Qureshi and Arif 2001). Realizing the importance of socioeconomic indicators, Naveed and Islam (2010) used the set of indicators to estimate MDP in the two provinces of Pakistan, i.e. Punjab and Khyber Pakhtunkhwa. They addressed education, health and nutrition, housing, source of lightning, access to safe drinking water, sanitation, assets, livelihood, child status, source of cooking and air quality, landholding and consumption. They critically examined the scorecard used for the identification of poor in the Benazir Income Sport Program in Pakistan. Similarly, an interim assessment of the World Bank (2001) highlighted the linkages of illiteracy, lack of health facilities, lack of access to other services, large family sizes, skewed pattern of land ownership, etc., with poverty in Pakistan.

This study uses the multi-dimensional approach to estimate the incidence of poverty in the Sindh province of Pakistan. It considers three main indicators/dimensions, i.e. education, health and housing facilities that comprise of ten variables (number of years of education, reading and writing ability, immunization, safe drinking water facility, prenatal and postnatal consultation, house occupancy status, access to electricity, access to gas,

access to telephone services and toilet facility). To best of our knowledge, it is the first attempt to assess the state of poverty using multidimensional approach in the Sindh province of Pakistan where magnitude of poverty is suspected to be much higher than other parts of the country. Methodology-wise, the approaches parallel to the traditional Foster Greer Thorbecke (FGT) class of poverty measures. However, this study has made some improvements to adjust the ordinal aspects of some of the attributes. Therefore, this improved approach could handle the cardinal as well as ordinal data for five time periods (1998–1999, 2001–2002, 2004–2005, 2005–2006 and 2007–2008). Besides contributing to formulate policy instruments conducive to reduce poverty, thereby enhancing the prospect of economic development, findings of this study will also supplement theoretical and empirical studies on MDP in developing countries.

## 2 Methodology

### 2.1 Description of the Study Area and Data Used

The study selected the province of Sindh to investigate the MDP due mainly to four reasons. First, to best of our knowledge, preceding studies did not investigate the issue of MDP in this province before. Second, there is suspected higher variation in the magnitude of MDP across the regions due to the primacy of provincial capital ‘Karachi’ in terms of economic activities and social facilities. Thirdly, the most regions of the province had been facing the severest climatic hazards. For instance, the province remained in the grip of droughts from 2001 to 2005 when summer monsoon failed to attain its active phase. Conversely, since 2005, the province has been under excessive rainfall and frequent flooding situation, resulting in higher poverty in the province compared to other provinces of Pakistan (Rasul et al. 2012). Lastly, the unequal distribution of land and resources is among the most critical problems in the province where strong feudalism or landlord system exists. Only a few landlord families, on average, thousands hectares of land whereas the majority of peasants are landless—locally called *Harees* (Hussain and Routray 2012). *Harees*, who are the poorest rural community, work as farm laborers or tenants for landlords. Though such cases can also be observed in other province yet the situation in the Sindh province is the worst. Based on the above four reasons, the socioeconomic data collected from other provinces of Pakistan may not be generalized for this province. In view of the chances of higher magnitude of poverty in the province, this study specifically targeted the Sindh province.

The required data of socio-economic data were obtained from the Household Integrated Economic Survey (HIES) and Pakistan Social and Living Standard Management Survey (PSLM) for five time periods, i.e. 1998–1999, 2001–2002, 2004–2005, 2005–2006 and 2007–2008. It is important to mention that HIES and PSLM are different names of the same survey conducted by same organization. However over the time, name of the survey was upgraded from HIES to PSLM with minor alterations (i.e. addition of some information on agriculture). Those alterations were not relevant to the data used for this study. Overall, sampling designs, sample size determination techniques, depth and form of collected information, and questionnaire structures remained almost the same in above-mentioned surveys. For this study, data sets for years 1998–1999, 2001–2002 and 2004–2005 were procured from HIES whereas datasets for years 2005–2006 and 2007–2008 were obtained from PSLM.

## 2.2 Assessment of Multidimensional Poverty

Recent studies on multi-dimensional assessment of poverty (Alkire and Seth 2013; Alkire and Roche 2013; Alkire et al. 2013; Alkire and Santos 2010; UNDP 2010b, 2013) considered three socio-economic dimensions, i.e. health, education and living standard. These studies used indicators of *nutrition* and *child mortality* for the dimension of 'health', *years of schooling* and *school attendance* for 'education', and *cooking fuel*, *sanitation*, *water*, *electricity*, *floor and assets* for the dimension of 'living standard'. In total, ten indicators/variables were used under the main dimensions. Following the same criteria, this study considered almost similar socio-economic dimensions comprising of the set of ten variables (Table 1). Initially, we planned to include 'food security' as an additional dimension but due to unavailability of data on proposed variables (i.e. calorie intake and dietary diversity), we excluded this from our proposed dimensions. Thus, only three dimensions as suggested by Alkire et al. 2013 were considered. However, the name of third dimension is suggested as 'housing' rather than 'living standard' due to the unavailability of the data on household assets. It was not justifiable to name the aspect as 'living standard' in absence of the indicator of household assets; therefore it was named as 'housing'. Also, information on indicators of *nutrition*, *child mortality*, *school attendance*, *cooking fuel* and *floor* were not available in HIES and PSLM data for the study area. Due to this data constraint, some of the alternative indicators were used for this study. For instance, five variables, i.e. *house occupancy status*, *access to electricity*, *access to gas*, *access to telephone services* and *toilet facility*, were used for aspect of 'housing'. Likewise, two variables, i.e. *number of years of education* and *reading and writing ability*, were used for 'education' whereas three variables, i.e. *immunization*, *safe drinking water facility* and *prenatal and postnatal consultation*, were used for 'health'. Total ten variables are taken under three socio-economic dimensions. In first stage of assessment, deprivation levels for health, education and housing were estimated using the methodology explained below. Finally, MDP was estimated for five time periods.

The methodological approach has taken into account the issues of weights assigning to attributes (variables) and the cutoff point for variables (Table 1) to estimate the deprivation level following the methodological advancement suggested by Alkire (2007). The estimation process is analogous to the standard measures of poverty but extended to enlist some of the ordinal aspects of data. The estimation scheme of MDP can be broken down into two phases, i.e. identification and aggregation phases. The identification phase based upon the dual cutoff method, where first threshold is used to differentiate the deprived from non-deprived in each dimension and the second is used across the dimension to identify the poor from non-poor. However, the aggregation step gathers the information regarding poor people and accomplished by defining a poverty line to explain the poor at the collective platform (Alkire and Foster 2008).

### 2.2.1 Identification Phase: Dual Cut-Off Criteria

This phase is characterized by dual cut-off process. The first cutoff is applied to identify the deprivation threshold that explains the criteria for each dimension to declare the individual or household as deprived or non-deprived, respectively. Generally, it is denoted by "z", where all the deprived level of achievements are normalized as " $(z_i - y_{ij})/z_i$ " and replaced with the positive non-zero values "1" for deprived and "0" otherwise (Table 1).

The second cutoff is applied to dichotomize the sampled data as poor and non-poor through constructing a vector by counting vertically each column and giving the number of

**Table 1** Description of dimensions and variables

Dimensions	Variables	Criteria for deprivation cut-off
Income (Y)	Uni-dimensional	If Income is <Poverty line then $\Psi D = 1$ , and 0 otherwise
Education ( $H_1$ )	Number of years of education	If highest class is $\leq 6$ then $D = 1$ , and 0 otherwise
	Reading and writing ability	If cannot Read and write in any language then $D = 1$ , and 0 otherwise
Health facilities ( $H_2$ )	Immunization	If not immunized then $D = 1$ , and 0 otherwise
	Safe drinking water facility	If source of water not piped then: $D = 1$ , and 0 otherwise
	Pre-natal consultation	If did not go for any pre-natal consultation then $D = 1$ , and 0 otherwise
Housing facilities ( $H_3$ )	House occupancy status	If house is not owned then $D = 1$ , and 0 otherwise
	Access to electricity	If electric connection is absent then $D = 1$ , and 0 otherwise
	Access to gas	If gas connection is absent then $D = 1$ , and 0 otherwise
	Access to telephone services	If telephone connection is absent then $D = 1$ , and 0 otherwise
	Toilet facility	If flush not connected to public sewerage/pit then $D = 1$ , and 0 otherwise

$\Psi$  Dummy variable

deprivation of each deprived person. The trivial application of dimensional cutoff such as “k” (the number of dimensions in which a person must be deprived in order to be declared as multidimensional poor) categorizes the multidimensional poor that should be greater than or equal to the cutoff point “k”.

### 2.2.2 Aggregation Phase: Multidimensional Headcount Ratio

Multidimensional headcount ratio represents the percentage of the poor population where individual is unit of analysis and it is denoted by “H”. The head count ratio is achieved through the application of aggregate cutoff point “k”. The value of cutoff point “k” is derived by dividing the number of dimensions by 2 and it is required to identify the multidimensionally poor (Naveed and Islam 2010). Alkire and Foster (2007) defined “k” as an integer between zero and “d” (number of dimensions) to classify the poor, i.e.  $c_i \geq k$ , where  $c_i$  denotes the cut-off within dimension. The general formula for the estimation of multidimensional headcount ratio can be derived as below:

$$H(X; z) = \frac{1}{n} \sum_{i=d}^n \left[ \sum_{j=1}^n g_{ij}(k) \right]^0 = \frac{q}{n}$$

where  $q$  = number of poor,  $n$  = total population

The estimation scheme is entirely parallel to the traditional measurement where headcount ratio “H” varies between 0 and 1. Though the multidimensional headcount ratio is simple to compute and easy to understand yet the measure has drawback of being a crude and partial index of poverty (Bourguignon and Chakravarty 2003). In addition to this, headcount ratio also violates the dimensional monotonicity, and the overall poverty scenario remains the same as if the deprivations of a person increase. Therefore, it is necessary

to adjust the headcount ratio to overcome the drawbacks. The adjusted headcount ratio is an appropriate measure that runs with ordinal as well as cardinal data. Thus, the measure is appropriate for different groups of population i.e. province, region, profession, race, etc., and is sensitive to the deprivations of the poor and the state of poverty varies as the number of deprivation increases. Moreover, it can be used for the groups of different sizes of population; so as to give meaningful comparisons across the space and over the time. Also, the measure can be broken down into dimensions to identify the share of each domain in the overall poverty (Alkire and Foster 2007). The adjusted headcount ratio elaborates the average deprivation gap, reflecting the additional information of the breadth of deprivation experienced by the poor. The adjusted headcount ratio is derived as the total number of deprivations of the poor divided by the maximum possible number of deprivations (Alkire and Foster 2007). Alternatively, “ $M_0$ ” can also be explained as the product of multidimensional headcount ratio “ $H$ ” and average deprivation gap “ $A$ ”, and it can be expressed as below:

$$M_0 = HA$$

where,  $H$  = Multidimensional headcount ratio,  $A$  = Average deprivation gap and  $A = \sum_i (c_i^*/d)/q$ .

Following the method explained by Alkire et al. (2013), this study adopted the equal weighting structure among the three domains i.e. education, health and housing facilities, and also across the several attributes. For instance, weight of 1/3 was given to each dimension. Within the dimension of education, equal weight of 1/6 was assigned to each indicator. Likewise, weight of 1/9 was given to each indicator of health. Similarly, weight of 1/15 was given to each indicator of the dimension of housing. According to Krujik and Rutten (2007), the application of weights ideally reflects the relative importance of the different aspects among the sets of attributes. Similarly, Noble et al. (2009) argued that the presence of separate deprived dimension enables the researchers to explicitly control the weights assigned to each of the domains. The appropriate way to assign weight in the measurement of MDP is to arrange the equal weights to each dimension that is logical in the absence of justifiable reason for giving more weight to one dimension than other (Chakravarty et al. 2008; Foster 2007). Moreover, a comparison of MDP across the time and region would not suffer significantly under equal weight scenario as against unequal configuration.

### 3 Results

#### 3.1 Absolute Poverty

The state of absolute poverty (AP) has been estimated to investigate the proportion of the poor population living below the national poverty line. Although it was not included in the main objective of this study yet it would provide better understandings while comparing the both absolute and MDP situations. Estimates showed that overall the level of AP declined significantly in the province particularly in the urban areas from 1998–1999 to 2007–2008 (Table 2). However, this reduction has not been consistent if we the minimal rises in 2001–2002 and 2005–2006 are taken into account. Among the five regions compared, Karachi showed the least level of AP in all time periods particularly in 2007–2008 (nearly 2 %) due to its primacy in economic and social advancement as compared to other



regions in the province. Surprisingly, the level of AP in rural areas showed considerable decline suddenly after 2005–2006 and remained only 5 % in 2007–2008 (Table 2). On the other hand, Larkana was identified as the region with the highest level of AP that was above 54 % in 1998–1999. However, the magnitude of poverty reduced from nearly 54 % in 2001–2002 to around 28 % in 2004–2005 but it rose again in 2005–2006. Nevertheless, it depicted the reduction of nearly 8 % in 2007–2008 compared to the previous year. Almost similar patterns of changes were observed in the cases of urban and rural poverty however the magnitude of rural poverty had been much higher than the urban poverty in all time periods.

Likewise, other regions, i.e. Sukkar, Hyderabad and Mirpur-khas, revealed zigzag patterns of changes in magnitude of poverty over the time and remained with above 20 % poor population in 2007–2008. However, urban areas of Hyderabad had nearly 10 % level of AP in 2007–2008 despite the fluctuating changes over the time. Logically it may happen due to the fact that urban areas of Hyderabad comprise of the metropolitan area of Hyderabad city, which is the second largest city of the province after Karachi. Therefore, people may have better income opportunities due to its diversity in economic activities. Overall, the region of Hyderabad had nearly 17 % people living below the national poverty line in 2007–2008.

### 3.2 Multidimensional Poverty

Estimates of MDP revealed the better understanding of the extent of poverty considering the aspects of education, health and housing facilities. Statistics are different from estimates of AP in terms of both magnitude and variation across the regions. The incidence of MDP in the province reduced slightly over the time. However, the magnitude of urban poverty increased by nearly 3 % in 2007–2008 compared to 1998–1999 (Table 3) whereas the magnitude of rural poverty minimally declined. Among the regions compared, Karachi was identified as the region with the least level of MDP ranging 16–19 % in all time periods from 1998–1999 to 2007–2008. Moreover, MDP in rural areas of this region showed significant decline over time whereas condition in urban areas did not show considerable change despite some fluctuation during the period of 10 years.

Mirpur Khas was identified as the region with the highest magnitude of MDP in almost all time periods except 2007–2008. However, magnitude of poverty remained the highest as far as rural areas are concerned despite some decline over the time (Table 3). As far as urban areas are concerned, Larkana region had the highest incidence of MDP in almost all time periods ranging from 48 to 54 %. Overall, all regions showed certain degree of fluctuation in magnitude over the years without certain consistency in declining trend. In general, it can be stated that magnitude of MDP was significantly higher than AP, and it did not show consistency in trend of reduction over the time at regional level. However, situation has improved as compared to the year 1998–1999. Important finding emerged from the estimates is that AP cannot depict the right picture of social wellbeing as the MDP can.

Above results revealed that the magnitude of MDP poverty remained considerably greater than the magnitude of AP for almost all regions in all five-time periods (Tables 2, 3). For instance, in 2007–2008, the magnitude of AP was around 20 % in Sukkar compared to the magnitude of MDP that was nearly 43 %. Likewise, substantial difference between the magnitudes of AP and MDP was observed in rural and urban areas of the same region. Such difference was consistent in the case of other regions as well. Another example, in Karachi region, the difference was overwhelmingly higher where magnitude of AP was nearly 2 %. However, the estimated MDP remained nearly 17 % (Tables 2, 3). Rarely, it



**Table 2** Estimates of absolute Poverty in five regions of the Sindh province

Regions	Headcount ratio (%)					National poverty line
	1998–1999	2001–2002	2004–2005	2005–2006	2007–2008	
<i>Sukkar</i>						
Overall	33.8	46.5	30.4	24.8	20.4	
Urban	15.1	28.5	23.0	19.6	9.6	
Rural	37.8	52.0	33.3	27.0	24.5	
<i>Larkana</i>						
Overall	54.1	54.1	28.4	45.6	37.9	
Urban	40.8	32.8	26.0	36.1	20.0	
Rural	56.8	61.2	29.2	48.5	44.1	
<i>Hyderabad</i>						
Overall	24.3	30.3	28.3	31.0	17.5	1998–99: Rs. 673.54/month/AE*
Urban	14.3	23.9	9.5	15.1	9.7	2001–02: Rs. 723.40/month/AE
Rural	30.6	33.0	37.1	41.9	23.2	2004–05: Rs. 878.64/month/AE
						2005–06: Rs. 944.47/month/AE
						2007–08: Rs. 1141.53/month/AE
						(Planning Commission of Pakistan 2010, pp. 17–30)
<i>Mirpur Khas</i>						
Overall	31.2	58.4	27.8	38.6	25.4	
Urban	25.2	34.5	18.0	25.2	17.1	
Rural	32.1	63.6	32.2	43.1	28.4	
<i>Karachi</i>						
Overall	6.7	8.0	3.9	4.6	1.8	
Urban	5.4	5.7	2.9	3.4	1.5	
Rural	14.9	29.7	14.7	16.4	5.0	
<i>Sindh</i>						
Overall	27.3	37.1	23.6	28.5	20.4	
Urban	11.7	17.1	11.2	14.2	8.5	
Rural	37.7	50.1	32.7	38.7	29.0	

Rs denotes Pak rupees, Rs. 97 = 1USD (reference period January 2013)

\* Adult equivalent

**Table 3** Estimates of multidimensional poverty in five regions of the Sindh province

Regions	Multidimensional poverty 'M0' (%)				
	1998–99	2001–02	2004–05	2005–06	2007–08
<i>Sukkar</i>					
Overall	47.91	49.63	46.46	43.81	42.63
Urban	27.87	37.21	27.00	32.65	32.21
Rural	51.92	53.31	53.85	48.18	46.59
<i>Larkana</i>					
Overall	51.34	49.93	43.94	46.64	45.67
Urban	37.29	39.46	35.37	37.73	37.53
Rural	54.00	53.26	46.72	49.21	48.29
<i>Hyderabad</i>					
Overall	44.45	46.64	43.51	40.12	38.94
Urban	28.58	33.98	26.18	25.78	27.85
Rural	53.75	51.90	51.28	49.58	47.12
<i>Mirpur Khas</i>					
Overall	55.54	51.35	47.29	46.93	44.89
Urban	39.79	36.47	31.06	32.07	32.72
Rural	57.84	54.33	54.05	51.68	49.03
<i>Karachi</i>					
Overall	18.86	22.79	17.94	20.14	16.79
Urban	15.21	20.93	14.45	18.42	15.10
Rural	41.08	39.52	50.49	37.70	33.04
<i>Sindh</i>					
Overall	41.54	43.58	39.72	39.78	38.40
Urban	22.30	28.70	22.75	25.88	25.50
Rural	53.32	52.68	51.27	50.11	47.29

happened that AP was higher than the MDP. For example, in 1998–1999, the magnitude of AP was slightly higher than MDP in Larkana region.

#### 4 Discussion

Despite the solemn efforts of policy makers and planners in Pakistan, the magnitude of poverty has not decreased as it was expected. Drifts of changes are not consistent over the time of 10 years. For instance, in 1 year the magnitude declined but it rose in the following year. Particularly, in 2001–2002, both absolute and MDP levels increased substantially. Some of the studies (Husain 2004) argued that political instability after military take over in 2000 resulted in deterioration of socio-economic development in Pakistan. Political instability may be among possible reasons of reduced government spending on socio-economic development. However, this logic is not 100 % justifiable as a net reduction in health deprivation was observed in 2001–2002 compared to previous time period, i.e. 1998–1999. It shows that there are some other key factors, i.e. corruption in development projects and poor education system (i.e. least assistance to poor students), may be resulting

**Table 4** Deprivation of education, health and housing facilities (1998–99)

Regions	% Deprivation (equal weight method)			
	Education (H <sub>1</sub> )	Health facilities (H <sub>2</sub> )	Housing facilities (H <sub>3</sub> )	Overall (H)
<i>Sukkar</i>				
Overall	63.3	49.75	87.5	66.18
Urban	46.0	26.1	46.7	39.20
Rural	67.3	53.65	96.1	71.62
<i>Larkana</i>				
Overall	71.3	53.5	90.7	71.11
Urban	57.3	29.95	74.2	53.27
Rural	74.4	57.2	94.1	74.48
<i>Hyderabad</i>				
Overall	64.4	47.2	75.0	61.57
Urban	51.2	28.75	42.9	40.54
Rural	73.7	55.25	95.1	73.93
<i>Mirpur Khas</i>				
Overall	75.9	62.2	92.8	76.19
Urban	52.1	47.6	68.5	55.50
Rural	79.9	63.7	96.5	79.23
<i>Karachi</i>				
Overall	45.5	15.1	21.9	27.22
Urban	42.2	12.2	12.7	22.14
Rural	69.5	27.05	81.8	58.85
<i>Sindh (overall)</i>				
Overall	61.4	44.25	68.7	57.53
Urban	46.1	20.5	29.7	31.77
Rural	73.0	55.15	94.7	73.54

in increased deprivation of education particularly in the rural areas. Overall, it seems that somehow poverty has decreased if we compare the first time period (1998–1999) with the ultimate period (2007–2008). Among the five regions compared, Karachi showed the least level of poverty in terms of both absolute and multidimensional estimates (Tables 2, 3) due mainly to the lower levels of deprivation of health and housing facilities. However, in rural areas of this region, the level of deprivation was higher that is why the magnitude of MDP remained quite higher than urban areas during the period of 10 years (Tables 4, 5, 6, 7, 8). Interestingly, the deprivation level of education in urban areas was unexpectedly higher in this region despite being the biggest city of Pakistan. Moreover, in rural areas of this region deprivation of housing facilities was also higher, resulting in higher magnitude of MDP compared to urban areas.

Larkana was classified as the region with the highest AP yet the assessment of MDP revealed that Mirpur Khas was the most poor region with nearly 55, 51, 47, 47 and 45 % levels of MDP during the time periods 1998–1999, 2001–2002, 2004–2005, 2005–2006 and 2007–2008, respectively. The magnitude of poverty was significantly higher in the rural areas. In this region, higher deprivation of education and housing facilities is very serious concern in both urban and rural areas, resulting in very high magnitude of MDP.

**Table 5** Deprivation of education, health and housing facilities (2001–02)

Regions	% Deprivation (equal weight method)			
	Education (H <sub>1</sub> )	Health facilities (H <sub>2</sub> )	Housing facilities (H <sub>3</sub> )	Overall (H)
<i>Sukkar</i>				
Overall	87.7	41.65	88.0	71.72
Urban	78.4	28.45	56.8	54.00
Rural	90.6	45.05	97.5	76.93
<i>Larkana</i>				
Overall	89.7	39.15	89.2	71.95
Urban	81.2	24.75	68.6	57.60
Rural	92.6	43.3	96.0	76.52
<i>Hyderabad</i>				
Overall	88.2	33.95	82.4	67.50
Urban	79.9	20.4	50.7	49.83
Rural	91.9	38.85	96.2	74.89
<i>Mirpur Khas</i>				
Overall	92.5	38.9	93.5	74.21
Urban	80.0	19.4	63.6	53.79
Rural	95.2	42.35	99.7	78.29
<i>Karachi</i>				
Overall	71.6	14.05	15.6	33.41
Urban	69.5	12.05	11.6	30.73
Rural	91.3	31.2	52.6	57.78
<i>Sindh (overall)</i>				
Overall	85.2	33.85	71.8	62.98
Urban	74.6	18.05	34.7	42.02
Rural	92.3	42.05	95.7	75.91

Not only in this region but other three regions also, i.e. Sukkar, Larkana and Hyderabad, the deprivation of education and housing facilities are seriously high (Tables 4, 5, 6, 7, 8) implying that magnitude MDP is considerably influenced by these dimensions. Deprivation levels are even higher in rural areas resulting in comparatively higher poverty. However, deprivation level of health facilities is relatively lower than other deprivation of other two dimensions yet not satisfactory.

This study found that magnitude of MDP estimated by using Alkire method was considerably greater than that of AP. This is not a common finding while applying the Alkire method. Rather, level of MDP may be less than AP in the case of developed countries where basic socioeconomic indicators, i.e. basic health facilities, school education and housing, are either provided on discounted rates or free of cost by the governments. However in most developing countries, such socioeconomic facilities are neither discounted nor free of cost. Therefore, the people have to spend money to attain the facilities like education, health and housing. A household may be marginally above the national poverty line but during making choices regarding the procurement of basic needs, the household head may prefer one facility to other. For example, he/she may choose to fulfill day-to-day food requirements of the family than providing education to children or

**Table 6** Deprivation of education, health and housing facilities (2004–05)

Regions	% Deprivation (equal weight method)			
	Education (H <sub>1</sub> )	Health facilities (H <sub>2</sub> )	Housing facilities (H <sub>3</sub> )	Overall (H)
<i>Sukkar</i>				
Overall	80.0	53.1	65.2	65.43
Urban	62.9	27.3	27.7	38.90
Rural	86.7	62.6	79.9	75.63
<i>Larkana</i>				
Overall	85.3	36.35	70.8	63.50
Urban	76.9	27.05	53.7	52.02
Rural	88.1	39.4	76.5	67.32
<i>Hyderabad</i>				
Overall	79.9	36.35	74.3	62.88
Urban	65.8	19.2	30.5	38.11
Rural	86.8	43.0	94.8	74.11
<i>Mirpur Khas</i>				
Overall	83.2	46.5	75.0	67.55
Urban	68.3	29.1	41.0	45.67
Rural	90.1	52.6	90.3	76.89
<i>Karachi</i>				
Overall	51.6	16.65	9.1	25.52
Urban	48.6	10.8	4.7	21.15
Rural	87.8	64.5	60.8	70.32
<i>Sindh (overall)</i>				
Overall	75.4	38.65	58.4	56.90
Urban	59.0	19.45	22.2	33.21
Rural	87.7	49.65	84.6	73.24

attaining some housing related facility. Consequently, the deprivation levels of ignored socioeconomic aspects will either remain at the same level or will rise over the time. It is observed that countries with such situation face cyclic poverty where socioeconomic variables are not only the indicators of poverty but also become the causes of poverty. The most prominent examples of such countries are South Asian and Sub-Saharan countries. Specifically, the South Asian countries, i.e. India, Pakistan, Bhutan, Nepal and Bangladesh, have greater magnitude of MDP with nearly 54, 49, 27, 44 and 58 %, respectively compared to that of AP with nearly 30, 22, 23, 25 and 31 % (UNDP 2013: pp. 160–161). Thus, the findings of this study are consistent with the fact explained above.

As reported elsewhere (Preece 2006), the lack of education, insufficiency of health facilities, poor housing facilities (e.g. safe drinking water), are the main indicators of MDP in developing countries. Bourguignon and Chakravarty (2002) also explored that poverty arises due to insufficiency of different attributes such as housing, health, literacy, inadequacy of public services and income, which are necessary to get the sustainable living standard. Findings of this study are consistent to such arguments. Moreover, it also validates the findings of preceding studies (Niazi and Khan 2012; Arif 2006a, b; Nasir and

**Table 7** Deprivation of education, health and housing facilities (2005–06)

Regions	% Deprivation (equal weight method)			
	Education (H <sub>1</sub> )	Health facilities (H <sub>2</sub> )	Housing facilities (H <sub>3</sub> )	Overall (H)
<i>Sukkar</i>				
Overall	83.9	27.95	82.5	64.14
Urban	75.7	15.85	54.4	48.16
Rural	87.2	32.05	93.9	70.34
<i>Larkana</i>				
Overall	88.6	29.10	89.2	68.28
Urban	80.2	19.35	69.6	55.82
Rural	91.2	31.40	95.1	71.84
<i>Hyderabad</i>				
Overall	83.8	23.40	71.3	58.91
Urban	71.5	9.30	35.1	38.25
Rural	92.4	31.90	96.0	72.70
<i>Mirpur Khas</i>				
Overall	87.7	33.50	86.7	68.61
Urban	76.6	15.80	52.0	47.65
Rural	91.5	38.30	98.5	75.34
<i>Karachi</i>				
Overall	67.3	8.50	14.5	29.80
Urban	65.2	8.50	8.4	27.09
Rural	89.0	8.75	72.5	56.18
<i>Sindh (overall)</i>				
Overall	82.1	25.4	69.0	58.25
Urban	70.9	12.5	32.6	38.28
Rural	90.4	36.6	95.0	73.26

Nazli (2000) conducted in other provinces of Pakistan. Particularly, the deprivation of education and housing facilities has been identified as the most important indicators the MDP. Although various studies on poverty in Pakistan (Awan et al. 2011b; Arif 2006a, b; Nasir and Nazli 2000; Qureshi and Arif 2001; Chaudarty et al. 2010; Jamal 2009; Naveed and Islam 2010; Niazi and Khan 2012) have already discussed the need of improvement in the indicator of education yet the issue of provision of adequate health and housing facilities still need due attention to enhance social welfare. Since the health facilities are slightly better in terms of level of deprivation than other two dimensions but far less satisfactory with the poverty reduction point of view. All three dimensions can not be improved directly rather a complete strategic approach may reduce the socioeconomic deprivations through improvement in other supplementary factors, i.e. problem of agriculture-based livelihood, large household sizes, higher dependency ratio and limited non-farm employment opportunities (Datt and Jolliffe 1999), which may result in better income and subsequent improved access to educational, housing and health facilities (Arif 2000; Chaudhry 2009; Datt and Jolliffe 1999; Arif 2004).

**Table 8** Deprivation of education, health and housing facilities (2007–08)

Regions	% Deprivation (equal weight method)			
	Education (H <sub>1</sub> )	Health facilities (H <sub>2</sub> )	Housing facilities (H <sub>3</sub> )	Overall (H)
<i>Sukkar</i>				
Overall	84.4	22.65	83.5	62.88
Urban	74.1	12.90	57.4	47.65
Rural	88.4	26.05	93.5	68.62
<i>Larkana</i>				
Overall	86.7	27.85	88.7	67.07
Urban	79.6	19.75	68.9	55.52
Rural	89.2	29.85	95.5	70.80
<i>Hyderabad</i>				
Overall	82.7	19.75	72.1	57.60
Urban	73.2	14.35	36.9	41.07
Rural	89.9	23.30	98.0	69.70
<i>Mirpur Khas</i>				
Overall	88.4	24.40	88.1	66.30
Urban	77.6	14.25	55.7	48.69
Rural	92.3	27.45	99.4	72.32
<i>Karachi</i>				
Overall	62.7	6.15	6.5	24.87
Urban	60.8	4.10	3.1	22.44
Rural	84.5	20.40	43.2	48.87
<i>Sindh (overall)</i>				
Overall	81.2	21.35	69.1	56.64
Urban	69.7	11.70	32.9	37.72
Rural	89.6	26.45	95.0	69.65

## 5 Conclusion

Globally, poverty concerns have progressed into the socio-economic concept and it has gone beyond the monetary aspects. In this regard, the inclusion of important socio-economic dimensions in the assessment of poverty has provided better understanding of magnitude of poverty. Taking into account three important dimensions, i.e. education, health and housing facilities, this study assessed the MDP of the province of Sindh in Pakistan, and found that magnitude of MDP is much higher than the AP in all regions compared, i.e. Karachi, Larkana, Hyderabad, Mirpur Khas and Sukkar. Overall, level of MDP at both provincial and regional levels showed minuscule decline over the period of 10 years (1998–1999 to 2007–2008) yet the declining trend was not consistent. Karachi was identified multidimensionally as the least poor region whereas Mirpur Khas was identified as the most highly poor region during the observed five periods (1998–1999, 2001–2002, 2004–2005, 2005–2006, 2007–2008). Notably, the situation is even worse in the rural areas. Higher levels of deprivation of education, health and housing facilities are the main factors of causing higher magnitude of MDP. Particularly, the degree of deprivation of education and housing facilities is seriously high and needs to be improved.



Although the deprivation level of health facilities is relatively lower in almost all regions yet it is far less satisfactory as well.

Based on the findings, the issue of poverty may be addressed through adopting a strategic integrated approach that could be designed to improve the facilities of education, health and housing in Pakistan. Remedying multiple domains is very important to meet the international standards of wellbeing and focus on the core objectives of poverty alleviation as established by the millennium development goals. Assessment of poverty based on merely monetary aspects is not justifiable to claim the success of poverty reduction efforts. In line with the findings of this study, some specific suggestions are made. Primarily, government may improve the education primary and secondary through improving infrastructure, primary enrollment, controlling dropout rate and providing some incentives of scholarships/stipends for food and books to low income groups. Moreover, provision of easy access to technical education for poor students may also improve the chances of income by providing skills to start non-farm earning enterprises (Chawanote and Barrett 2012). A rise in education level and improvement in technical skills will raise household income levels and subsequently the chances of better access to housing facilities as well. Cognizant of the higher MDP in rural areas, earning opportunities in the agriculture sector may also be improved through providing subsidized inputs, easy access to adequate credit, needed extension services and provision of farm machinery services at farm level by local agriculture departments at subsidized rent. Moreover, effective marketing system, particularly the procurement system, will also contribute to enhance income margins of rural people (Hussain and Routray 2012). Likewise, the provision of health facilities is also imperative to overcome the issue of MDP in general and particularly in the most affected areas. In this regard, the government may increase in the number of well-equipped hospitals along with adequate trained staff particularly in the rural segment of the population. Very importantly, wherever hospitals are already established, the local management may ensure the working of staff as per assigned duties, and easy access to deprived people to the health facilities. In most areas of Pakistan particularly rural areas, hospitals are established and staff is appointed but they do not perform their duties as per assigned schedule. Therefore, not only the hospitals but also effective working of staff is important to facilitate the poor segment of the society.

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