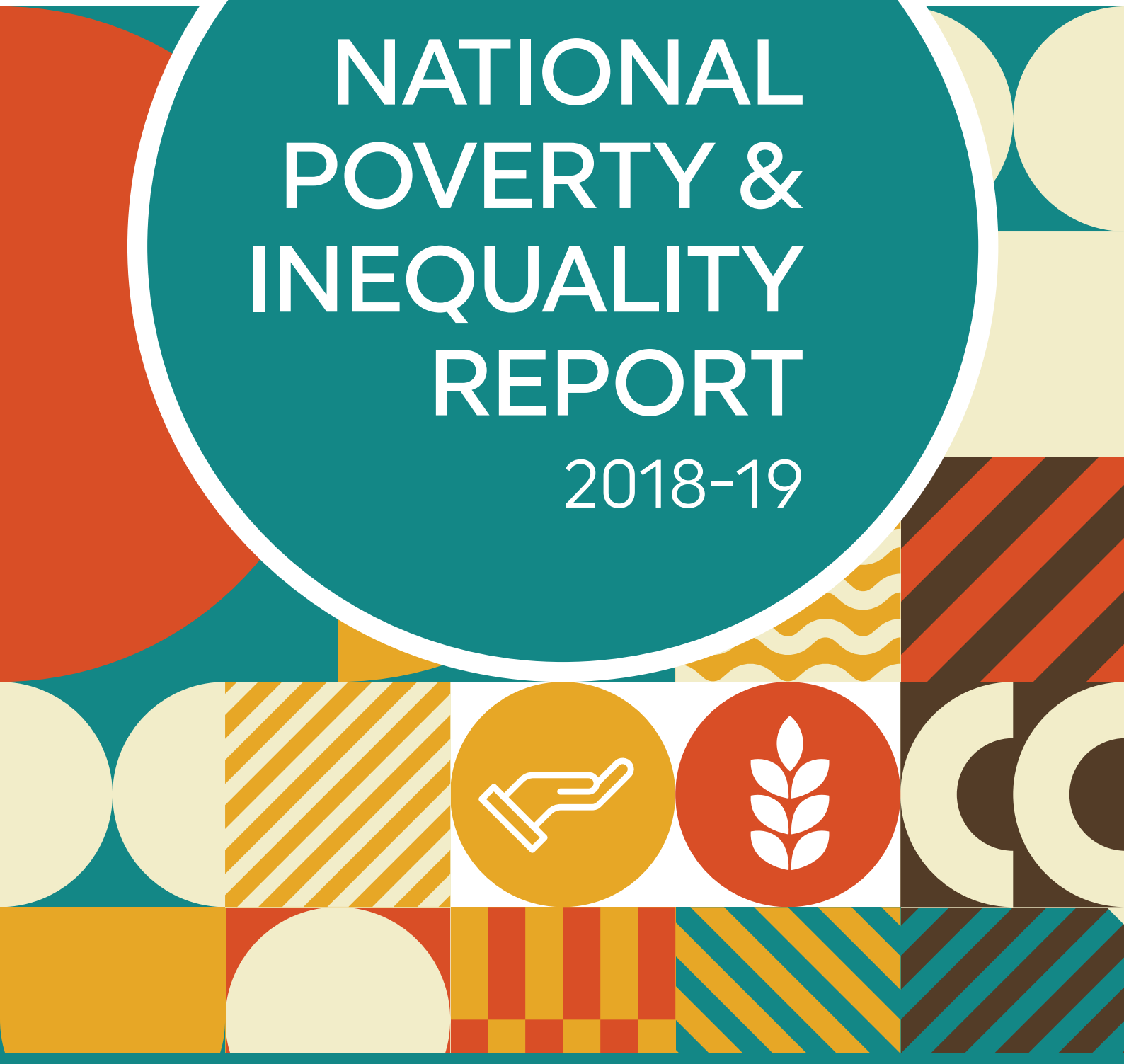
NATIONAL POVERTY & INEQUALITY REPORT

2018-19



National Poverty & Inequality Report

2018-19

Ministry of Planning
Development &
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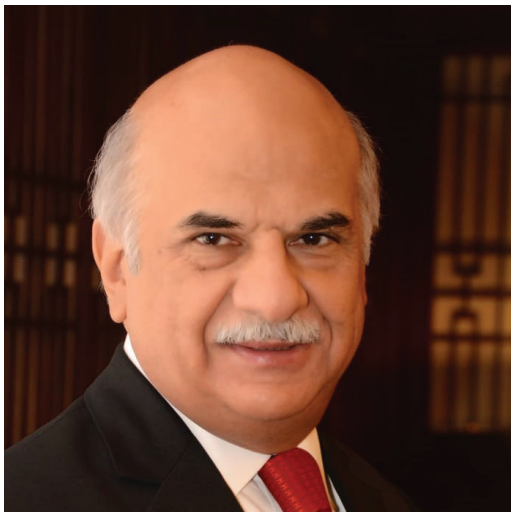

Deputy Chairman Planning Commission Message

We are currently at a critical juncture for achieving the Sustainable Development Goals (SDGs) as we are halfway through implementing the UN 2030 Agenda. Poverty is one of the significant challenges that SDGs aim to address. Accordingly, the first SDG is to end poverty in all its forms and dimensions, aiming to eradicate extreme poverty globally and reduce the percentage of people living in poverty below the national poverty line. SDG 1 also highlights the need for social protection systems and targeted measures to reduce the exposure of poor and vulnerable populations to crisis and disasters. Moreover, other SDGs such as SDG 2 (Zero Hunger) and SDG 10 (Reduced Inequalities) also address poverty as a key issue for sustainable development.

Unfortunately, over the past few years, our country has faced several catastrophic events, particularly affecting the vulnerable segments of the society. First, the pandemic and later, natural disasters such as floods have jeopardized the progress we made over the past few decades. Such crises have disproportionately impacted the poorest, the most vulnerable who are least equipped to navigate such challenges. The climate crisis has added another dimension to poverty and is subjecting the impoverished communities to the twin burdens of climate change and rising living costs. Moreover, there has been a rise in inequality, widening the gap between the rich and poor each year.

Our government recognizes the importance of accurate estimates to monitor and evaluate anti-poverty policies effectively. We are dedicated to using data-driven approaches to ensure that available resources effectively target the most vulnerable in society. Additionally, we understand the role inequality can play in exacerbating poverty and are taking a holistic approach to addressing poverty and inequality.

We need to surpass the act of merely listening to people living in poverty and provide an opportunity for them to become authentic partners in sustainable development. Only then can poverty-eradication strategies deliver optimal results to those who have been neglected and left behind. Therefore, I believe that with timely and appropriate interventions, policies, and programs, we can ensure that no child is born into poverty by 2030 and that everyone has an equal opportunity to succeed in a more just, flourishing, and sustainable world.

Our commitment to reducing poverty and to building an equitable society will remain unwavering.

Mr. Mohammad Jehanzeb Khan

Deputy Chairman,

Ministry of Planning, Development & Special Initiatives

Secretary's Message

This publication serves as a clarion call for us to reaffirm our commitment towards devising inclusive policies and sustainable initiatives aimed at mitigating inequality. It is imperative that we harness our collective expertise, leveraging data-driven insights, to devise targeted strategies that address the root causes of multi-dimensional poverty and its correlated inequalities.

As we delve into the comprehensive analysis presented, it has become evident that the issue of inequality remains a pivotal concern that requires immediate and concerted action. The findings underscore the multifaceted nature of poverty, delving beyond income inadequacy to encompass various dimensions including health, education, and living standards. Regrettably, these dimensions are disproportionately affecting certain segments of our population, perpetuating systemic disparities.

By fostering an environment conducive to equitable opportunities and access to essential resources, we can move towards a more just and prosperous society. we stand united in our resolve to combat poverty and foster an environment where every citizen has equal opportunity to thrive.

Mr. Awais Manzur Sumra

Secretary,

Ministry of Planning, Development & Special Initiatives

Message by Head, Poverty Estimation Committee

On behalf of the Poverty Estimation Committee and in my capacity as Chair of the Committee, I am pleased to present the state of poverty and inequality in the country encapsulated in the National Poverty & Inequality Report (2018-19). The report provides poverty estimates at both the national and provincial levels, along with essential details on the data sources and the methodology used for estimation. Moreover, for the first time, the national report gives both the poverty and inequality estimates for all four provinces of the country and contains not only information on poverty estimation but also on various related issues. The report has been thoroughly reviewed by the Poverty Estimation Committee comprising of members representing academia, statistical agencies, provincial representatives, and practitioners.

Over the last two decades, living conditions have improved globally. Resultantly, the number of people living in extreme poverty has been cut in half worldwide. However, poverty remains a significant issue in our country, affecting millions of people. It is notable that despite the consistent decline in poverty rates over the past fifteen years in Pakistan, there has been little change in inequality.

It is also evident that the poverty rate is higher in rural areas compared to urban areas whereas the poverty rate varies significantly across provinces, with the highest poverty rates reported in Balochistan and the lowest in Punjab. High unemployment rates, limited access to quality education, and healthcare are just a few of the contributing factors exacerbating poverty and inequality. Therefore, reduction in poverty and narrowing of inequality are essential to improving lives, unlocking the potential of millions of people and developing the overall socioeconomic profile of the population of Pakistan.

The first step towards informed policy making is reliable evidence. The poverty and inequality estimates in this report present a measurement-based situation of the poverty and inequality in the country, thus providing a technical basis to design interventions that are in proportion to the challenge. Also, the report goes a step further than mere positive analysis and points towards addressing the underlying determinants of poverty and inequality in the development of socio-economic policies aimed towards effectively tackling poverty and inequality.

I sincerely thank my esteemed colleagues and committee members for their valued contributions and consistent supervision of the poverty and inequality estimation process. The work and output of the committee has visibly highlighted the need for periodic estimation, monitoring, and analysis of poverty and inequality trends at both the national and provincial levels along with devising an institutional mechanism dedicated to the task of poverty and inequality estimation and analysis at both the national and sub-national tiers of the government.

Dr. Aliya H. Khan
Head, Poverty Estimation Committee

Foreword

The unveiling of the Poverty and Inequality Report 2018-19 marks a pivotal moment, encapsulating years of rigorous analysis, empirical insights, and a commitment to foster inclusive growth. It is with great satisfaction that we note a tangible decline in poverty, a testament to concerted efforts aimed at uplifting the marginalized and vulnerable. The statistic is striking: poverty has receded to 21.9 percent in 2018-19, a commendable achievement of reducing 28.5 percentage points in the last 13 years.

Poverty in rural areas persists at disproportionately higher rates than in urban areas, which underscores the need for targeted rural development initiatives and agrarian reforms. In confronting poverty, we must confront the structural inequities that perpetuate its existence, ensuring that no segment of society is left behind. This is the first time the Planning Commission has revealed the Provincial estimates of poverty for 2018-19.

The Planning Commission's unwavering commitment to holistic development reflects the need for not only the eradication of poverty, but also the cultivation of a more just and equitable society. For this reason, inequality estimates are presented alongside the poverty data, spanning from 2005-06 to 2018-19.

As has been decided, we will convene a team to discuss the estimation of a new poverty line when the next HIES is available.

We thank the Poverty Committee, the provincial members of the committee, the UNICEF and the World Bank for giving technical inputs on poverty and inequality estimates. We also appreciate UNICEF's support in editing, designing and printing the report.

Muhammad Ali Kemal

Chief SDGs,

Ministry of Planning, Development & Special Initiatives

Team

Poverty Estimation Committee

Dr. Aliya H. Khan	Head
Dr. G. M. Arif	Member
Ms. Rabia Awan	Member
Dr. Muhammad Idrees	Member
Dr. Rashid Memon	Member
Dr. Hamid Hasan	Member
Dr. Saqlain Raza	Member
Mr. Zafar ul Hassan	Member
Dr. Hasan M. Mohsin	Member
Mr. Muhammad Ali Kemal (Chief, SDGs)	Member/Secretary

Provincial Members

Dr. Naeem uz Zafar	Member/Sindh
Dr. Amanullah	Member/Punjab
Dr. Ali Raza	Member/KP
Mr. Arif Shah	Member/Balochistan

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Mr. Zeeshan Mangi	Assistant Chief
Mr. Muhammad Saleh	Assistant Chief
Mr. Shahid Imdad	Assistant Chief
Ms. Rida Najam	Assistant Chief
Mr. Muhammad Jawad	Data Expert

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Mr. Luis Gorjon Fernandez	Chief Social Policy
Ms. Sadaf Zulfiqar	OIC Chief Social Policy
Muhammad Ali Raza	Poverty Assessment Consultant

Introduction

1. Introduction

Pakistan is committed to alleviating poverty in all its manifestations everywhere by 2030. Poverty estimation, along with inequality estimation using appropriate methods, has important policy implications for the design of various socio-economic policies and strategies including social protection (budgetary or non-budgetary)[1] and other poverty reduction programmes. As a result, the report includes consumption inequality estimates based on the CBN (Cost of Basic Need) approach since 2005-06. The definition of poverty is the same as was in the 2013-14 and 2015-16.

The Planning Commission of Pakistan, to estimate poverty, has utilized two principal approaches for deriving poverty lines: the Food Energy Intake (hereafter, FEI) approach by (Dandekar & Rath, 1971; Greer & Thorbecke, 1986), and the Cost of Basic Needs (hereafter, CBN) approach (Ravallion, 1994, 1998; Ravallion & Bidani, 1994; Ravallion & Sen, 1996; Wodon, 1997). With time, the CBN approach has gradually become predominant.[2]

The first official poverty line was based on the threshold level of 2350 kcal per day per adult equivalent and applied FEI method on the micro-data of 1998-99 HIES was published. For consistency, this line, after adjusting it with CPI, was used for poverty estimation in subsequent years when the HIES was carried out, notably in 2001-02, 2004-05, 2006- 07, 2007-08, 2010-11, 2011-12 and 2015-16. Following this precedent we estimate and update the official poverty line using CBN approach for the year 2018-19.

Pakistan has witnessed a persistent decline in poverty; 50.4% in 2005-06 to 24.3% in 2015-16. Poverty in both rural and urban areas has also been on the decline (GoP, 2018) with a poverty headcount of 12.5% in urban and 30.7% in rural areas in 2015-16. The decline in poverty is more pronounced in urban areas than in rural areas. After the release of the Household Integrated Income and Expenditure Survey (HIES) 2018-19, it is important to revisit the poverty estimates at both the national and provincial levels.

The poverty estimates at the national and provincial levels, approved by the Poverty Committee and Planning Commission, are being given in this report, with necessary detail on both the data source, the methodology applied for estimation and some worth noting recommendations. The rest of this report is organized as follows: Section 2 shed light on the data and several issues regarding poverty estimation are reported therein. Section 3 contains methodology used to update the poverty line and aggregation of consumption expenditure for this round of the survey i.e. 2018-19. The estimates of poverty, poverty trends and bands followed by a discussion on trends in poverty gap and severity are discussed in Section 4. Section 5 provides estimates of inequality and its trends using the HIES data and following the CBN approach for aggregating consumption. Lastly, the conclusions and recommendations for future work on poverty and inequality are given in Section 6.

2. Data Source

2.1 An Overview

Though the HIES has been conducted since 1963, nonetheless in 1990 the HIES questionnaire was revised in order to address the requirements of a new system of national accounts. The four surveys of 1990-91, 1992-93, 1993-94 and 1996-97 were conducted using the revised questionnaire. In 1998-99, the HIES data collection methods and the questionnaire were revised to reflect the integration of HIES with the Pakistan Integrated Household Survey (PIHS). After this the HIES was conducted as an Integrated Survey with PIHS in 1998-99 and 2001-02.

1 *Budgetary social safety net programmes include Benazir Income Support Programme (BISP) and Pakistan Bait-ul-Mal (PBM) while Zakat, Pakistan Poverty Alleviation Fund (PPAF), Empolyees Old Age Benefit Institution (EOBI) and Workers Welfare Fund (WWF) are non-budgetary programmes (Pakistan Economic Survey 2021-22)*

2 *The reason to switch from FEI to CBN is outlined in Pakistan Economic Survey 2014-15.*

The PIHS survey was renamed in 2004 to the Pakistan Social and Living Standards Measurement (PSLM) Survey; however, the modules of the HIES remain intact.[3] HIES were conducted in 2004-05, 2005-06, 2007-08, 2010-11, 2011-12, and 2013-14. However, in 2015-16, a special survey namely the Household Integrated Income & Consumption Survey (HIICS) was conducted for rebasing of the price indices, for which all items were disaggregated and asked in detail in order to compute separate weights. It is pertinent to mention that this survey was designed in such a way that it also provided all data and information regarding HIES. HIES 2018-19 covers 24,809 households and provides important information on household income, savings, liabilities, consumption expenditure, and consumption patterns both at the national and provincial levels with urban/rural disaggregation.

2.2 HIES 2018-19 Sample Size and Design

The sample size of the HIES 2018-19 consists of 24809 households; 15936 households from rural areas and 8873 households from the urban areas of the country. The Sampling Frame, which was updated through the 2017 Census, has been used for sample selection. Each enumeration block is comprised of 200-250 houses on average with well-defined boundaries and maps. In urban areas each enumeration block is treated as a PSU while in rural areas villages are divided into blocks with well-defined boundaries and maps and each separate block within the village is considered as a PSU. For a detailed discussion on survey sample design and size, we refer the interested reader to go through the link.[4]

3. Methodology

The Ministry of Planning, Development & Special Initiatives (MOPDSI) constituted a Poverty Estimation Committee which included representation from academia, statistical agencies, provincial members, and practitioners. This committee published a national poverty report for the 2015-16 HIICS micro-data using the CBN method (GoP, 2018). The latest poverty estimates are based on the HIES 2018-19. The sample size consists of 24,809 (15,936 rural; 8,873 urban) households. The government of Pakistan has adopted the Cost of Basic Need (CBN) methodology in 2013-14. The poverty line for the said period was then calculated as Rs. 3030 per adult equivalent per month. The same poverty line was adjusted for 2015-16 using Consumer Price Index (CPI) based inflation. The updated poverty line for 2015-16 was Rs. 3250 per adult equivalent per month. Using CPI based inflation; the updated poverty line for 2018-19 is calculated as Rs. 3757.85 per adult equivalent per month.

3.1 Poverty Line

Using HIES 2013-14 the data food poverty line (FPL) was estimated by taking the average spending on the food of households in the reference group–10th to the 40th percentile of the expenditure distribution. The CBN then considered non-food expenditures (clothing, shelter, education etc.) that are necessary for households, focusing on households who are able to fully meet the FPL at their current level of food expenditures. The FPL was then scaled up to reflect the total expenditure of these households to obtain the CBN poverty line.

For the HIICS 2015-16, the estimated poverty line using CPI based inflation for 2015-16 was Rs. 3250.28 per adult equivalent per month, however, the updated poverty line for the year 2018-19 is Rs. 3757.85.[5] The CBN poverty lines for early surveys years, adjusted by CPI, are reported in (Table 1, below).

3 *PSLM (District Level) Survey and PSLM/ HIES (National/ Provincial level) Survey were conducted in alternating years.*

4 *https://www.pbs.gov.pk/publication/household-integrated-economic-survey-hies-2018-19.*

5 *Poverty line is updated in consultation with PBS*

Table 1: Poverty Lines using CBN Approach

Year	Poverty Line (Rs. per adult equivalent per month)
2005-06	1277.74
2007-08	1543.51
2010-11	2333.35
2011-12	2600.15
2013-14	3030.32
2015-16	3250.28
2018-19*	3757.85

Source: Poverty Estimation Committee, MoPD&SI

3.2 Aggregation of Consumption Expenditure

The consumption aggregate has three main components: (i) the aggregate nominal consumption expenditure: which includes all food and non-food expenditures of the household converted into the same time unit, for instance annual, monthly, or weekly expenditures, (ii) the spatial price index: to adjust for the cost of living differences across space or regions, and (iii) the equivalence scale: to adjust for differences in household size and age composition across households. The consumption aggregate includes all food and non-food expenditures that are incurred on a recurrent basis.

In the first step, the monetary value of all these expenditure categories is aggregated for each item. In the next step, the item level expenditures are converted into the same time unit to obtain the aggregate nominal consumption expenditure. In Pakistan, the key non-food items include expenditure on clothing, footwear, housing, education, health, fuel, utilities, transport, recreation, and communication etc. The rental value of the dwelling occupied by the household is also included in the consumption aggregate. However, house and property taxes and fees, and infrequent repairs and maintenance expenses are not included. All the expenditures are converted to a common base; monthly consumption aggregate.

Expenditures are also taken to represent purchases made over a 14-day period, and are therefore, multiplied by a factor of 2.17 (an approximation for 30.5/14). As the cost of basic food and non-food needs varies across regions within a country, the aggregate nominal expenditure needs to be adjusted for spatial price differences. A common way to do this is to construct a spatial price index. For this purpose we used the Paasche formula provided an estimation at the level of a primary sampling unit (PSU). This PSU-level Paasche index is based on a set of items for which both the quantity and the expenditure information is available in the HIES 2018-19. This gives one price index per PSU. In the

last step, the index is normalized by its mean. After getting one price index per PSU, in the last step, the index is normalized by its mean.

The issues related to welfare aggregates are being addressed by adjusting the welfare aggregate using equivalence scales. The adult equivalence scale is used which assigns a weight of 0.8 to each individual below the age of 18, and a weight of 1 to each individual age 18 and above. The final welfare aggregate used for poverty measurement in Pakistan is the spatially adjusted monthly per-adult equivalent consumption expenditure.

4. Poverty Estimation

Over the last decade Pakistan's poverty headcount has witnessed a persistent decline both at the national and regional levels. Table 2 presents poverty estimates, based on the CBN poverty lines adjusted by CPI, for all survey years of the last decade. The percentage of people living below the poverty line has dropped from 50.4% in 2005-06 to 21.9% in 2018-19. Poverty in both rural and urban areas has also been decreasing with poverty headcount of 11.0% in urban and 28.2% in rural areas for the period 2018-19.

Stable and significant informal economic activities; relative political stability; improvement in peace and tranquility; moderate economic growth; along with high remittance inflows; especially from the middle east, which are received by relatively poor families; and inclusive characteristics of economic growth are some of the important reasons contributing to a significant decline in the poverty headcount since 2005-06 (see Table 2).

Table 2 presents poverty incidence and change in poverty headcount (%age point) using the CBN approach for the period spanning over 2005-06 to 2018-19, not only at the national level but also for rural and urban areas. For comparison, the corresponding estimates for the previous surveys are also given. Overall, the poverty declined by 2.5 percentage point from 24.3% in 2015-16 to 21.9% in 2018-19. The annual average decline in poverty over the span of 13 years is 2.2% per year. This implies that if the same trend continues then we may be able to achieve the SDG target in the next 5-6 years. However, the unforeseen impacts of COVID-19, floods, and the recession make this scenario uncertain.

Table 2 also reports data on change in poverty headcounts by percentage points for national as well as for rural and urban areas. Poverty headcount has declined by 1.5 percentage points in urban areas and 2.5 percentage points in rural areas between 2016 and 2019, thereby leading to an overall decline of 2.4 percentage points in the incidence of national poverty headcount. The decline in poverty is more pronounced in rural areas than urban areas, albeit the extent of poverty in rural areas is significantly higher than urban areas.

Table 2: Poverty Trends 2005-06 to 2018-19

Year	Poverty Incidence			Change in Poverty Headcount (%age point)		
	National	Urban	Rural	National	Urban	Rural
2005-06	50.4	36.6	57.4	-	-	-
2007-08	44.1	32.7	49.7	6.3	3.9	7.7
2010-11	36.8	26.2	42.1	7.3	6.5	7.6
2011-12	36.3	22.8	43.1	0.5	3.4	-1.0
2013-14	29.5	18.2	35.6	6.8	4.6	7.5
2015-16	24.3	12.5	30.7	5.2	5.7	4.9
2018-19	21.9*	11.0	28.2	2.4	1.5	2.5

Source: Poverty Estimation Committee, MoPD&SI

4.1 Incidence of Poverty at the National and Provincial Levels

Table 3 presents the poverty incidence in 2018-19 for the national and provincial levels for both rural and urban areas. Provincial estimates are published for the first time in the official report based on HIES 2018-19 after the approval of Planning Commission.[6] Due to issues in comparison with HIICS 2015-16, the poverty committee and Planning Commission decided not to compare with 2015-16 provincial estimates.

Similar to national estimates, poverty in rural areas for all the provinces is significantly higher than the urban areas. Newly merged areas (FATA) in Khyber Pakhtunkhwa are relatively poorer therefore significant differences in the estimates of poverty are visible in the poverty estimates of Khyber Pakhtunkhwa. Nevertheless, the differences in urban poverty estimates of Punjab, Sindh and Khyber Pakhtunkhwa without FATA are not significant.

6 *Meeting was held on 27th and 28th November 2023*

Table 3: Poverty Incidence at National & Provincial Level

Provinces	2018-19		
	All	Urban	Rural
Punjab	16.5	9.1	20.9
Sindh	24.5	10.7	39.5
Khyber Pakhtunkhwa	28.7	17.8	30.9
Khyber Pakhtunkhwa (Without FATA)	21.3	10.9	27.5
Balochistan	41.8	25.6	47.9
Pakistan	21.9	11.0	28.2

Source: Poverty Estimation Committee, MoPD&SI

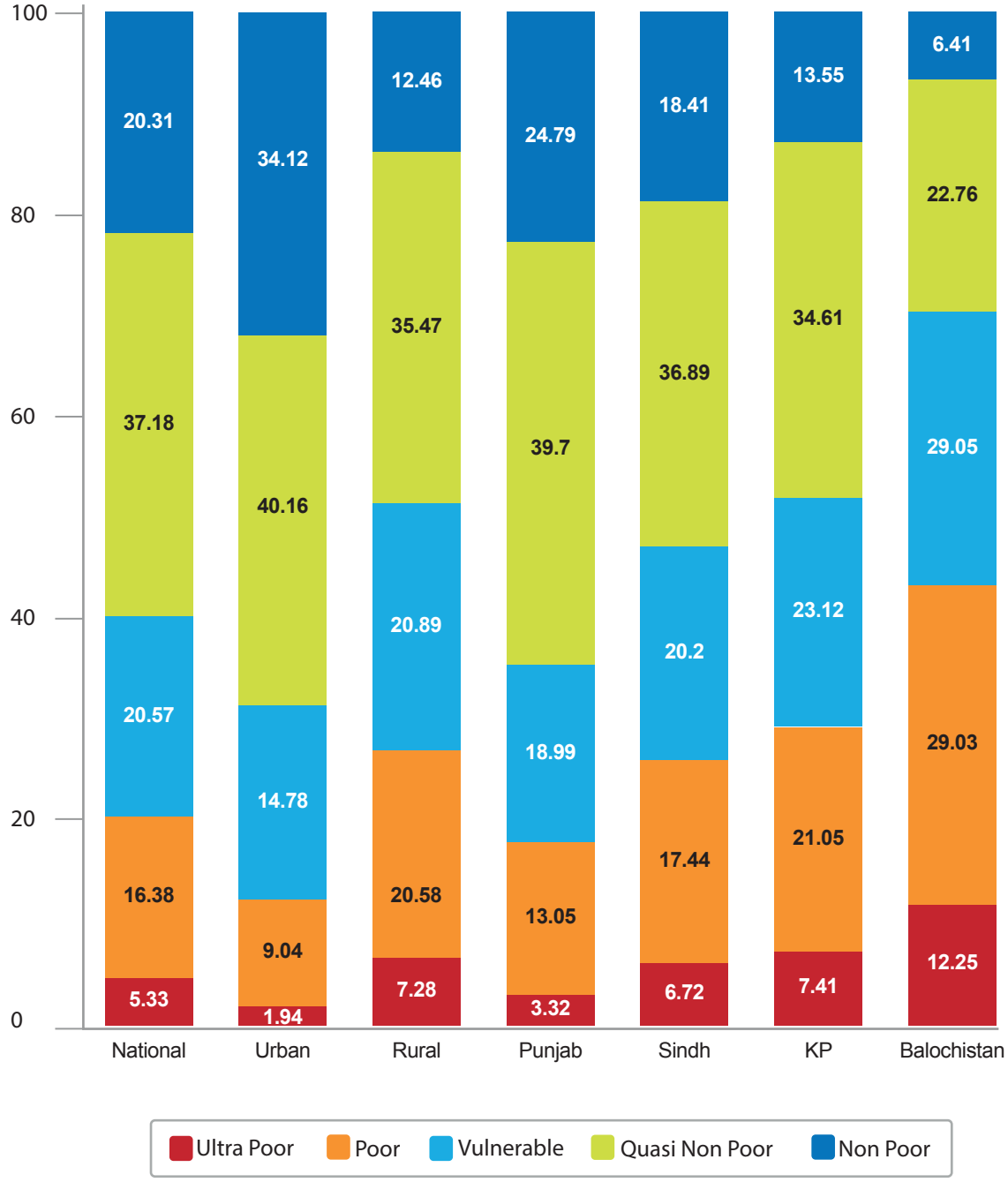
4.2 Bands of Poverty

The estimation of 'poverty bands' is essential to examine the depth of deprivation and to group the population into various bands according to different vulnerability levels such as; extremely poor, vulnerable, Quasi non-poor and non-poor etc. Extremely poor are those individuals whose per adult equivalent consumption expenditure per month is less than 50% of the poverty line, i.e., below Rs. 1878.93 in 2018-19. While on the other side of the scale are non-poor, whose per adult equivalent consumption per month is more than 200% of the poverty line, i.e., more than Rs. 7515.7 in 2018-19 (see Table 4).

As shown in Table 4, the 5.56% of population is classified as "extremely poor" & "ultra-poor". It implies that about 11.75 million people require social safety net coverage. Also, it is worth noting that about 16.4% (34.59 million in which 8.25 million Urban & 24.67 million rural) are those who are at the border line where a little push can pull them out of the poverty. However, 20.57% (43.44 million in which 13.49 million urban & 28.64 million rural) population is in a situation where a small negative shock can push them into poverty; thus a targeted social protection program is essential to keep this particular group above the poverty line. The percentage of population defined as "vulnerable" have also increased but the state of increment was relatively slow compared with the "quasi non-poor". For the sake of clarity these bands have been displayed in Figure 1 (see below).

In the presence of skewed consumption distribution, median income/consumption is a good measure. Median average consumption (per adult equivalent per month) is lower than the mean average consumption (per adult equivalent pet month) as shown in Table 4. Following the SDG indicators 10.2.1, 2.876 percent of households are living below 50 percent of the median income. The ratio has declined from 2015-16 when 3.33% of households were living below the 50% of the median income.

Figure 1: Poverty Bands at National and Regional Level in Pakistan



Source: Poverty Estimation Committee, MoPD&SI

4.3 Poverty Gap and Severity Gap Index[7]

Poverty incidence does not give information on the intensity or the severity of poverty. Thus, two popular indices are being used: The Poverty Gap Index (hereafter, P_1) is expressed as a percentage of the poverty line and the Squared Poverty Gap Index also known as poverty severity (hereafter, P_2), takes into account the inequality among the poor.

The Poverty Gap Index measure is the mean proportionate poverty gap in the population (where the non-poor have zero poverty gap). More specifically, define the poverty gap (G_i) as the poverty line (z) less actual income (y_i) for poor individuals; the gap is considered to be zero for everyone else. Using the index function, we have

$$G_i = (z - y_i) \times I(y_i < z)$$

Mathematically, the poverty gap index (P_1) can be written as:

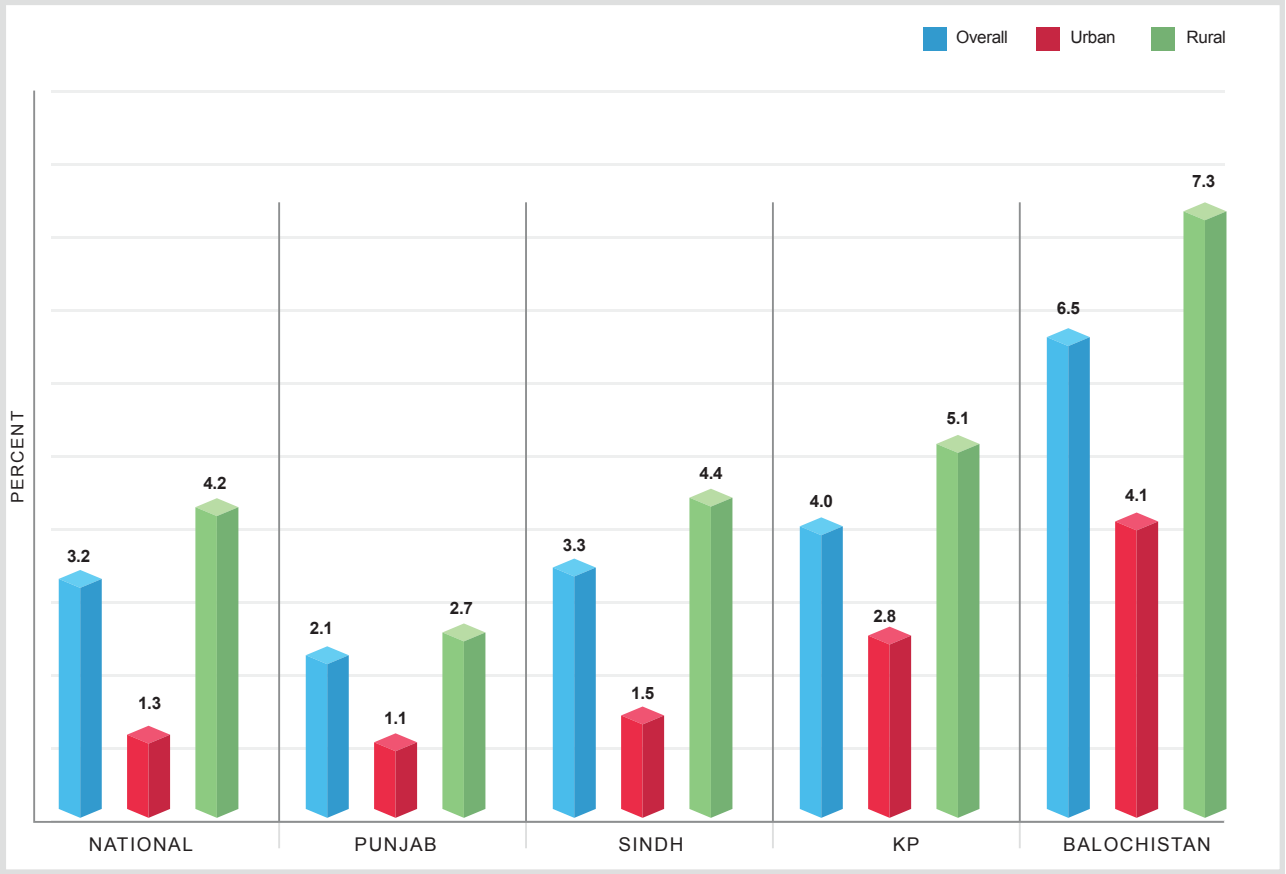
$$P_1 = \frac{1}{N}\sum_{i=1}^{N}\frac{G_i}{z}, where \text{ the gap is considered to be } zero \ for \ all \ z < y_i$$

From the form of the index, it can be seen that the ratio of the minimum cost of eliminating poverty with perfect targeting i.e. G_i to the maximum cost with no targeting (i.e., z, which would involve providing everyone with enough to ensure they are not below the poverty line) is simply the poverty gap index. Thus, this measure is an indicator of the potential savings to the poverty alleviation budget from targeting: the smaller the poverty gap index, the greater the potential for a poverty alleviation from identifying the characteristics of the poor—using survey or other information—so as to target benefits and programs.

In case of Pakistan, consider the numbers in the poverty gap for the year 2018-19 given in Figure 2 for national, urban, rural, and all four provinces. The urban poverty gap is significantly lower than rural in all provinces and at the national level. The poverty gap in Punjab is the lowest followed by Sindh, KP and Balochistan.

7 *For details on other poverty measures please see Annexure-I.*

Figure 2: Poverty Gap – 2018-19



Source: Poverty Estimation Committee, MoPD&SI

The other poverty index is P_2 which is simply a weighted sum of poverty gaps (as a proportion of the poverty line), where the weights are the proportionate poverty gaps themselves. This is in contrast with the poverty gap index, where the gaps are weighted equally. Hence, by squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line. Mathematically it can be defined as:

$$P_2 = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{\boldsymbol{z}}\right)^2$$

Generally, it may be thought of as one of a family of measures proposed by (Foster et al., 1984), which may be written as:

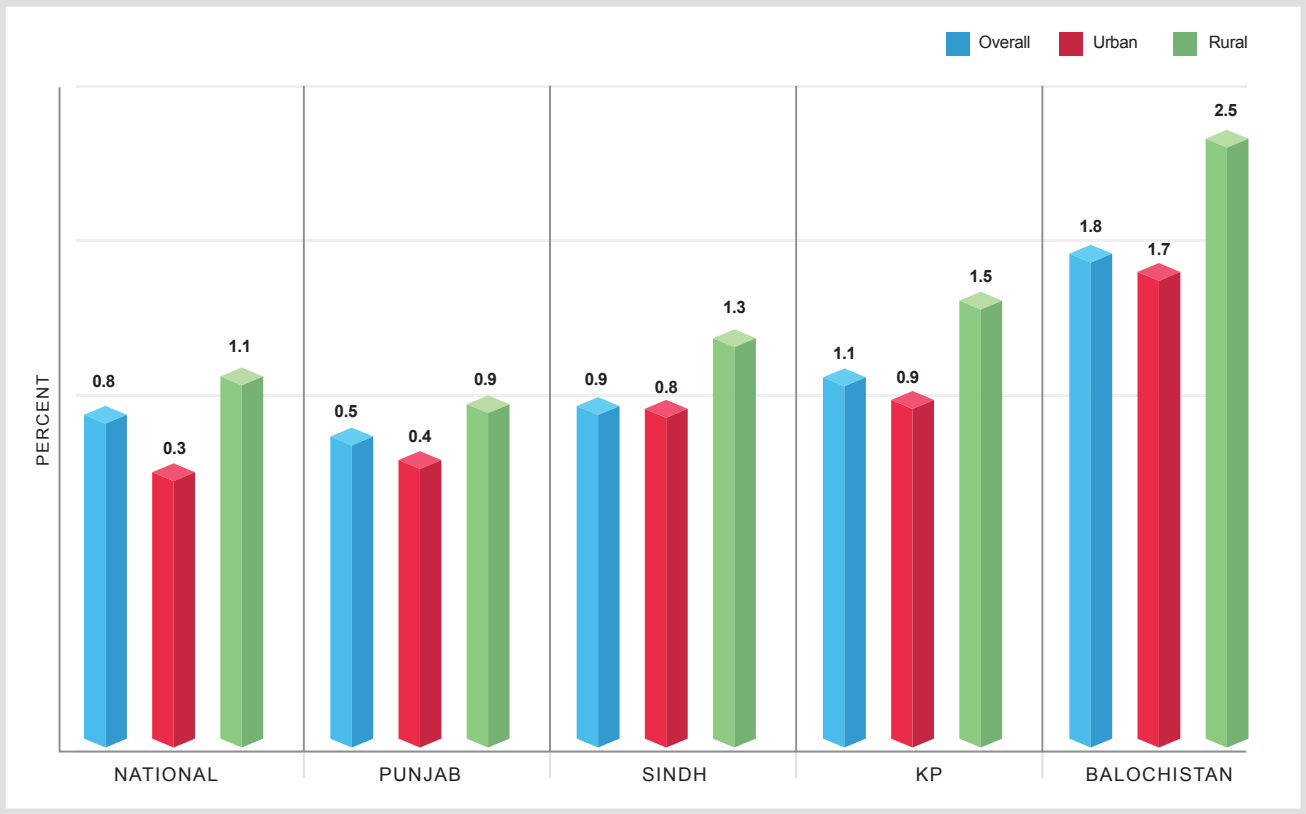
$$P_\alpha = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{\boldsymbol{z}}\right)^\alpha, \qquad (\alpha \geq 0)$$

Where α is a measure of the sensitivity of the index to poverty and the poverty line is z, the value of expenditure per capita for the ith person's household is x_i, and the poverty gap for individual i is G_i=

z – x_i (with G_i = 0 when x_i > z). When parameter α = 0, is simply the headcount index. When α = 1, the index is the poverty gap index, and when α is set equal to 2, is the poverty severity index. For all α > 0, the measure is strictly decreasing in the living standard of the poor (the higher one's standard of living, the less poor one is deemed to be). Furthermore, for α > 1 the index also has the property that the increase in measured poverty because of a fall in one's standard of living will be deemed greater the poorer one is. The measure is then said to be "strictly convex" in incomes (and "weakly convex" for α = 1).

See Figure 3 for the squared poverty gap for the year 2018-19 for national, urban, rural, and all four provinces. Similar to the poverty gap, the severity of poverty is significantly lower in urban areas than rural areas in all provinces and at the national level. Similar to poverty gave severity is the lowest in Punjab, followed by Sindh, KP, and Balochistan.

Figure 3: Squared Poverty Gap 2018-19



Source: Poverty Estimation Committee, MoPD&SI

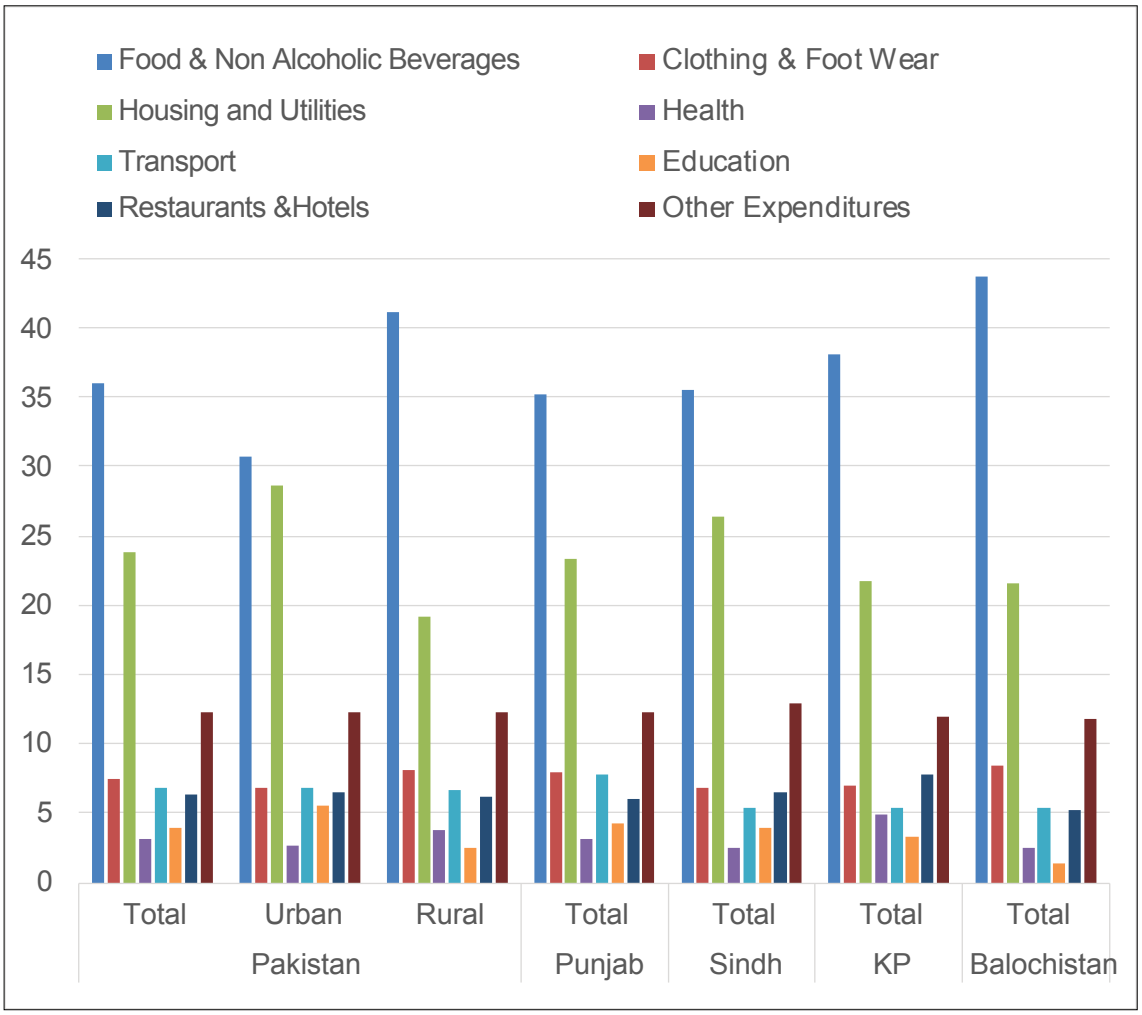
4.4 Consumption Patterns

Consumption patterns of national, urban, rural, and for all the provinces is provided below. The graph provides the share of expenditures on 8 groups, i.e., food and non-alcoholic beverages; clothing and footwear; housing and utilities; transport; health; education; restaurants and hotels; and other expenditures. The share of food and non-alcoholic beverages was 36% in 2018-19, followed by the share of housing and utilities. Health has the lowest share followed by education. Expenditures on transport, and restaurant and hotels were more than health and education.

Expenditures on food and non-alcoholic beverages; clothing and footwear; and health in urban areas were lower than in rural areas. However, expenditures on housing and utilities, and education were higher in urban areas than in rural areas. Though spending on transport and restaurants and hotels were somewhat similar in both areas.

Similar to the national level expenditures share, in all provinces the highest share of expenditures was found to be food and non-alcoholic beverages followed by housing and utilities. Whereas, Balochistan has the highest share of expenditures in food and non-alcoholic beverages, followed by KP, Sindh, and Punjab. While, Sindh has the highest share of expenditure on housing and utilities it is followed by Punjab, KP, and Balochistan. The share of health expenditures is highest amongst KP and is even higher than education, whereas the expenditure share on education and health is very low in Balochistan (see figure 4).

Figure 4: Consumption Patterns – National, Urban/Rural and Provinces



Source: Poverty Estimation Committee, MoPD&SI

Table 4: National and Regional Level Poverty Bands - % age of Population

Poverty Bands	National	Urban	Rural	Punjab	Sindh	KP	Balochistan
Extreme Poor (<50% of Poverty line) i.e. <Rs. 1878.93	0.23	0.06	0.32	0.14	0.34	0.26	0.49
Ultra Poor (>50% and <75% of Poverty line) i.e. >Rs. 1878.9 & <Rs. 2818.39	5.33	1.94	7.28	3.32	6.72	7.41	12.25
Poor (>75% and <100% of Poverty line) i.e. > Rs. 2818.39 and < Rs. 3757.85	16.38	9.04	20.58	13.05	17.44	21.05	29.03
Vulnerable (>100% and <125% of Poverty line) i.e. >Rs. 3757.85and <Rs. 4697.31	20.57	14.78	23.89	18.99	20.20	23.12	29.05
Quasi Non-Poor (>125% and <200% of Poverty line) i.e. >Rs. 4697.31and <Rs.7515.7	37.18	40.16	35.47	39.70	36.89	34.61	22.76
Non-Poor (>200% of Poverty line) i.e. >Rs. 7515.7	20.31	34.12	12.46	24.79	18.41	13.55	6.42
Total Population	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Poverty Estimation Committee, MoPD&SI

5. Inequality Estimation

Poverty estimates don't explain the distribution of income/consumption among the population. Inequality estimates, on the other hand, provide information about the dispersion of income/consumption levels across individuals or households. By examining both, we get a more comprehensive picture of how resources are distributed within a society. The Planning Commission, reporting the inequality estimates for the first time along with poverty estimates from 2005-06 till 2018-19 for national, urban and rural areas and all provinces.

Various metrics are used for measuring inequality. The most commonly used measures are Gini coefficient, Lorenz curve, Interdecile ratios, the Palma ratio, and the distribution of consumption expenditures. Every approach has its benefits and limitations. Understanding the dimensions of income inequality is a key first step toward choosing equitable policies to address it.

5.1 Consumption Versus Income

In general, consumption inequality is relatively lower than income inequality because individuals can smooth temporary shocks to income (e.g. end of a seasonal job) through saving and borrowing. Income, on the other hand, can be more volatile than consumption, especially for individuals or households with irregular or unpredictable sources of earning, such as self-employment or seasonal work. Disparities in consumption better reflect differences across individuals in the accumulation of assets, access to credit, or the social safety net.

Though income inequality and consumption inequality measures two different dimensions and their policy implication will be different while studying the effects on vulnerable groups. However, economists such as Attanasio & Pistaferri (2016) argue that "consumption" is a more appropriate indicator of persistent inequality as it is closely related to permanent income.[8] Recent studies use the link between income and consumption variation to quantify the role of assets, taxes, transfers, and family labor supply in insuring against permanent income shocks (Blundell et al., 2016; Heathcote et al., 2014).

In practice, the choice between income or consumption measures is often determined by data availability. Advanced economies tend to collect high-quality income data, especially those drawn from administrative tax records. Contrarily, consumption data is particularly relevant for developing countries, since it is difficult to obtain reliable estimates of income because a large part of the population failed to report the actual income, producing for their own consumption (especially in agriculture), or being paid in kind. For this reason, World Bank Development Indicators on inequality for the least developed countries are typically estimated on household consumption expenditures. Keeping this in view, we used "Mean per Equivalent Adult Expenditure" as a proxy for income throughout our analysis for measuring inequality. The case study that jointly analyses consumption and income data suggest that, the overall ranking of countries is similar under both measures (Krueger et al., 2010).

5.2 Gini Coefficient and the Lorenz Curve

Income/consumption distribution may play a vital role in alleviating poverty. If income/consumption distribution is highly unequal it may increase poverty gaps and extreme poverty; balanced and inclusive growth may help in achieving a better distribution of resources, hence, would result in reducing income/consumption inequality. Over the years, the pattern of income/consumption distribution in Pakistan, measured in terms of Gini Coefficient and household income share of the lowest and the highest 20% for rural and urban areas has been mixed and moderate. The Gini coefficient of household income had been around 0.35 or below since the 1960s, reaching 0.407 in 1990-91, 0.410 in 1998-99, and after that it started decreasing due to the improved poverty situation and reached 0.303 in 2018-19 as compared to 0.33 in 2015-16. The persistent decline in inequality may be attributed to the well-targeted conditional and unconditional transfers program of the government (see Table 5 and Figure 5).

We have witnessed higher poverty in rural areas than in urban areas. However, urban areas have higher inequality than the rural areas which is among the interesting results and can be a good topic to study to examine the reasons behind the negative association between poverty and inequality across regions. Notwithstanding, changes in inequality are not as significant as we have experienced in the poverty trends over the years. This implies that fair and just distribution may not have a significant association with the decline in poverty.

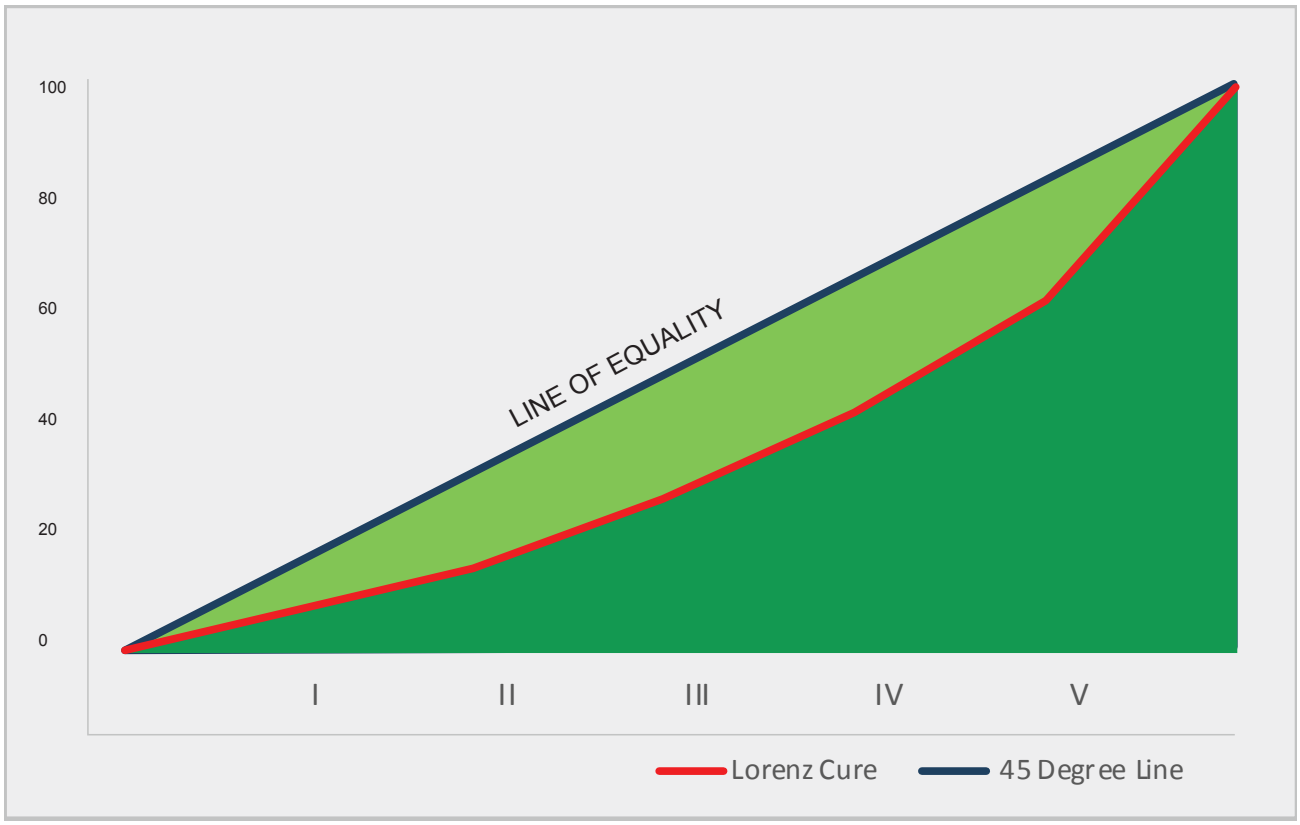
8 *See also https://manhattan.institute/article/when-it-comes-to-inequality-consumption-is-what-matters#:~:text=There%20are%20several%20reasons%20why,fluctuates%20from%20year%20to%20year.*

Table 5: Gini Coefficients

Year	National	Urban	Rural
2005-06	0.330	0.376	0.265
2007-08	0.314	0.354	0.264
2010-11	0.296	0.334	0.253
2011-12	0.307	0.351	0.250
2013-14	0.299	0.323	0.259
2015-16	0.326	0.356	0.266
2018-19*	0.303	0.328	0.248

Source: Poverty Estimation Committee, MoPD&SI

Figure 5: Lorenz Curve



Source: Poverty Estimation Committee , MoPDSI

5.3 Provincial Inequality Estimates

Provincial estimates are not much different from the national estimates. For Punjab and Khyber Pakhtunkhwa, the overall changes in the entire period were not apparent. The range on the Gini coefficient for Punjab is 0.026 whereas in Khyber Pakhtunkhwa it was 0.017. In Sindh, Gini shows two spikes upward; in 2011-12 by 0.031 and in 2015-16 by 0.09 followed by downward adjustment in the next period. In Balochistan, a decline in Gini in the first five year by 0.062 was followed by increase in Gini by 0.076 in the next four years. However overall, it was 0.26 in 2005-06 and 0.224 in 2018-19, which marks a slight improvement in inequality while poverty is also declining.

Table 6: Gini Coefficients – Province Wise

Years	Punjab	Sindh	KPK	Balochistan
2005-06	0.328	0.349	0.279	0.260
2007-08	0.307 ↓	0.341 ↓	0.271 ↓	0.241 ↓
2010-11	0.302 ↓	0.304 ↓	0.262 ↓	0.198 ↓
2011-12	0.303 ↑	0.335 ↑	0.266 ↑	0.225 ↑
2013-14	0.307 ↑	0.283 ↓	0.265 ↓	0.274 ↑
2015-16	0.315 ↑	0.373 ↑	0.273 ↑	0.251 ↓
2018-19	0.302 ↓	0.313 ↓	0.271 ↓	0.224 ↓

Source: Poverty Estimation Committee, MoPD&SI

5.4 Average Adult Equivalent Consumption

Quintile wise average adult equivalent consumption shows that besides the top quintile growth of income for each quintile in urban area is higher than rural areas. However, for top quintile rural income growth is higher than the urban income growth. Moreover, income growth of the top quintile is less than

the bottom 4 quintiles. Does this imply that we have quite inclusive policies over the years? This is not enough information to establish this fact.

Table 7: Average Adult Equivalent Consumption – Quintile wise

QUINTILES	2005-06 (Rs.)	2007-08 (Rs.)	2010-11 (Rs.)	2011-12 (Rs.)	2013-14 (Rs.)	2015-16 (Rs.)	2018-19 (Rs.)	Average Annual rowth	Change
I - Overall	751.88	891.91	1652.87	1779.4	2219.32	2689.87	2996.74	12.21%	3.96
I - Urban	852.42	1023.11	1819.57	2007.37	2655.47	3001.42	3618.11	12.80%	4.24
I - Rural	712.21	841.99	1584.12	1677.98	2104.77	2386.84	2828.13	12.18%	3.97
II - Overall	1026.13	1208.76	2225.15	2402.55	3022.34	3730.33	4104.41	12.25%	3.99
II - Urban	1193.12	1415.02	2503.92	2749.26	3735.34	4184.77	5077.57	12.83%	4.26
II - Rural	953.69	1122.93	2091.41	2221.59	2801.27	3154.71	3782.27	12.17%	3.97
III - Overall	1282.89	1503.51	2745.28	2973.75	3783.66	4752.15	5122.94	12.23%	3.99
III - Urban	1548.67	1816.55	3171.17	3457.49	4744.43	5348.7	6526.01	12.73%	4.21
III - Rural	1165.67	1360.34	2534.57	2695.18	3420.54	3857.77	4603.01	12.13%	3.95
IV - Overall	1678.38	1952.53	3500.38	3826.89	4864.36	6289.75	6689.5	12.21%	3.98
IV - Urban	2136.73	2477.42	4161.7	4640.15	6324.87	7161.51	8600.74	12.30%	4.03

IV - Rural	1454.15	1693.34	3132.75	3348.7	4262.35	4846.96	5749.36	12.14%	3.95
V - Overall	3670.03	4183.63	6786.93	7930.25	9226.72	12888.18	12712.04	10.91%	3.46
V - Urban	5281.75	5891.42	9004.21	10803.99	12698.22	14920.35	17348.07	10.42%	3.28
V - Rural	2418.51	2864.51	5084.72	5443.25	6936.29	7946.54	9495.56	12.07%	3.93
National	1681.6	1947.91	3381.95	3782.07	4622.94	6069.21	6324.28	11.67%	3.76
Urban	2203.16	2524.62	4132.44	4731.65	6031.81	6922.49	8233.27	11.61%	3.74
Rural	1340.73	1576.5	2885.36	3077.39	3904.91	4438.14	5291.14	12.12%	3.95

Source: Poverty Estimation Committee, MoPD&SI

5.5 Percentile Shares

Table 8 compares the decile shares of the consumption expenditures for the years 2015-16 & 2018-19. It highlights that there is about a 5.4% increase in expenditures for the bottom 10% of households. This incremental effect can be observed in almost all deciles except for the top 10% of the households. Where there is a significant decline of about 7%. This indicates that the income is being distributed relatively more to the bottom quintiles or the middle class in 2018-19 as compared with 2015-16. On the other side, in 2015-16 the top 10% of the households spend approximately 7.1% more than the bottom 10%. While in 2018-19 the top 10% of the households spend more than 26% of the expenditures while just 4% of the spending accrued to the poorest 10% of the population. There seems to be a change of tendency in 2015-2018: poor households and middle classes increase their expenditures whereas the top 10% households reduced them. In 2018-19, the top 5% of households captured 17% of the expenditures while the poorest 5% of households spend less than 2% (see Table A1).

5.6 Inter-decile Ratio & Palma Ratio

A commonly used percentile ratio also known as, “Interdecile ratio,” is the 90-10 ratio, which shows the income level of individuals at the top of the consumption distribution (top 10%) relative to the consumption level of those at the bottom of the distribution (bottom 10%). For example, the 90-10 ratio in Pakistan, calculated based on income proxy, is 7.1 for the year 2015-16; this means that the consumption of the richest 10% is 7.1 times greater than that of the poorest 10% of the households in Pakistan. While this ratio is kept low at 6.3 for the year 2018-19. This measure can also be split into 90-50 and 50-10 ratios to study consumption disparity separately between the upper end and the middle, and between the middle and the lower end of the consumption distribution, respectively. The benefits

of using the percentile or share ratios is that they are transparent about what part of the distribution is driving the observed changes in the summary measure, which is more difficult to pinpoint when using the Gini coefficient.

Table 8: Summary Statistics for Inequality: Percentiles

(Mean per Equivalent Adult Expenditure)

HIICS/HIES 2015-16					HIES 2018-19				
Number of obs = 24,238					Number of obs = 24,809				
Income[9]	Coef.	S.E.	[95% Conf. Interval]		Income	Coef.	S.E.	[95% Conf. Interval]	
0-10	3.942	0.033	3.877	4.006	**0-10**	4.154	0.028	4.098	4.209
10-20	5.050	0.036	4.980	5.121	**10-20**	5.325	0.033	5.261	5.390
20-30	5.812	0.039	5.736	5.888	**20-30**	6.132	0.036	6.061	6.204
30-40	6.583	0.042	6.500	6.666	**30-40**	6.872	0.039	6.795	6.949
40-50	7.417	0.046	7.327	7.506	**40-50**	7.666	0.043	7.582	7.750
50-60	8.363	0.049	8.266	8.459	**50-60**	8.602	0.047	8.511	8.694
60-70	9.547	0.054	9.441	9.653	**60-70**	9.720	0.051	9.620	9.820
70-80	11.151	0.059	11.034	11.267	**70-80**	11.329	0.058	11.215	11.444
80-90	14.010	0.076	13.861	14.160	**80-90**	14.052	0.074	13.907	14.197
90-100	28.126	0.334	27.472	28.780	**90-100**	26.147	0.347	25.467	26.827

Source: Poverty Estimation Committee, MoPD&SI

9 *Mean per Equivalent Adult Expenditure Variable (As a proxy for income)*

Table 9: Summary Statistics for Interdecile Ratios & Palma Ratios

Year	Interdecile Ratio			Share Ratio (Palma Ratio)*	
	90-10	90-50	50-10	80-20	90-40
2015-16	7.136	0.977	18.063	4.686	1.315
2018-19	6.295	0.867	16.816	4.241	1.163

Source: Poverty Estimation Committee, MoPD&SI

A similar measure of income concentration can be obtained by looking at consumption expenditure shares of individuals at different parts of the distribution, e.g. by dividing the population into quintile groups. Table 9 above reports the "Interquintile Share ratio", 80-20, which shows the share of total consumption spending by the top quintile (top 20%) relative to the share spent by the bottom quintile (bottom 20%) for both years 2015-16 & 2018-19 as well.

Apart from the transfer principles, the quintile ratio satisfies the anonymity, population independence, normalization, and scale invariance properties. The quintile ratios are not decomposable as they are not additively decomposable and do not satisfy the sub-group consistency property. Another key limitation of using quintile ratios is that such measures only compare two consumption quintiles (i.e. compare only the selected percentiles), and therefore do not reflect information from the entire consumption distribution. Note that there are different quintile ratios used to measure inequality in the literature. Among the most commonly used measures are the proportion of income/consumption that goes to the top 1% and the top 10%, and the Palma ratio.

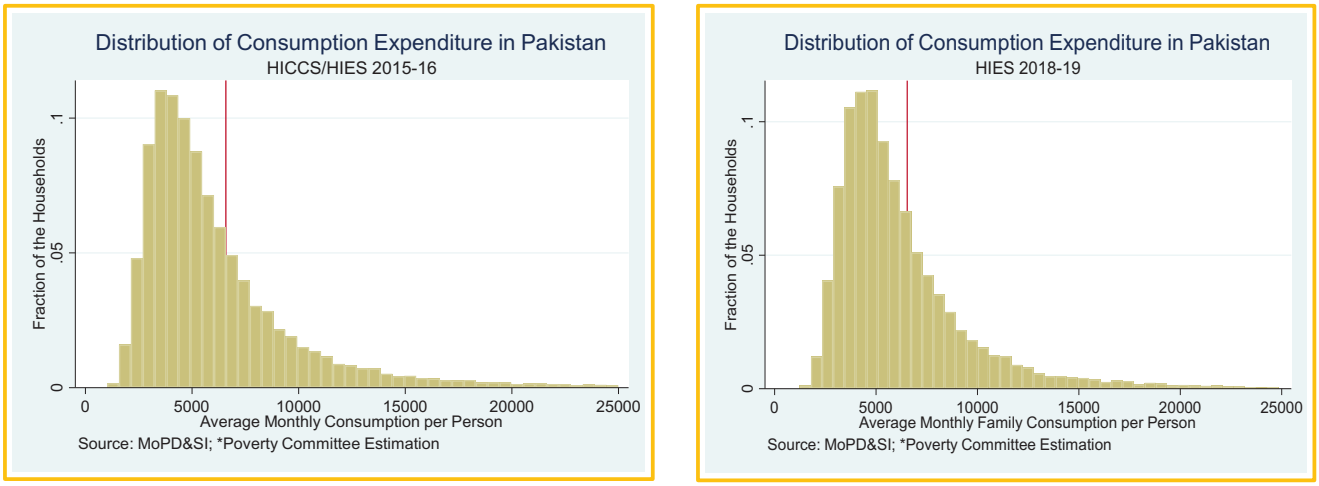
The Palma ratio is the share of total income or expenditure enjoyed by the top 10% divided by the poorer 40% of the households. The use of the Palma ratio has grown in recent years (see; Doyle & Stiglitz, 2014). The motivation for using the Palma ratio as a measure of inequality is based on the empirical observation that the share of expenditures going to the 'middle' deciles (5-9) is relatively stable across countries and over time, and accounts for about half of the total expenditures. Thus, changes in income/consumption inequality are mainly due to changes in the 'tails' (Cobham et al., 2016). It is considered that countries with a Palma ratio of 1 or below 1 are relatively equal, meaning that the top 10% does not receive a larger share of total expenditures than the bottom 40%. Table 7 above reports the Palma ratio for the years 2015-16 (i.e. 1.3) & 2018-19 (i.e. 1.2). It shows a relative improvement over the time, means that the expenditure share is being transferred from richest 10% to the bottom 40%. Another way of expressing this is that the poorer 40% of the household improved their living standards.

5.7 Distribution of Consumption Expenditure: A Graphical Overview

Measuring inequality with the help of comparing distributions of consumption expenditures for a country over time helps in identifying the distributional patterns among households. Figure 6 presents distributions of average family consumption expenditures per person across households in Pakistan for the years 2015-16 & 2018-19. The skewed shape with a long right tail for consumption expenditures highlights that most of the households consume below the average with a few households that are slightly on the higher side. Measures of inequality attempt to capture the dispersion, or the spread, of this distribution. It is worth noting that for both of the years we get almost the same level of household

income reported by the PBS[10], once we multiply the average family consumption expenditure per person by the average household size. This indicates the consistency of our estimates and about the proxy we used here for the estimations.

Figure 6: Distribution of Consumption Expenditure



Note: Using mean per equivalent adult expenditure as a proxy of income

Source: Poverty Estimation Committee, MoPD&SI

5.8 Inequality Measures from SDGs

The report also includes the two measures of inequality that are listed in Goal 10 of the Sustainable Development Goals, i.e., 10.1.1 and 10.2.1.

Fostering Income Growth of the Bottom 40 Percent

The measure exhibits the change in consumption over the years and shows welfare distribution over time. It is computed by the compound growth rate of average household consumption among the bottom 40 percent households, i.e.,

$$\text{Growth of consumption} = \left(\left(\frac{C_n}{C_0}\right)^{1/(T_n - T_0)} - 1\right) x\ 100;$$

C_n represent average per capita consumption in the nth period

C_0 represents average per capita consumption in the based period

T_n represents nth time period and T_0 represents base period time period

The report includes compound growth rate of consumption for two periods, i.e., 2013-14 to 2015-16 and 2015-16 to 2018-19. Using the average per capita consumption 7.41% growth rate was estimated during 2013-14 to 2015-16, whereas 3.01% growth rate of average consumption was estimated.

10 *For instance, considering 2018-19, the average income per person is 6538.15 and average household size is 6.24. Now when 6538.15x6.24 = 40798.04.*

SDGs Indicator 10.1.1 Growth Rates of Household Expenditure Per Capita Among the Bottom 40 Percent	
Year	**Growth Rates of Household Expenditure or Income Per Capita Among the Bottom 40 Percent (%)**
2013-14 to 2015-16	7.41
2015-16 to 2018-19	3.01

Source: Poverty Estimation Committee, MoPD&SI

Median Consumption

Median consumption of households per month was Rs. 4335.7 in 2015-16 (Table 4) and the proportion of households living below 50 percent median consumption was 3.33%. The median consumption in 2018-19 was increased by 17% in 3 years to Rs. 5070.2 per household per month. Whereas, proportion of households living below 50 percent median consumption was 2.88%.

SDGs Indicator 10.2.1 Proportion of Households Living Below 50 Percent of Median Income/Consumption			
Year	**Median Consumption of HH per Month (Rs.)**	**50 % of Median Consumption of HH per Month (Rs.)**	**Proportion of Households Living Below 50 Percent of Median Consumption (%)**
2015-16	**4335.742**	**2167.871**	**3.33**
2018-19	**5070.197**	**2535.099**	**2.876**

Source: Poverty Estimation Committee, MoPD&SI

6. Conclusion & Recommendations

The mandate of the Poverty Committee includes estimation of poverty as well as inequality nationally and for all four provinces. Poverty and inequality for all the four provinces is calculated and reported in the national report for the very first time. Consistent decline in poverty is not matched with the changes in inequality over the last one and a half decade. The fundamentals of poverty are mostly associated with growth, remittances, land prices, changes in the incomes and addition of earners. However, redistributive impact on poverty is ambiguous due to less variation in inequality.

The sampling frame, which was updated through the 2017 Census, has been used for sample selection. Poverty lines have risen by 15.6% between the three years (2015-16 and 2018-19), which implies an increase of 4.96% per annum. The decline in poverty is more pronounced in urban areas than rural areas.

Our extreme poor definition is different than World Banks definition of $2.15 (PPP) per month per person. Our estimates of show that 5.56% of population are classified as “extremely poor” & “ultra-poor”, comprised of 11.75 million people who require social protection coverage. Moreover, at the higher end, the percentage of “quasi non-poor” increased from 34.8% in 2015-16 to 37.2% in 2018-19.

The Poverty Committee recommends that:

- We must start publishing provincial numbers of poverty and inequality in accordance with the TORs of the committee.
- Academia and think tanks may be asked to explore the determinants of poverty and inequality both in rural as well as in urban areas.
- It will be more than ten years since we estimated new poverty line using CBN method in 2013-14 when the next HIES is held in 2024-25; it is suggested to convene a team to discuss the estimation of a new poverty line when the next HIES is available.
- Though there is a consistent decline in poverty, it is not matched with the inequality estimates, this also shows that our policies are not based on the principles of equity. More research is required to explore this area by academia and think tanks.
- The role of the provinces is to keenly work to reduce poverty and inequality, thus significant interaction is required to synergize provincial polices and plans with the federal policies and plans.

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Annexure

Annexure-I

Table A1 - Summary Statistics for Inequality: Deciles

(Mean per Equivalent Adult Expenditure)

Consumption[11]	Coef.	S.E.	[95% Conf. Interval]	
0-1	0.302	0.003	0.296	0.308
1-5	1.558	0.012	1.535	1.580
5-10	2.294	0.015	2.264	2.324
10-20	5.325	0.033	5.261	5.390
20-30	6.132	0.036	6.061	6.204
30-40	6.872	0.039	6.795	6.949
40-50	7.666	0.043	7.582	7.750
50-60	8.602	0.047	8.511	8.694
60-70	9.720	0.051	9.620	9.820
70-80	11.329	0.058	11.215	11.444
80-90	14.052	0.074	13.907	14.197
90-95	9.146	0.062	9.024	9.268
95-99	10.621	0.118	10.390	10.852
99-100	6.381	0.327	5.740	7.021

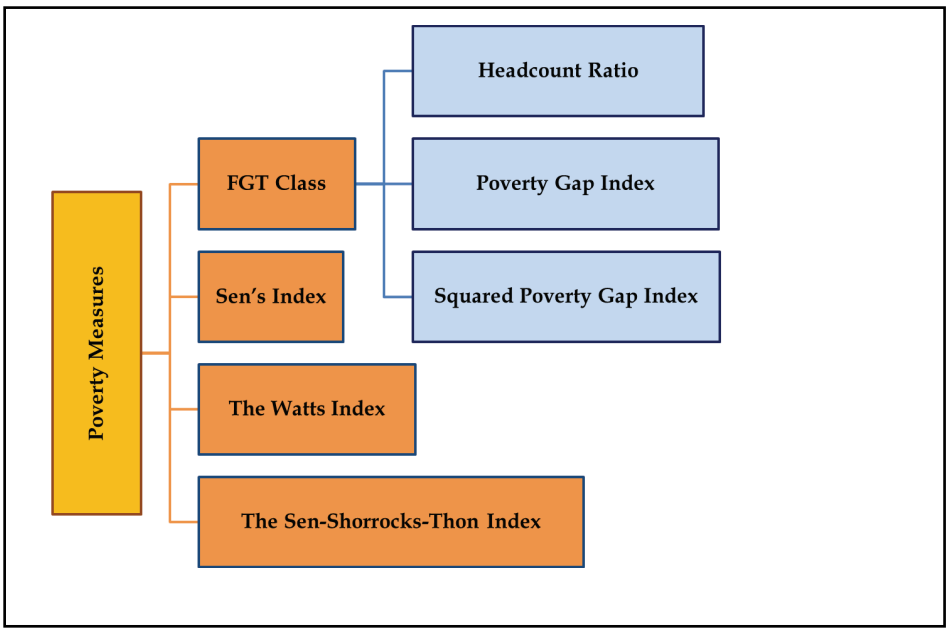
Source: Poverty Estimation Committee, MoPD&SI

The details of FGT class poverty measures have already been discussed earlier. However, our following

11 *Mean per Equivalent Adult Expenditure Variable (As a proxy for income)*

Poverty Measures

Concerning poverty measures, we have a number of options available in literature. For a concept map (see; Figure A, below):



Source: (see; GoP, 2018) report

discussion spans to get an idea of other poverty measures displayed in above figure.

Sen's Index: This index combines the effects of the number of poor, the depth of their poverty, and the distribution of poverty within the group. Mathematically can be defined as:

$$P_s = P_o\left(1-(1-G)\frac{\mu^P}{z}\right)$$

where P_o is the headcount index, μ^P is the mean expenditure of the poor, and G is the Gini coefficient of inequality among the poor. The Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality). This index is widely used though almost never been used outside of the academic literature because it "cannot be used to decompose poverty into contributions from different subgroups" (Deaton, 1997).

The Watts Index: Ravallion and Chen (2001) argued that for a good measure of poverty three axioms[12] must be satisfied. This index is increasingly used by researchers because it satisfies all the theoretical properties that one would want in a poverty index. Mathematically it can be written as:

12 *Focus axiom, monotonicity axiom & transfer axiom*

$$W = \frac{1}{N}\sum_{i=1}^{q}(\ln(z) - \ln(y_i))$$

where the N individuals in the population are indexed in ascending order of income (or expenditure), and the sum is taken over the q individuals whose income (or expenditure) y_i falls below the poverty line z.

The Sen-Shorrocks-Thon Index: So far, several attempts have been made to modify Sen's Index but the one by Sen-Shorrocks-Thon (SST) is considered to be more fascinating one. Mathematically written as:

$$P_{SST} = P_0 P_1 \left(1 + \hat{G}\right)$$

which is the product of the headcount index, the poverty gap index (applied to the poor only), Gˆis the term with the Gini coefficient of the poverty gap ratios for the whole population. This Gini coefficient typically is close to 1, indicating great inequality in the incidence of poverty gaps.

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