Multidimensional Child Poverty Measurement and Its Mapping: Case of Balochistan, Pakistan

ABDUL HAMEED and IHTSHAM UL HAQ PADDA

The progress of Pakistan remained poor in human development indicators, especially health, education, stunting, living standard, food security, malnutrition and unemployment. It is a very alarming condition for the Pakistan future that 44 percent of children under five years old are facing stunting. It is notable that poverty levels in Balochistan province of Pakistan are comparatively high. This study uses Multiple Indicator Cluster Survey (2010) data of Balochistan, for estimation of multidimensional child poverty and deprivation with multiple dimensions using Multiple Overlapping Deprivation Analysis (MODA). The results show that 71 percent children under five years of age are deprived in nutrition, health, child development, housing and sanitation. A significant difference exists between the rural and urban multidimensional deprivation as 75 percent of rural children are deprived as compared to the 57 percent of urban. The study results call for more investment in child poverty reduction sectors by provencial and central governments. The focus should be on provision of economic opportunities, health, education, nutrition to enhance the regional and area level living standards.

Keywords: Child Poverty, MODA, Balochistan, Deprivation

1. BACKGROUND

Child poverty is an imperative problem for developing countries. The child's depreviation level vary greatly, ranging from meterial depreviation to access to better socioeconomic status. Children grown up in poverty are assumed to be poor in their adulthood as poverty itself is considered a vicious cycle [Roelen, Gassmann, and de Neubourg (2011); Minujin (2012)]. However, investment in under-five children can lead to permanent effects in reduction of poverty and adult outcomes [Porter (2013)].

Children are deprived if they face severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. Overall, the literature on child poverty emphasises that household's income alone, although a good predictor of child poverty, but children's rights are not well expressed [Minujin (2012); Roelen, Gassmann, and de Neubourg (2011)]. The current practice points towards a need to apply a child-centered multidimensional approach when measuring child poverty, recognising that children's needs are age specific and multidimensional. Dimensions of multidimensional child poverty are different from overall multidimensional poverty. Child poverty indicators are proper nutrition, adequate health, child development and basic concepts, availability of proper housing, safe drinking water and hygienic proper sanitation facilities. The children of the today will be the wealth of tomorrow. It is the basic responsibility of government to provide facilities regarding education, healthcare, food and nutrition security and poverty reduction.

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Pakistan is facing sustainable development deprivation and wellbeing issues. The official statistics show material poverty in Pakistan's 29.5 percent [ADB (2017)]. A study by the government of Pakistan in 2016 coordinated by Oxford Poverty and Human Development Initiative and United Nations Development Programme, depicts that 19.7 percent population of Pakistan is multidimensional poor while in Punjab, Sindh, Khyber Pakhtunkhwa (KP) and Balochistan 15.2 percent, 23.1 percent, 25 percent, 39 percent population is poor, respectively [Pakistan (2016)]. It is notable that poverty levels in Balochistan are comparatively high. No doubt overall poverty affects the child poverty. As per the economic condition of Pakistan, the province Balochistan is also facing the same challenges in health, education, stunting, living standard, food security, malnutrition and unemployment. It is the largest by area and smallest by population province in Pakistan. The Balochistan's economy is based on agriculture, livestock, fisheries and mineral resources like production of gas, coal, iron, sulphur, marble, limestone, etc. But lowest in the social welfare, education, health and living standard [Haq and Farooq (2016)].

Keeping in view the socioeconomic conditions of Pakistan, the main objective of this study is estimated and map multidimensional deprivation under the five years children at divisional and aggregate levels. Finally to link expected returns with socioeconomic of the society and children. On the basis of robust analysis the results will be used to develop policies at the local and sub-regional (Divisional) level for the marginalised people of Balochistan.

2. DATA AND METHODOLOGY

2.1. Data

This study uses the Multiple Indicator Cluster Survey, 2010 [MICS (2010)] data to assess the multidimensional child poverty in Balochistan, a province of Pakistan. The MICS is an international household survey data that provides diverse information at the household and child level with the wide range of socioeconomic and sustainable development indicators. It is suitable for the analysis of child deprivation [Ferron and Chzhen (2015)]. MICS Balochistan, 2010 is a divisional administrative based survey that provides the key social and Sustainable Development Goals (SDGs) indicators like education, health, clean drinking water, sanitation, energy, etc. This study uses 7,895 children under five from 5,390 households at the divisional administrative level (Quetta, Kalat, Sibi, Zhob, Nasirabad, Mekran) (see Table 1). Except MICS (2010) no other data are suitable/available for estimation of child poverty of Balochistan.

Table 1

Divisional Base Data Distribution

Region	Number of Children	Number of Households
Quetta	1,766	995
Kalat	1,664	1263
Sibi	1,144	862
Zhob	1,644	1059
Nasirabad	1,088	765
Mekran	589	446
Total	7,895	5390

2.2. Methodology

There are many approaches that used to measure the child poverty. The Monetary, Bristol and Alkire-Foster approaches are the widely used in developed and developing countries. The Monetary and Bristol approaches did not capture the depth and breadth of child poverty. Also, the head count can't decentralise into age, sex, region or orphan-hood status. The next, Alkire and Foster approach is a new innovation to measure the multidimensional deprivation at the household and individual level. Alkire and Foster approach is a dual cut-off approach. It is followed by the unidirectional and intersection or intermediate approaches. Unidirectional approach means counting the number of poor, those deprived in any given dimension and intersection or intermediate approach summarise the number of poor, those deprived in all dimensions or specified number of dimensions.

This study uses the United Nations Children's Fund UNICEF's Multiple Overlapping Deprivation Analysis (MODA) methodology for the estimation of multidimensional child poverty in Balochistan [Ferron and Chzhen (2015) and Bruckauf (2014)]. The MODA methodology provides the comprehensive approach to the multidimensional aspects of child poverty and deprivation with multiple dimensions and indicators [Plavgo, *et al.* (2013)]. This comprehensive approach basically followed by the Alkire and Foster approach. Due to data availability and constraints, there are a few limitations of MODA approach: the primary weakness of MODA approach is weights. There is no any scientific technique for assigning weights to each indicator and dimension. MODA approach assumes equal importance of all indicators and dimensions for different age group children. The second weakness of MODA is overlapping deprivation. This is due to the absence of all indicator data for all children. Some indicators are used for under the age of 2 years and some are used for under the age of 3 up to 5 years. The gap between ages covered by the single and overlapping deprivation analysis. Furthermore, decomposition analysis provides the complete[1] picture of child deprivation contribution into overall multidimensional poverty. This comprehensive approach re-construct by the UNICEF office of research with the collaboration of policy and strategy division for the analysis of children's well-being. MODA has the four main characteristics that distinguished from the most existing studies.

- First, it uses children as the unit of analysis, rather than the household level analysis
- Second, the life-cycle approach is used to assess the separate age group deprivation like early childhood, primary childhood and adult.
- Third, it uses a single approach (nutrition, health, education, child development, and living standard) with an overlapping analysis.
- Fourth, it uses whole-child oriented view with geographical and social position.

This section provides the step-by-step process and decision to be taken for the multidimensional deprivation.

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[1]The world "complete" used under the certain limitations of data; these are the country basis limitations as per the usage of available data.

2.2.1. *Step 1-Choose Field, Domains and Indicators of Child Well-being*

   MODA is child deprivation analysis based method, meaning that any filed, domains, indicators of child well-being can be used. This study uses five dimensions with fifteen indicators for the estimation of multidimensional deprivation filed (see Table 2).

Table 2

Multidimensional Child Poverty Dimensions, Indicator and Threshold

Dimension	Indicator	Indicator Definition and Threshold
Nutrition	Underweight	Weight-for-age z-score < -2 under the age of 5 years (NCHS)
	Stunting	Height-for-age z-score < -2 under the age of 5 years (NCHS)
	Wasting	Weight-for-height z-score < -2 under the age of 5 years (NCHS)
Health	Infant and Young Child Feeding	A child age of under 2 years currently never breastfeeding
	Immunisation against Measles or MMR	A child ever given Measles or MMR vaccination under the 5 years
	Immunisation against Polio	A child ever given Polio vaccination under the 5 years
Child Development	Identification of alphabets	A child age of 3 up to 5 years cannot identify at least 10 letters of the alphabet
	Identification of numbers	A child age of 3 up to 5 years does not know name and recognised symbols of all numbers from 1 to 10
	Children's Toys	A child under the age of 5 years does not play with toys from a shop
	Children's Books	A child under the age of 5 years does not have any children's books or picture books
	Early Childhood Education Programmes	A child ages 3 up to 5 years does not attend an early childhood education programme
Housing	Overcrowding	A Household has more than four people sleeping per room on average
	Cooking Fuel	Type of fuel used for cooking is kerosene, coal/lignite, charcoal, wood, straw/shrubs/grass, animal dung or agricultural crop residue
	Flooring	The main material of the dwelling floor is earth/sand or dung
Water and Sanitation	Safe Drinking Water	A child uses water from unprotected well, unprotected spring or surface water and/or the source of drinking water is not within a distance of 30 minutes' walk (round trip)
	Access to Toilet	A child has access to unimproved sanitation facilities such as pit latrine without slab/open pit, bucket or has no facility i.e. bush/field

2.2.2. *Step 2-Define Deprivation and Specify its Dimensions*

● **Nutrition**

Nutritional well-being is not just a basic human right. It is more important for the human capital development. Children under five years of age in the developing country are facing malnutrition, due to the lack of adequate food and poor health [Reinhard and Wijayaratne (2002)]. There are different indicators (Underweight, Stunting and Wasting) used to assess the malnutrition in children under five [Maken and Varte (2012)]. This study uses anthropometric measurements, underweight (weight-for-age), stunting (height-for-age), wasting (weight-for-height) and infant and young child feeding for the evaluation of insufficient nutrition in children under five. The infant and young child feeding are also the most important role in the growth and development of children under five. This study uses the given Z-score of MICS under the United Stated National Centre for Health Statistics (NCHS) threshold guideline for the deprivation of underweight, stunting and wasting [Wang and Chen (2012); Maken and Varte (2012); Reinhard and Wijayaratne (2002)]. A child is considered to be deprived in underweight, stunting, wasting and young child feeding as follow;

- Underweight = Weight-for-age z-score < -2 under the age of 5 years (NCHS)
- Stunting = Height-for-age z-score < -2 under the age of 5 years (NCHS)
- Wasting = Weight-for-height z-score < -2 under the age of 5 years (NCHS)
- I &YCF = A child under 2 years of age currently never breastfeeding (WHO).

● **Health**

The 3rd important goal of sustainable development is health "Ensure healthy lives and promote well-being for all at all ages" [UNDP (2016)]. This study uses immunisation against Measles or MMR and polio indicator for the estimation of health dimension. A child is deprived in the immunisation against measles or MMR and polio if s/he not ever given measles or MMR and polio vaccination under the 5 years.

● **Child Development**

Child development dimension includes child education and development activities. A child (3 up to 5 years) is deprived in the child development if se/he cannot identify at least 10 letters of the alphabet or does not know name and recognised symbols of all numbers from 1 to 10 or does not attend an early childhood education programme and child (under 5 years) does not play with toys from a shop or does not have any children's books or picture books [UNICEF (2015)].

● **Housing**

Housing dimension includes overcrowding, cooking fuel and flooring to assess the living stander of children under five. A child is deprived in the housing if s/he lives in a household where more than four people sleeping per room on average or household used for cooking is kerosene, coal/lignite, charcoal, wood, straw/shrubs/grass, animal dung or agricultural crop residue or main material of the dwelling floor is earth/sand or dung.

- **Water and Sanitation**

A child is deprived in water and sanitation dimension if s/he uses water from unprotected well, unprotected spring or surface water and/or the source of drinking water is not within a distance of 30 minutes' walk (round trip) or has access to unimproved sanitation facilities such as pit latrine without slab/open pit, bucket or has no facility i.e. bush/field [UNICEF (2015)].

2.2.3. *Step 3- Choose a Unit of Analysis*

This study uses child as a unit of analysis with the combination of household and the child level datasets of MICS. The dimension nutrition, health and child development are used from the child level dataset and dimension housing, water and sanitation are used from the household level dataset.

2.2.4. *Step 4- Define Weights*

According to the MODA methodology, all the deprivation is equally important. It means that this study no explicit weighting assign, it should be noted that implicitly equal weighting assign to the each dimension (see Table 2).

2.2.5. *Step 5-Define Cut-Offs*

MODA also followed by the dual cut off approach that explained above. The selection of any of these approaches stipulated well-known information or judgment taking into consideration. To avoid this decision, MODA presents results at all possible cut-off points. This study followed by the union and intermediate cut-off approaches for the identification of single and multidimensional deprivation. This study uses a union approach at the single dimension level analysis: A child s/he will be considered multidimensionally deprived in the specific dimension if s/he experiences at least one deprivation in the specific domain indicator and intermediate approach uses at the aggregate level analysis: A child s/he will be considered multidimensionally poor at overall if s/he experiences more than three dimensions deprived. mostly, multidimensional studies used 1/3 (.33) score as a cut-off at the overall estimation of multidimensional poverty and some developing coutries suggest fexible cut-off at ½ (.50) or ½.5 (0.40). This sudty suggest soft cut-off point at K>3 out of 5 dimensions (0.60) to assess the overall multidimensional poverty in Balochistan beucause Balochistan is more deprive in household income, employment, health, education and infrastuecture as compared to the other provinces of Pakistan.

2.2.6. *Step 6-Single Deprivation by Indicators and Dimensions*

This study uses the deprivation status headcount ratio for the each indicator and dimension according to the threshold definition (see Table 2). The headcount ratio means that the number of children deprived in the respective indicator or dimension as a share of the total number of children in the respective indicator or dimension. The following formula uses to estimate the headcount ratio:

$$h_{j,r} = \frac{q_{j,r}}{n_r} . \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad (1)$$

$$q_{j,r} = \sum_{i=1}^{n_r} y_j \cdot \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Where

$h_{j,r}$ -Headcount ratio of deprived children in indicator j.

q_j -Number of deprived children in indicator j.

n_r -A number of the total children in the reference population r.

y_j -Status of deprivation, according to the threshold (yes=1, otherwise zero), y_j

   =1 (deprived) if $x_j < z_j$ and y_j =0 (no deprived) if $x_j > z_j$.

x_j -Value of indicator j.

z_j -Threshold of indicator j.

Here noted that after the estimation of single indicator level than the similar formula used for the dimension level, after the assigning of threshold (yes=1, otherwise zero) as per the indicator status.

2.2.7. *Step 7-Overlaping Deprivation*

After the single deprivation analysis, each dimension deprivation status count into the single variable like one child has deprived in nutrition, health and housing, it means that the counting total of child one is 1+1+1=3 and the second child has deprived into nutrition, health, child development, housing and water and sanitation than the counting total of second child is 1+1+1+1+1=5. The following formula is used for the deprivation counting:

$$D_i = \sum_{j=1}^{d} y_j \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Where

D_i -Total number of dimensions, where a child i is deprived with y_j =1 if a child

   is deprived in the dimension j; y_j =0 if a child is not deprived in dimension

   j.

2.2.8. *Step 8-Multidimensional Child Poverty at Different Cutoff Points*

The multidimensional headcount deprivation measures the number of children deprived in the respective cutoff point. The multidimensional deprivation measures as:

- Assign deprivation status of each indicator according to threshold (see Table 2).
- After assigning deprivation each indicator, if s/he deprived in any indicator also consider deprived in the respective dimension.

- In the second stage, summation of all the dimensional deprivation status into D_i as per the overlapping.
- This study uses K>3 is the cutoff point for the multidimensional deprivation. It means that if a child deprived in more than 3 dimensions that will be considered multidimensionally deprived child.

This can be defined as follows:

$$y_k = 1 \; if \; D_i > K \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (4)$$

$$y_k = 0 \; if \; D_i < K \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (5)$$

For the estimation of multidimensional child headcount deprivation, the following formula can be applied:

$$H = \frac{q_k}{n_a} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (6)$$

$$q_k = \sum_{i=1}^{n} y_k \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (7)$$

Where

H -Multidimensional child deprivation headcount.

q_k -Total number multidimensional deprived children.

n_a -Total number of children.

y_k -Deprivation status of children on the cutoff base.

K -Cutoff point.

To calculate the average intensity of multidimensional deprivation A measures the breath of child poverty.[2]

$$A = \frac{\sum_{1}^{q_k} c_k}{q_k * d} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (8)$$

Where

A -Average intensity of multidimensional deprivation.

q_k -Number of children affected by at least k.

d -Total number of dimensions.

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[2]A is what Alkire and Foster (2007) defines as "intensity of poverty (A)". Noted that A similar to Alkire's and Foster's but differs in one important way in MODA; instead of measuring the average intensity of deprivation among the multidimensional poverty, A measure for the whole population.

c_k-Number of deprivation each multidimensional deprived child, with

$$c_k = D_i * y_k$$

The third component of multidimensional deprivation is adjusted headcount ratio or multidimensional child poverty. Multidimensional child poverty is the combination of headcount and average intensity of deprivation. This measure of poverty satisfies the property of "dimensional monotonicity".[3] The multidimensional poverty measure as follows:

$$M_0 = H * A \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \quad (9)$$

Where

M_0-Multidimensional child poverty (Adjusted headcount ratio).

H-Headcount of deprived children as per cut-off point.

A-Average intensity of deprivation.

2.2.9. *Step 9-Decomposition of Multidimensional Poverty by Dimensions*

Decomposition is the important step to understand the depth and the contribution of dimensions into multidimensionally deprivation or adjusted headcount ratio (Mo). To understand the each dimension contribution into adjusted head count ratio as follows:

$$P_j = \frac{\sum_{i=1}^{n}(y_{j*}y_k)}{n_a * d * M_o} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \quad (10)$$

Where

P_j -Contribution of each dimension into the adjusted head count.

$\sum_{i=1}^{n}(y_j * y_k)$ -Total number of children deprived in the respective dimension

while also deprived multidimensionally.

n_a-Total number of children.

d -Total number of dimensions.

M_O-Adjusted head count ratio.

3. RESULTS

This section presents the comprehensive empirical results to understand the depth of multidimensional deprivation under the five years old children in the Balochistan province of Pakistan. The empirical results describe into four subsections;

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[3]Dimensional monotonicity suggests that in a situation where a multidimensional poor person increase his or her poverty by becoming deprived in a dimension on which (s) he was previously not deprived, overall poverty level increase.

- Single deprivation analysis
- Overlapping deprivation analysis
- Multidimensional deprivation analysis
- Decomposition by dimensions

3.1. Single Deprivation Analysis

The single deprivation analysis presents the empirical results by indicators and dimensions under the regional, area and gender level.

Deprivation Incidence by Indicators at a Balochistan, Regional, Gender and Area Level

Nutrition, health, child development, housing and sanitation domains indicators are the key role of intra-household and regional level child well-being. Overall, indicator wise deprivation under the age of 5 years children in Balochistan observed very high in the child development, safe drinking water, sanitation, education and immunisation against MMR indicators. The majority of Balochistan children under 5 are deprived in early childhood educational programme (97 percent), children's books (93 percent), safe drinking water (88 percent), flooring (74 percent), cooking fuel (75 percent), identification of numeric numbers and alphabets (79 percent), respectively (see Figure 1).

The incidence in the access to a toilet, immunisation against polio, infant and young child feeding are also in the critical range. The children under 5 in Balochistan 35 percent, 42 percent and 33 percent are deprived in the above mentioned indicators. The children of Balochistan are better in nutrition (stunting, wasting and underweight) as compared to the other indicators (see Figure 1). In the launching ceremony of "Scaling up Nutrition, 2016" in Balochistan, The United Nations Food and Agriculture Organisation's (FAO) representative Francisco Gamarro said: "The ratio of children found underweight decreased from 42 percent in 2001 to 31.5 percent in 2011"[4] Child health is the key challenge for the national and international organisation, local and provincial government in the developing countries. Pakistan ranks 23rd in the world for under five deaths, almost half of children do not receive a full course of vaccination. In the 2015, around 500,000 children missed vaccination due to inaccessibility [UNICEF (2015)]. The 90 percent deaths from diarrhea disease in the developing nation's occurred in children under 5 years of age. It can be reduced by improving the drinking water and sanitation services and better hygienic behaviors [WHO (2005)]. According to the president of Islamic Republic of Pakistan Mamnoon Hussian "It is unfortunate that the lack of sanitation facilities is one of the major causes of the high child mortality rate in Pakistan, despite of the fact that cleanliness is declared half of faith in Islam". PSLM 2014-15 reports that 13 percent households of Balochistan do not have a toilet facility same as like national level [Pakistan (2016)]. In Pakistan, 110 deaths of children under 5 year age per day due to the water and sanitation related diseases, around 36 percent population of Pakistani live without access to sanitation and large number of Pakistanis do not have access to clean drinking water [UNICEF (2015)].

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[4] https://www.dawn.com/news/1253247.

The intra-regional deprivation results show that the children under-five in the Sibi division are more deprived in underweight (38 percent) indicator as compared to the other divisions. The stunting situation has more worsened in the Mekran division, where 50 percent children under-five are facing stunting. The infant and young child feeding deprivation (38 percent) in Quetta division and followed by Sibi and Zhob divisions 36 percent and 37 percent, respectively (see Table 3). At a regional level, as a whole in Balochistan more than 50 percent children under-five are deprived in immunisation against MMR and polio, identification of numeric numbers and alphabets, children's books, early childhood education, cooking fuel, safe drinking water and sanitation indicators. Almost a third of the South Asian children who are out of school at the school going age live in Pakistan, where 38.9 percent are girls and 30.2 percent are boys. Education is the 4th important goal of sustainable development "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for the all" [UNDP (2016)]. The indicators wasting, access to a toilet and overcrowding are better in the Mekran division as compared to the other divisions (see Table 3).

Table 3

Indicators Wise Deprivation by Divisional under the Age of
5 Years Children in Balochistan (%)

	Quetta	Kalat	Sibi	Zhob	Nasirabad	Mekran
	%	%	%	%	%	%
Underweight	17	21	38	13	28	14
Stunting	24	21	33	12	30	50
Wasting	13	12	15	7	11	3
Infant and Young Child Feeding	38	27	36	37	23	28
Immunisation against MMR	80	79	89	88	77	55
Immunisation against Polio	42	51	48	30	41	46
Identification of Alphabets	85	78	82	83	77	57
Identification of Numbers	85	80	79	84	71	69
Children's Toys	48	56	61	71	53	39
Children's Books	96	93	97	96	94	65
Early Childhood Education Programmes	98	98	98	97	97	96
Overcrowding	22	7	15	13	6	2
Cooking Fuel	58	84	55	92	75	89
Flooring	61	76	70	87	81	66
Safe Drinking Water	91	88	83	81	93	95
Access to Toilet	30	28	41	51	41	15
N	1766	1664	1144	1644	1088	589

The indicator wise deprivation range among female gender is 41 percent to 47 percent and among male gender is 53 percent to 59 percent (see Figure 2). There is a significant gap exist between the urban and rural Balochistan. Overall, the children living in the rural areas are more deprived than urban areas.

Fig 1: Overall indicator wise deprivation

Fig 2: Indicators wise deprivation by gender

Fig 3: Indicators wise deprivation by locality
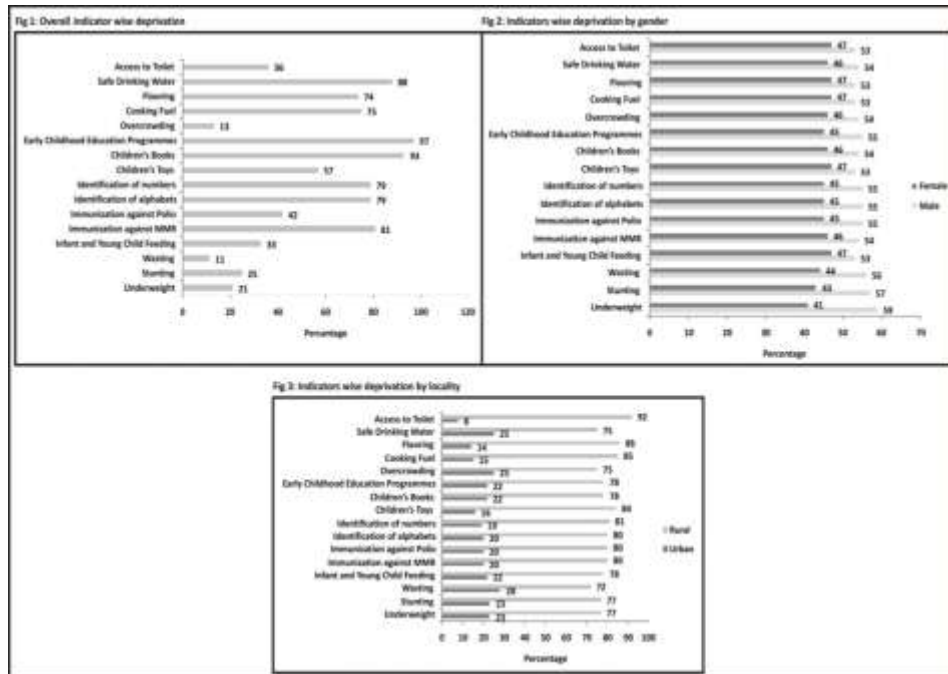
The difference between children living in the rural and urban areas in access to a toilet, safe drinking water, early childhood education, immunisation, infant and young child feeding and malnutrition (84 percent, 50 percent, 56 percent, 60 percent, 56 percent, and 54 percent respectively). It means that the child well-being problems are the serious concern for the rural areas of Balochistan (see Figure 3).

Deprivation Incidence by Dimension at a Balochistan, Regional, Gender and Area Level

The single dimensional level analysis is the combination of indicator wise deprivation. A child considered to be deprived in each dimension if s/he deprived in respective any indicator. Overall, dimensional wise deprivation shows the pathetic situation at the Balochistan level, 46 percent children deprive in nutrition, 81 percent in health, 99 percent in child development, 89 percent in housing and 93 percent in sanitation dimension (see Table 4).

Table 4

Overall Dimension Wise Deprivation under the Age of 5 Years Children in Balochistan

	%	N
Nutrition	46	3620
Health	81	6405
Child Development	99	7804
Housing	89	7063
Sanitation	93	7368

The dimensional deprivation results show that the children under-five in the Mekran division are more deprived in nutrition (58 percent) followed by Sibi division in nutrition (56 percent) dimension as compared to the other divisions. The health situation is better in the Mekran division as compared to other divisions, where 58 percent children under–five are facing health deprivation. Apart from Mekran, all other divisions' health situations are very bad. In these all other divisions, more than 77 percent children are deprived in health. At the regional level, the children under-five facing a very underprivileged situation in child development, housing and sanitation dimension (see Table 5).

Table 5

*Dimension Wise Deprivation by Region under the Age of
5 Years Children in Balochistan*

	Quetta	Kalat	Sibi	Zhob	Nasirabad	Mekran
	%	%	%	%	%	%
Nutrition	49	41	56	34	47	58
Health	81	80	90	88	77	58
Child Development	99	99	100	99	99	96
Housing	80	94	85	97	89	92
Sanitation	95	91	94	91	96	96
N	1766	1664	1144	1644	1088	589

The deprivation analysis of dimensional level among male and female children is same as like the above mentioned indicator wise analysis. There is very little gap between the male and female distribution (see Figure 4). As per the indicator wise results, the dimensional deprivation results show the significant difference between urban and rural deprivation. The dimension wise deprivation by area shows that 52 percent difference in nutrition, a 60 percent difference in health, 54 percent difference in child development, a 64 percent difference in housing and 52 percent difference in sanitation dimension observed (see Figure 5). For decades in Balochistan, there was no progress in the education sector and the education of children under five years of age are completely affected, around 75.7 percent children under five years of age in Balochistan are not attending school with small gender disparity 78.5 percent are boys and 73.2 percent are girls. Yes, there is an urban- rural disparity exists as per the above behavior where 60.8 percent of urban compared to 79.9 percent of rural under five are not going to pre or primary school [UNICEF (2013)].

**Fig. 4. Dimension Wise Deprivation by Gender under the Age of
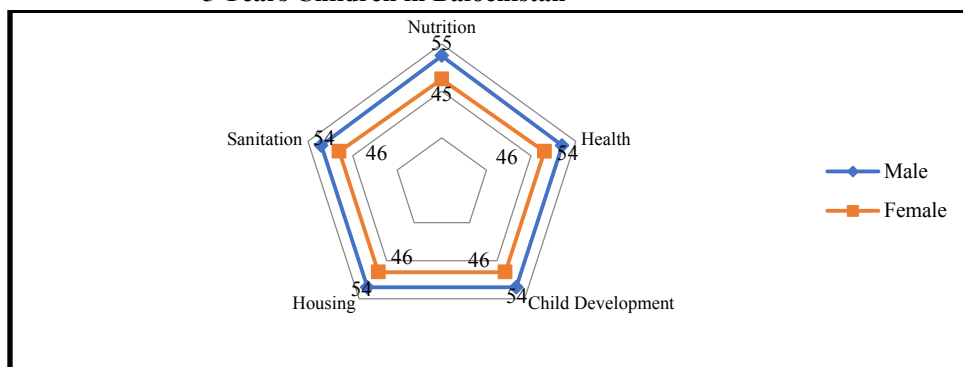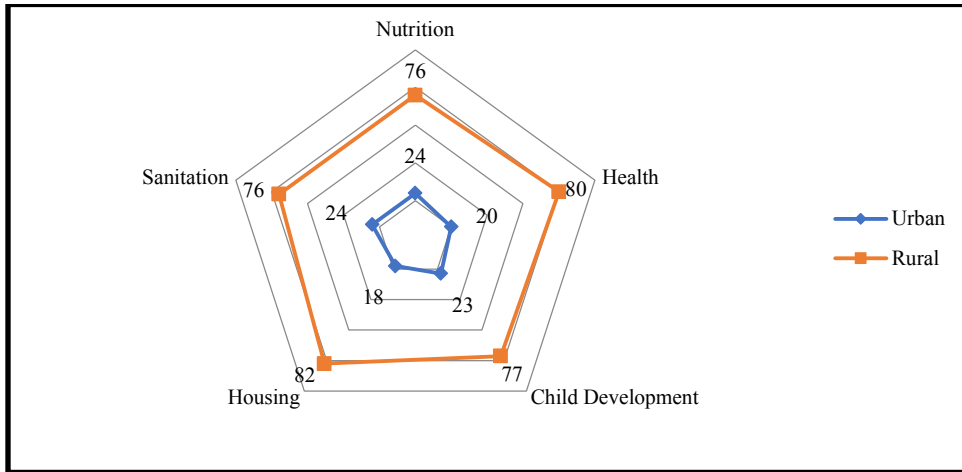5 Years Children in Balochistan**

Fig. 5. Dimension Wise Deprivation by Locality Under the Age of 5 Years Children in Balochistan

3.2. Overlapping Deprivation Analysis

The overlap deprivation analysis is carried out to study the simultaneous deprivation. It means that at the same time how many children are facing the other sectorial deprivation. The overlap deprivation analysis observes that just only 0.1 percent children under-five are facing single dimension deprivation and 30.5 percent children under-five are facing five dimension deprivations. According to the cut-off point (K>3), 81 percent children facing more than three dimension deprivation (see Figure 6).

Fig. 6. Child Deprivation by Number of Dimensions
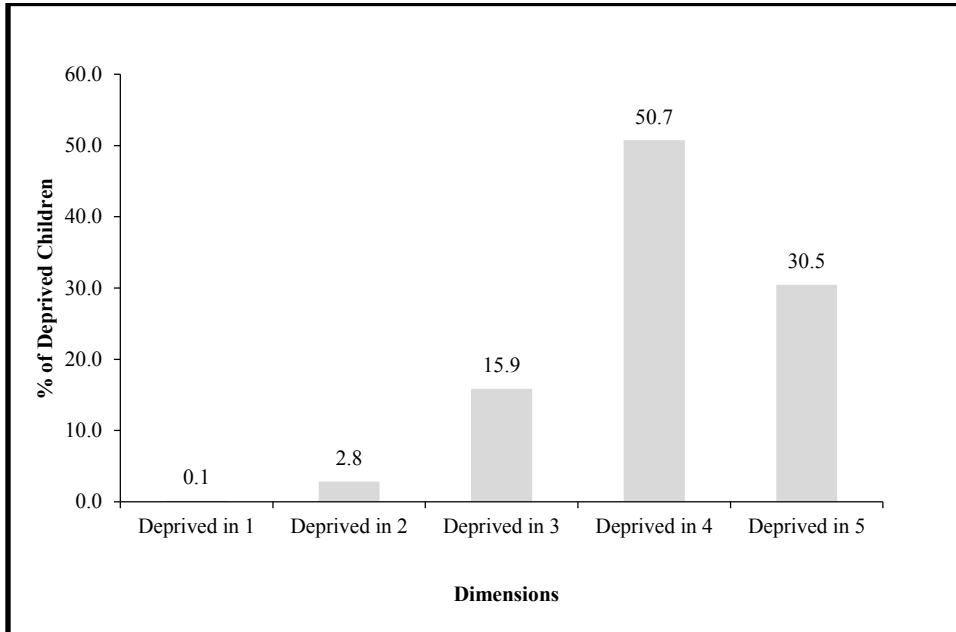
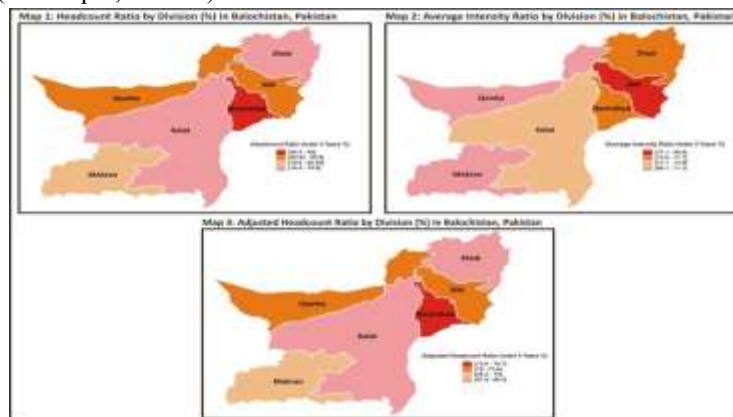### 3.3. Multidimensional Deprivation Analysis

In the previous sections, study presented the single deprivation analysis by the indicator and dimension wise identification of number of deprived children. The multiple deprivation analysis gives detail understanding at the respective cut-off point. The following three deprivation ratios used to understand the aggregate situation of multidimensional deprivation: the deprivation headcount ratio (H) showing the percentage of multidimensional deprived children; the average intensity of multidimensional deprivation (A) showing the average breadth of child deprivation; and adjusted headcount ratio (M_o) which is the calculate with headcount ratio (H) adjusted by the average intensity (A) of deprivation.

Table 6

Deprivation Headcount, Intensity and Multidimensional Child
Poverty by Gender and Locality

	Headcount (%)	Average Intensity (%)	Adjusted head count (M0) (%)
Balochistan	81.2	87.5	71.1
Male	81.2	87.7	71.2
Female	81.2	87.3	70.9
Urban	65.8	86.4	56.9
Rural	85.9	87.8	75.3

As per the selected cut-off, 71 percent children are facing multidimensional poverty/deprivation at the Balochistan level and followed by the gender male (71.2 percent) and female (70.9 percent) deprivation. At the area level, the average intensity of deprivation almost same (87 percent), however, varies across urban (59.9 percent) and rural (75.3 percent). It means that the average breadth of multidimensional deprivation same across the area and gender (see Table 6).

At the regional level, the deprivation headcount ratio as per the selected cut-off (K>3) more than 75 percent children under-five deprived in more than three dimensions in all overall the Balochistan, the average intensity of the multidimensional deprivation range between 85 percent to 89 percent which showing the worsened condition. The adjusted headcount ration between the regions varies from 67 percent to 77 percent. It means that almost 75 percent children across regions are facing a terrible and pathetic situation (see Map 1, 2 and 3).

3.4. Decomposition by Dimensions

Decomposition is the important step to understand the depth and the contribution of dimensions into multidimensional deprivation. According to the decomposition results, 12 percent contribution of nutrition deprivation in the overall Balochistan multidimensional deprivation (71.1 percent). All the remaining dimensions almost equally distributed among overall multidimensional deprivation (see Figure 7).

Fig. 7. Decomposition by Dimensions in M_o (71.1 percent in Balochistan).
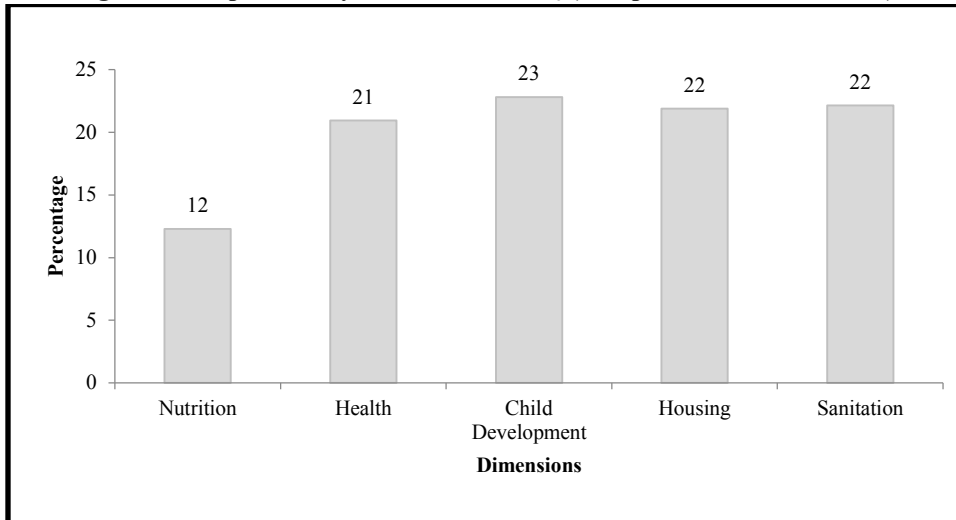
4. CONCLUSIONS AND RECOMMENDATIONS

On average, 71 percent children under five years of age are deprived in nutrition, health, child development, housing and sanitation. Whereas 46 percent in nutrition, 81 percent in health, 99 percent in child development, 89 percent in housing and 93 percent in sanitation are deprived. Almost half of the population of children (51 percent) of Balochistan is deprived in four out of five dimensions. As per the decomposition of multidimensional deprivation, a 12 percent contribution is of nutrition in the overall multidimensional deprivation. All the remaining dimensions almost equally distributed among overall multidimensional deprivation. A significant difference exists between the rural and urban multidimensional deprivation where 75 percent of rural children under five years of age deprived as compared to the 57 percent from urban.

It is fact that there are many challenges for the Pakistan's economic development at national and regional levels. A large number of Pakistanis are facing poverty, food insecurity, unemployment, illiteracy, health issues, unavailability of clean drinking water, housing problems, the unavailability of proper sanitation, etc. Similar challenges are being faced by the people of Balochistan

The study results call for more investment in child poverty reduction sectors. It is the responsibility of government institutions, policy makers, community level organisations, political parties and non-profit organisations to formulate development policies at the regional, area and community levels. Therefore, the federal and provincial

governments, should focus on the provision of economic opportunities, health, education, nutrition to enhance the regional and area level living standards. However, rural areas need more focus than urban. The CPEC is one of the beacons from which it is expected that more trade, employment, health and education opportunities will be available for local population. Small business men and farm owners can promote their businesses and farm products. If the benefits are transferred towards local population, it will directlly have an impact on living standards of local population and reduction in child poverty as well.

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