



Food and Agriculture  
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Food Prices for  
Nutrition 

# Measuring the Cost and Affordability of a Healthy Diet in Pakistan





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Joint output of Food and Agriculture Organization of the United Nations (FAO), the Food Prices for Nutrition project and the Government of Pakistan.

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## Table of Contents

Table of Contents.....	iv
Acronyms and Abbreviations.....	vii
Acknowledgements.....	vi
Executive Summary.....	vii
Introduction.....	1
Food Security and CoAHD.....	3
Objectives.....	6
Data and Methodology.....	7
Data.....	7
Food price data.....	7
Data on household consumption expenditure.....	8
Pakistan's FBDG.....	9
Methodology.....	10
CoHD.....	10
Affordability.....	11
Calculating Cost and Affordability of a Healthy Diet.....	13
Historic Trend of CoHD at National and Provincial Level.....	13
Spatial variations in the CoHD.....	13
Temporal variations in CoHD food basket.....	17
Understanding rising CoHD in the context of high inflation.....	18
Affordability of a Healthy Diet.....	20
Ratio of CoHD to real food expenditure per adult equivalent.....	20
Percentage of households that cannot afford CoHD.....	22
An alternate approach to estimating affordability.....	23
Limitations.....	26
Way Forward.....	28
Conclusion.....	30
References.....	32
Appendix 1.....	35
Appendix 2.....	38
Annexure.....	40

## Table of Tables

Table 1: Breakdown of monthly food price data.....	7
Table 2: Recommended number of foods and calories per food group .....	9
Table 3: Percentage-wise breakdown of CoHD at different geographical levels for the year 2023 .....	16
Table 4: Ratio of the Cost of a Healthy Diet to real food expenditure per adult equivalent, by year and different geographical levels.....	21
Table 5: Share (%) of households that cannot afford a healthy diet, by year and different geographical levels .....	23
Table 6: Share (%) of households that cannot afford a healthy diet in the year 2023 .....	24

## Table of Figures

Figure 1: Historic inflationary trend in Pakistan.....	1
Figure 2: Inflationary trend during the year 2023.....	2
Figure 3: 2023 Global Hunger Index scores in South, East, and Southeast Asian countries .....	3
Figure 4: Prevalence of moderate or severe food security in Pakistan (percentage of households) .....	4
Figure 5: Prevalence of moderate or severe food insecurity based on household expenditure quintiles (percentage of households).....	5
Figure 7: Trends in prevalence of undernourishment, annual inflation, and food inflation in Pakistan using international data .....	6
Figure 8: Historic trend in nominal CoHD at national and provincial levels .....	13
Figure 9: Spatial variation in CoHD for the year 2023.....	14
Figure 10: Breakdown of CoHD by food group for the year 2023 .....	15
Figure 11: Yearly and seasonal variation in CoHD by food group at national level .....	17
Figure 11: Indexed trend in CoHD, general and food CPI from July 2019 to November 2023 ...	19
Figure 14: Historic trend of nominal CoHD, real CoHD and Food CPI from July 2019 to November 2023.....	20

## Acronyms and Abbreviations

**AE**

Adult Equivalent

**CPI**

Consumer Price Index

**CoAHD**

Cost and Affordability of Healthy Diet

**CoHD**

Cost of Healthy Diet

**GHI**

Global Hunger Index

**FAO**

Food and Agriculture Organization of the United Nations

**FCT**

Food Composition Table

**FPL**

Food Poverty Line

**FBDG(s)**

Food-Based Dietary Guideline(s)

**GDP**

Gross Domestic Product

**HIES**

Household Integrated Economic Survey

**PBS**

Pakistan Bureau of Statistics

**PCSIR**

Pakistan Council of Scientific & Industrial Research

**PKR**

Pakistani Rupee

**PSLM**

Pakistan Social & Living Standards Measurement

**PC**

Ministry of Planning, Development & Special Initiatives

**UNICEF**

United Nations Children's Fund

**USDA**

United States Department of Agriculture, Agricultural Research Service

**WFP**

World Food Programme

**WHO**

World Health Organization

**YoY**

Year on Year



## Acknowledgements

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## Executive Summary

The cost and affordability of a healthy diet is a key policy concern as removing barriers to a healthy diet allows people to live an active and healthy lifestyle as productive members of society. In Pakistan, the relatively higher cost of healthy food items impacts their affordability, the quality of overall diet as well as nutrition and health outcomes. The impact of unaffordability is disproportionately greater on the poor, which is evidenced by the prevalence of undernourishment in Pakistan reported at around 18.5 percent in 2021 (FAO, 2023). While the cost of healthy food is not the only factor that determines food choices, food prices do play a significant role. The recent significant hike in food inflation, exacerbated by supply-side disruptions, worsening exchange rate, and rising fuel and energy costs, has substantially enhanced the impact food prices have on dietary choices as people prioritized caloric adequacy over nutritional richness.

Given the inflationary pressure being faced by the country, this report aims to describe the Cost and Affordability of a Healthy Diet (CoHD) in Pakistan. The country has among the highest burdens of malnutrition in the world, with the prevalence of child malnutrition (stunting prevalence among under 5 children estimated to be around 34 percent) and prevalence of undernourishment estimated to be around 18.5 percent in the total population (FAO, 2023). The Cost of a Healthy Diet (CoHD) metric uses national monthly food price data (collected by PBS) and Pakistan's food-based dietary guidelines (FBDGs) to calculate the minimum daily cost of meeting the dietary recommendations by selecting the least-cost foods available per food group at a particular time and location.

The results of average daily CoHD are reported at national, provincial, and regional levels using the latest price data from July 2019 to November 2023. At the national level for the year 2023, CoHD was estimated to be PKR 281 for Pakistan, lower than the CoHD for urban Pakistan (PKR 278) and higher than the CoHD for rural Pakistan (PKR 285), respectively. The data also showed variation across provinces, with Punjab reporting the lowest CoHD (PKR 262), Balochistan reporting the highest (PKR 298).

A breakdown of nominal CoHD at the national level for the year 2023 shows that meeting recommendations for the milk and milk products is the most expensive in nominal terms, and starchy staples is the most affordable in cost per calorie terms. In Pakistan as of the year 2023, dairy and its products accounted for roughly 43 percent of the total daily CoHD, with similar contributions estimated for urban and rural Pakistan. As such, milk and milk products food group

is a key contributor towards the CoHD across regions and provinces. Similar composition of cost of food groups is reported at the provincial level as well.

Overall, nominal CoHD shows a rising trend over the period of analysis at national, provincial, and regional (urban/rural) level. At the national level, nominal CoHD has increased from PKR 151 in July 2019 to PKR 290 in November 2023. Similar increase in nominal CoHD was estimated for urban and rural Pakistan, however, inflation adjusted CoHD showed a downward trend for both these regions over the period of analysis. This is as expected as food inflation was far more elevated than general inflation during the last few years.

Assessing affordability of CoHD is a pivotal step in understanding and addressing access to a healthy diet for the population of Pakistan. At national level, 82 percent of households could not afford a healthy diet in 2023. More people could afford a healthy diet in urban areas than in rural areas. Amongst the provinces, Punjab consistently had the lowest levels of unaffordability (78 percent) whereas Balochistan had the highest level of unaffordability (95 percent). Temporally, unaffordability seemed to have risen during the period of analysis, likely due to lower real wages or incomes due to a relatively greater rise in cost of food as well as non-food items compared to the relatively slower rise in nominal wages or earnings.

In this analysis, our method relies on the assumption that expenditure rises at the same rate as inflation. If wages or incomes grew at a rate less than that of general inflation, our analysis underestimates the increase in unaffordability in Pakistan over the 2019-2023 period. This assumption is necessary as the latest consumption expenditure data available dates to 2018-19; new data from the next HIES will provide deeper insights, as could other sources of income and wage data. Furthermore, given that food CPI rose faster than general inflation and CoHD, unaffordability is not rising at the same rate for all foods; least-cost items experienced less inflationary pressure than all food items during the 2019-2023 period, on average.

The report provides data that can guide agriculture and food policies with a focus on improving physical and economic access to the foods needed for a healthy life. Food inflation has risen at a faster rate than CoHD, it is possible that people might be focusing more on fulfilling calorie requirement at the expense of a healthy diet. To improve the affordability of a healthy diet, targeted interventions, such as conditional cash transfers, as well as agriculture and food policies can be used to emphasize and prioritize improving access to a healthy diet.

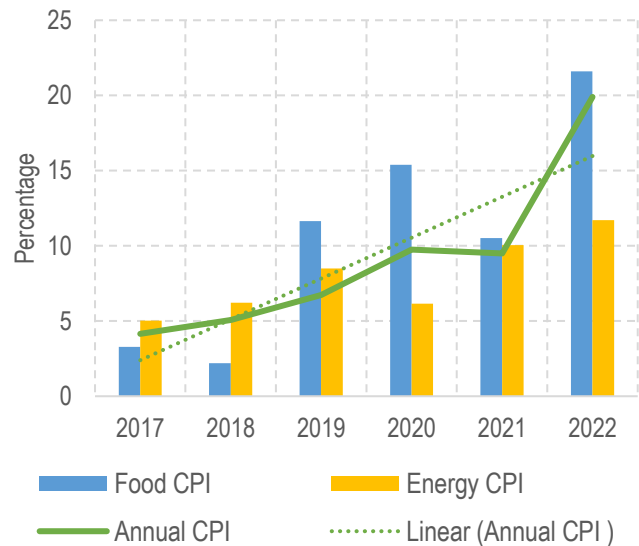
## Introduction

Price and affordability of healthy diet is a key policy concern as removing barriers to a healthy diet allows people to live an active and healthy lifestyle as productive members of society. In Pakistan, the cost and affordability of healthy food is impacted primarily by seasonality, availability, access, and value chain efficiency. Nutritious food such as fruits, vegetables, meat, and dairy products are not only relatively more expensive than calorie-dense food, but their cost also varies geographically and seasonally. This is substantiated by 2018 Cost of the Diet study: The findings showed that cost and affordability of diet varies across different regions in Pakistan and that on-average nutritious diet is more expensive than energy-adequate diet (Beyero, 2018).

The relatively higher cost of healthy food impacts its affordability as well as the quality of overall diet and nutrition outcomes, such as malnutrition and stunting. Moreover, this impact is disproportionately greater for the poor, who are more likely to choose cheaper, energy-rich diets.

The Prevalence of Undernourishment (PoU) in the population was estimated to be around 18.5 percent in a recent report (FAO, 2023). Ever-increasing population, food price volatility and declining purchasing power due to persistent inflationary pressure are some of the key factors that have impacted food affordability in the recent years. While cost of food is not the only factor which determines food choices and affordability, it plays a significant role in the selection of diet, especially for the poor who spend a disproportionately larger part of their income on food and are more sensitive to even small food price hikes.

**Figure 1: Historic inflationary trend in Pakistan**



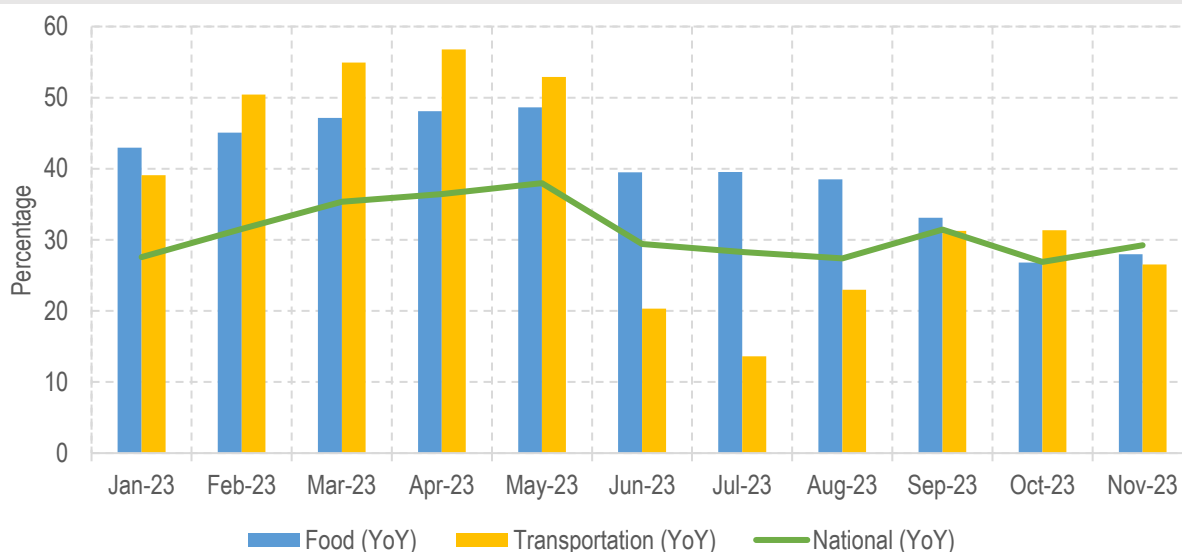
Notes: Data shown is yearly percentage change from 2019 to 2022.  
 Source Jongrim, H., Ayhan, K. M., and Ohnsorge, F. 2021. *One-Stop Source: A Global Database of Inflation*. Policy Research Working Paper, 9737. Washington DC. World Bank. [Cited 18 December 2023].  
<https://www.worldbank.org/en/research/brief/inflation-database>

Cost and affordability of healthy diet is adversely impacted by food price inflation. Food commodity prices have displayed an upward trajectory in the past few years (see Figure 1) and this inflationary pressure has considerably worsened in the last year (see Figure 2). Food inflationary pressure remained elevated throughout the first half of 2023. Supply-side disruptions, acute

## Introduction

shortage of foreign reserve leading to import curtailment and reduced fiscal space, worsening exchange rate, rising fuel and energy costs, and political instability were the main drivers behind the elevated levels of general and food inflation during the year 2023. The second half of the year witnesses a gradual easing in the inflationary pressure. However, despite the central banks continued monetary tightening and the base effect of 2022, inflation plateaued at an elevated level in 2023. With food inflation reaching an average of 39.8 percent in 2023 so far, people were likely making dietary choices that prioritized dietary adequacy over nutrient richness.

**Figure 2: Inflationary trend during the year 2023**



Notes: Data shows year on year (YoY) change in food, transportation and general levels of inflation.

Source: Pakistan Bureau of Statistics (PBS). *Monthly Review on Price Indices*. [Cited 18 December 2023].

<https://www.pbs.gov.pk/cpi>

Given the inflationary pressure being faced by the country, this report aims to describe the cost and affordability of a healthy diet in Pakistan. The country has among the highest burdens of malnutrition in the world, with around 43 million people estimated to be undernourished (FAO et al., 2023). Elevated numbers of malnutrition signals at widespread poor dietary choices in the country, with cost and access likely being two important components of this decision-making process. The Cost and Affordability of a Healthy Diet (CoAHD) metric harnesses existing data to calculate the minimum cost of meeting dietary needs as well as its affordability, with the aim of enabling better-informed and timely policy decisions thus, ultimately aiding in improving dietary and nutrition outcomes in the country.

## Food Security and CoAHD

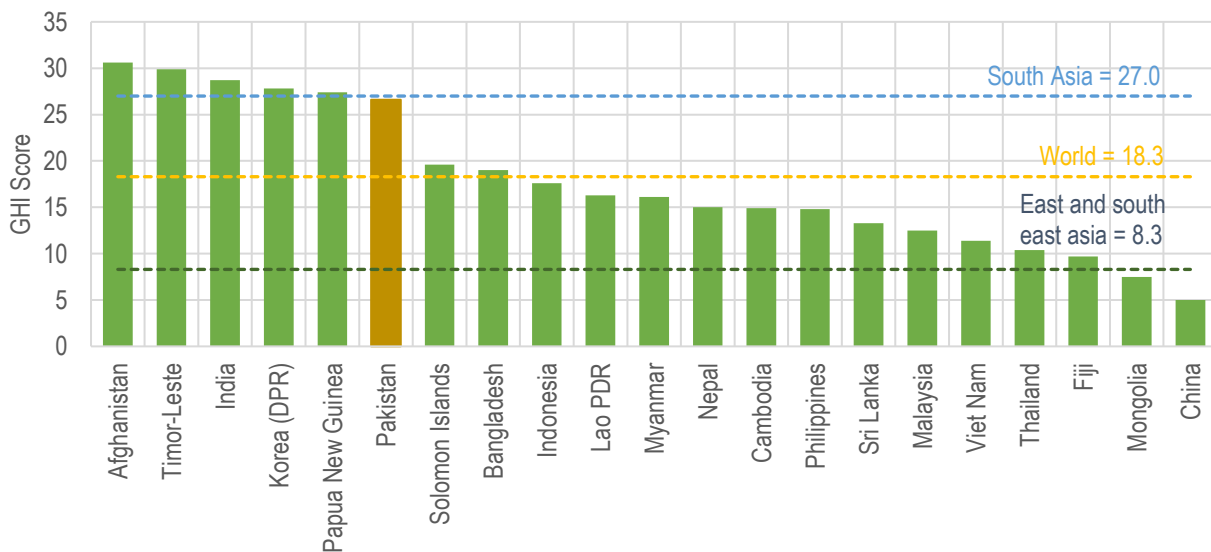
According to the United Nations’ Committee on World Food Security:

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996).

Food security is, thus, inherently impacted by changes in climate, population and environment, all of which in turn adversely impacts food availability, quality and cost. In recent years, food security in Pakistan has been impacted by the Covid-19 pandemic, the Ukraine-Russia war, devastating monsoon floods and the persist elevated levels of food inflation.

In Pakistan, food security is a priority policy concern as it has one of the worst incidences of hunger in the region. Pakistan ranked 102 out of 125 countries and sixth worst amongst the South Asian, and East and Southeast Asian countries in the 2023 Global Hunger Index (GHI). Pakistan’s GHI is only marginally below the South Asian average and is significantly above the world GHI score (Grebmer et al., 2023). Improving food security is a pressing humanitarian issue with far reaching economic, social and political consequences.

**Figure 3: 2023 Global Hunger Index scores in South, East, and Southeast Asian countries**

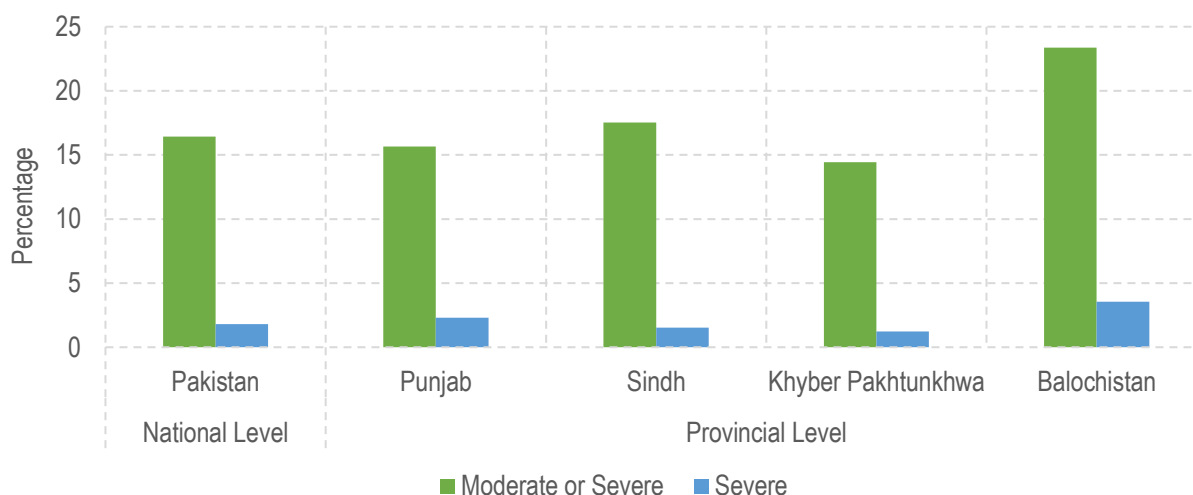


Notes: Countries included in estimation of South Asia are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The remaining countries are included East and Southeast Asia. Due to insufficient data, Bhutan and Maldives are not shown.

Source: Von Grebmer, K., Bernstein, J., Wiemers, M., Reiner, L., and Bachmeier, M. 2023. *2023 Global Hunger Index. The Power of Youth in Shaping Food Systems*. Dublin, Concern Worldwide and Bonn, Welthungerhilfe. [Cited 18 December 2023]. <https://www.globalhungerindex.org>

Apart from gender disaggregation, the incidence of food insecurity also displays a disproportionate impact across other characteristics. Factors, such as poverty, inequality, effectiveness of food systems, inadequate safety nets, and poor governance especially at the local level, all play a part in the severity and distribution of the incidence of food security. According to the 2018-19 Pakistan Social & Living Standards Measurement (PSLM), 15.9 percent of the households in Pakistan are faced with moderate or severe food insecurity, with the incidence of food insecurity being more acute in rural Pakistan (20 percent of households) than in urban Pakistan (9.2 percent of households) (PBS, 2020). According to the 2019-20 Pakistan Social & Living Standards Measurement (PSLM), the prevalence of food insecurity slightly increased to 16.4 percent and varied across provinces of Pakistan as well, with Balochistan reporting the greatest number of households as moderately or severely food insecure (23.4 percent of households) and Khyber Pakhtunkhwa reporting the lowest number of households as moderately or severely food insecure (14.4 percent of households). The prevalence of moderate or severe food insecurity in Punjab and Balochistan was above that of the national average while the incidence of severe food insecurity was the lowest in Sindh and Khyber Pakhtunkhwa (PBS, 2021). This implies that a stronger role is being played by poverty, inequality, food systems, climate change, and governance in worsening the incidence of food security for the poor in Balochistan, which has the highest incidence of moderate or severe food insecurity and severe food insecurity.

**Figure 4: Prevalence of moderate or severe food security in Pakistan (percentage of households)**



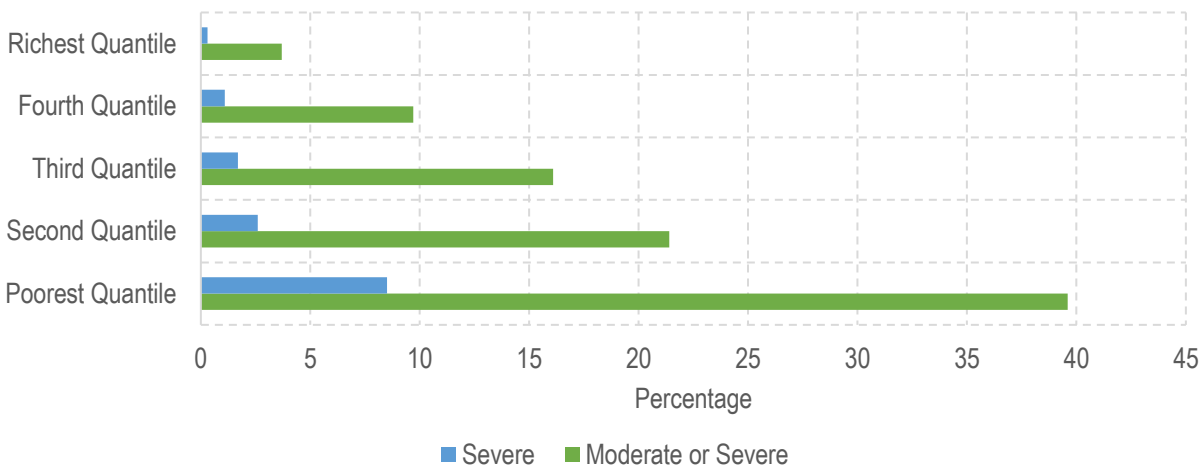
Notes: Estimates shown have been calculated using FAO's Food Insecurity Experience Scale (FIES).

Source: PBS. 2021. *PSLM - 2019-20 Pakistan Social and Living Standards Measurement Survey District Level Survey*.

Islamabad, PBS. <https://www.pbs.gov.pk/content/pakistan-social-and-living-standards-measurement>

Poverty and inequality are the strongest forces adversely acting on food security. High prices combined with low levels of household income result in households making poor nutrition and dietary choices. In Pakistan, the prevalence of moderate or severe food insecurity is highest among households that belong to the poorest expenditure quintile (see Figure 5). Roughly 40 percent of the households in the poorest income quintile are moderately or severely food insecure. Balochistan has the lowest percentage contribution to the real Gross Domestic Product (GDP) of Pakistan at 3.5 percent (USD 13 billion) with high levels of household poverty, this is likely to be contributing towards higher levels of food insecurity in the province (Government of Balochistan, 2022).

**Figure 5: Prevalence of moderate or severe food insecurity based on household expenditure quintiles (percentage of households)**



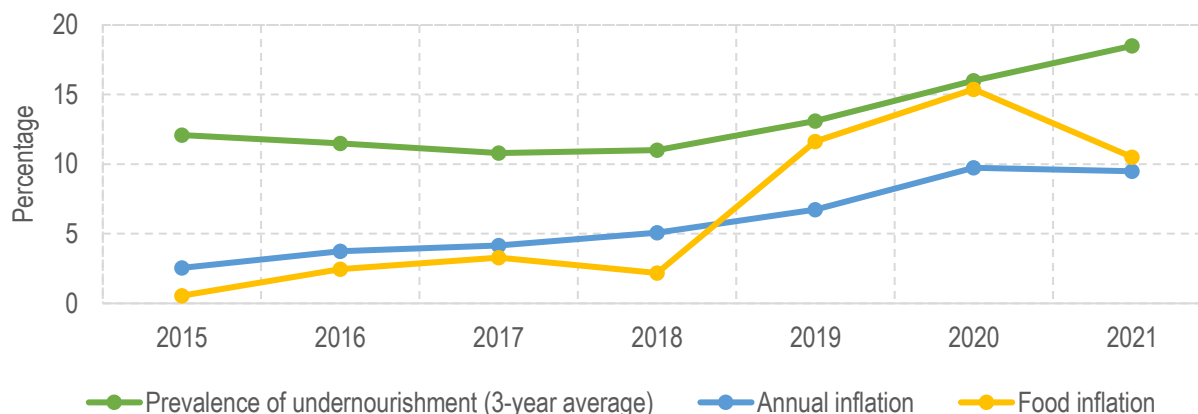
Notes: The latest publication does not include this analysis hence the second latest publication is used to report these figures.

Source: PBS. 2020. *Pakistan Social & Living Standards Measurement Survey (PSLM) 2018-19 National /Provincial (Social Report)*. Islamabad, PBS. <https://www.pbs.gov.pk/content/pakistan-social-and-living-standards-measurement>

Pakistan has been experiencing high levels of inflation which directly impacts people’s ability to afford a healthy diet. Recent years has witnessed worsening levels of inflation accompanied by increasing levels of undernourishment in the population. Annual food inflation has risen from 0.6 percent in 2015 to 10.5 percent in 2021 as shown in Figure 7. Food inflation even surpassed annual inflation figures from 2019 to 2021, with peak level reached in 2020 due to the supply-side complications caused by the pandemic. The rate of increase in PoU has accelerated since 2019, likely contributed in large part by rising levels in food inflation, with the momentum not lessening in 2021, implying prolonged sensitivity to food inflation.



**Figure 6: Trends in prevalence of undernourishment, annual inflation, and food inflation in Pakistan using international data**



Note: PoU has been estimated as a three-year average e.g., 2021 is the average of 2020 to 2022 estimated PoU values.

Source:

FAO. 2023 Suite of Food Security Indicators In: *FAOSTAT*. Rome. [Cited 18 December 2023].

<https://www.fao.org/faostat/en/#data/FS>

Jongrim, H., Ayhan, K. M., and Ohnsorge, F. 2021. *One-Stop Source: A Global Database of Inflation*. Policy Research Working Paper, 9737. Washington DC. World Bank. [Cited 18 December 2023]. <https://www.worldbank.org/en/research/brief/inflation-database>

Food security and the cost of diet are intrinsically linked as prices of food commodities capture access, availability, and affordability of food. Any shocks to food system are signalled by a rise in food prices which adversely impacts the state of food security in the country. Cost of Healthy Diet (CoHD) and its affordability indicators can thus provide policymakers and international organizations with timely data that can be leveraged to guide agriculture and food systems policies towards improved nutrition and health outcomes.

## Objectives

The report aims to apply the methodology (explained in Data and Methodology section) to monthly price data and household survey data from Pakistan to showcase the utility of this data in evaluating economic constraints on nutrition, and food security. The results will better inform key stakeholders at national and international level regarding CoAHD metric for measuring and monitoring activities. Broadly, the objectives are to:

1. Use the CoHD method to estimate the minimum CoHD in Pakistan and across different regions,
2. Assess the affordability of the CoHD relative to household consumption expenditure.

By utilizing existing food price data, the CoHD method can be used to broaden awareness and attention regarding the minimum cost of nutritious diets and foods, and thereby enabling better-informed policy decisions.

## Data and Methodology

CoHD estimates the minimum daily cost of achieving the recommended diet. These estimates are calculated using monthly price data of each food item, and information from food-based dietary guidelines (FBDGs). For the purpose of this report, Pakistan’s FBDG has been used for the calculation of CoHD, however, the methodology can easily be applied using any other dietary guideline. To estimate affordability, household consumption expenditure data from Household Integrated Economic Survey (HIES) 2018-19, published by Pakistan Bureau of Statistics (PBS), has also been utilised.

### Data

#### Food price data

Monthly food price data is regularly collected by PBS for the calculation of Consumer Price Index (CPI) in 95 markets across Pakistan and is used for the calculation of CoHD metric (PBS, 2019). The complete list of monthly food price data was requested from PBS as monthly price data for only select commodities and districts is publicly available. Average retail food prices for rural and urban districts were shared (see Table 1).

**Table 1: Breakdown of monthly food price data**

	Urban Data	Rural Data
Number of food items	90	79
Number of districts	35	27
Date (to and from)	July 2019 to November 2023	July 2019 to November 2023

Notes: Food price data is collected from different number of markets in each district, depending on their urban-rural classification. Source: PBS. 2023. Food prices. In: *Price Statistics*. Islamabad. [Cited 21 December 2023].

The number of food items being reported differs in urban and rural locations. There are 70 common food items, 20 unique food items for urban areas and 10 unique items for rural areas. All food items were included in the analysis with certain exceptions such as infant food, sweets, condiments etc. as these food items are not recommended or required as part of a healthy diet: 20 common food items, 12 food items in the urban food items list and 5 food items in the rural food items list were excluded from the analysis based on this criterion (see Appendix 1 for detailed food list).

## Data and Methodology

In the urban and rural food price lists, 16 districts were common in both whereas data was being collected from 22 unique urban districts and 14 unique rural districts (see Appendix 2 for a list of all districts).

The main advantages of using CPI data for the purpose of calculating CoHD is that this data is already being collected regularly, is available at the district level, and reports commonly consumed food items. However, retail price data does not adequately represent prices being faced by the whole of the population e.g., consumers buying food items from *sastaa bazaars* (affordable markets). Nonetheless, retail market prices are the food prices being faced by most consumers and has the most relevance when assessing the impact of rising price of food items.

### **Data on household consumption expenditure**

Household consumption expenditure data was used from the 2018-19 HIES, with a sample size of 24,809 households. This data has certain advantages: Firstly, this data is representative at provincial and national level, allowing for the calculation of subnational variation in estimates. Secondly, HIES data is collected throughout the year; thus, seasonal variations in consumption expenditure are also considered. Thirdly, HIES allows us to compare CoHD with food expenditure; both observed food expenditure and an estimated food budget based on spending of relatively poor households – which, in this case, has been defined as households that belong to the second-lowest total expenditure quintile of the total population (referred to as the “reference population” in this remainder of this paper). In estimating total expenditure, non-food and food consumption and expenditure were aggregated, including the values of non-purchased items such as food produced by the household or received as a gift.

The consumption and expenditure module of the HIES 2018-19 asks households to rely on a specified recall period in reporting consumption of food and non-food items as well as their quantities and values. The recall period is either a fortnight, a month or a year, depending on the recall lists and options for reporting units. The recall period for food items is either a fortnight or a month, with the longer duration of a year reserved for non-durable and durable goods and services. As the duration of recall period inversely impacts quantities consumed, it is likely that the longer recall period would result in larger, downward-biased recall errors for some items (Beegle, Weerdt, Friedman, & Gibson, 2012).

The CoHD calculations use the latest monthly price data whereas the most recent HIES data covers the period 2018-19. To make the comparison, consumption expenditures reported in HIES have been firstly converted to real values (using June 2016 as the base period) and to adult

equivalent terms, before they are projected forward using the general, food, and non-food CPI, as appropriate.

For the estimation of an adult equivalence factor for each household, the energy needs for an active individual from the Institute of Medicine for the Dietary Reference Intakes was used for individuals based on their age-sex composition (Institute of Medicine, 2006). An adult equivalency is assigned to each household members which is equal to the energy needs for an individual of reference height and weight in their same age-sex category, divided by 2,330 calories, which is the reference calorie intake for the Cost of a Healthy Diet (Schneider and Herforth 2020; Herforth et al. 2022). The projected real consumption expenditure per adult equivalent per day values are used to estimate the affordability indicators.

### Pakistan's FBDG

Pakistan's Dietary Guidelines for Better Nutrition-Pakistan's dietary guideline-provides country-specific guidelines for the adoption of healthy eating practices with the aim of improving quality of life and overall socio-economic development conditions in the country (Ministry of Planning, Development and Special Initiatives, 2019). Culturally appropriate and relevant, Pakistan's FBDG provides description of nutritious diet according to different age and gender groups thus, ensuring ease in adaptability. Moreover, it provides specific quantity, nutrient and caloric recommendations by food groups, information that is essential for the calculation of CoHD. The document identifies six main food groups: starchy staples (labelled as cereals); vegetables; fruits; meat, pulses, and eggs; milk and milk products; and fats and oils. In addition, the number of recommended servings per day, serving size, and nutrient information are also mentioned per food group.

**Table 2: Recommended number of foods and calories per food group**

Food Group	Number of foods recommended	Calories (kcal/day)
Starchy staples	2	927
Oils and fats	1	330
Fruits	2	258
Vegetables	3	80
Meat, pulses, and eggs	2	256
Milk and milk products	1	479
Total	11	2,330

To calculate CoHD, recommended amounts for each food group needed to be expressed in number of food and calorie terms. Pakistan's FBDG laid out consumption recommendations in a range of number of servings for each food group. These consumption recommendations were quantified in calories per day terms for each food group for the purpose of diet costing. Recommended number of food and calories per food group based used in the estimation of each CoHD basket are shown in Table 2. The recommended number of foods and calories per day are based on the average recommended number of food items and example food item for each food group, respectively. The calories per day amount per food group had been proportionally scaled to meet the daily 2,330 calorie requirement.

## Methodology

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### CoHD

Calculating CoHD involved the following steps once a dietary standard has been selected. First, food matching was carried out to match each food item in the food price list to a food group and their corresponding entries in Food Composition Tables (FCTs). This allows for the second step: estimating cost per calorie of each item, based on each food item's energy density and edible portion. Data on kilocalories per 100 grams of edible portion is used from different FCTs, primarily from United States Department of Agriculture (USDA) National Nutrient Database for Standard Reference, Release 28 (USDA, 2016), and the Pakistan's Food Composition Tables (NWFP Agriculture University, UNICEF & Ministry of Planning and Development, 2001; Pakistan Council of Scientific & Industrial Research (PCSIR) and Ministry of Planning, Development and Special Initiatives, forthcoming), however, a few food items were also matched using Nepal's FCT (Department of Food Technology and Quality Control, 2017). To calculate the cost per day, total calories per day is estimated for each food group, using target quantities according to Pakistan's FBDG: This means that the kcal per day of each food group and the number of recommended food(s) per day for each food group is used to estimate total calories per day as per Pakistan's dietary guideline. The fourth step involves adjusting the total calories per day from Pakistan's FBDG to match to the global reference for energy requirements – 2330 kcal/day. Scaling up or down of the quantities of each food group, would allow for comparisons to be drawn across countries and with the global estimates of CoHD results.

The next step is selecting the least-expensive food items per food group based on the cost per calorie calculations. This step is simplified by ranking food items based according to their cost per calorie. In the final step, cost per calorie of each least expensive food item selected is multiplied

by calories needed as per Pakistan's FBDG. Summing the costs of all selected items gives us the CoHD indicator.

Food items such as spices, condiments, and beverages (other than milk) were excluded from the CoHD calculation because they are not required or recommended in a healthy diet, or do not contribute any calories (e.g., water).

The method ensures that more than one least-cost item is selected per food group as per the selected FBDG thus ensuring dietary diversity in a cost-effective manner. Moreover, selecting least-cost food items ensures robustness against sensitivity to very expensive food items and items not available in the market.

### **Affordability**

The affordability indicator provides complementary information that sheds light on the financial circumstances of the population. A measure of income or consumption expenditure is used to compare the cost indicator with the purchasing power of the population. For this report, consumption expenditure was used to estimate purchasing power as income estimates can be less reliable, such as in instances where households rely on subsistence agriculture, when cash incomes fluctuate throughout the year and it can be difficult to recall the past year's income, or when economic activity is largely driven by the informal market.

To estimate the affordability indicator, CoHD is compared to an "available food budget" based on typical spending of relatively poor households and the observed total expenditure of each household. Relatively poor households, also called reference population in this report, are defined in this report as the households that fall in the second lowest total consumption expenditure quintile per adult equivalent. This approach of comparing CoHD with an estimated food budget allows us to answer the following question: Are incomes sufficient to afford healthy diets without compromising other essential needs? This approach is preferred because we do not want to confuse the analysis with the question of whether people are making these choices because of reasons other than affordability, such as utilization, preferences, etc.

As affordability of a healthy diet is reported as the percentage of people who cannot afford CoHD, nationally representative household survey data (HIES 2018-19) is used to estimate food, non-food, and total consumption expenditure per adult equivalent per day. These consumption expenditure values are converted to real values to estimate median share of food expenditure for our reference group population – households in the second lowest quintile of total expenditure

## Data and Methodology

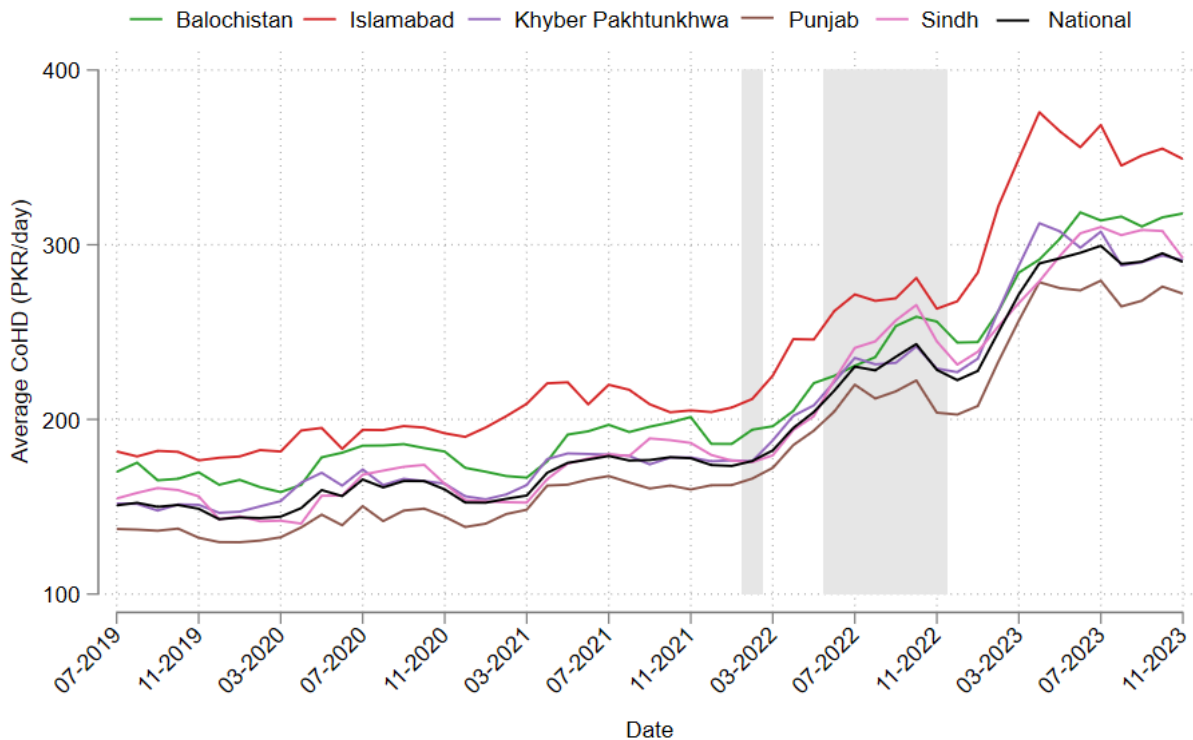
per adult equivalent – at the rural-urban provincial level. The estimated food budget is calculated using this median share of food expenditure for the reference population and total real adult equivalent expenditure calculated for the current period of estimation. This estimated available food budget is used to classify each household as being able to or unable to afford a healthy diet.

## Calculating Cost and Affordability of a Healthy Diet

### Historic Trend of CoHD at National and Provincial Level

The CoHD indicator allows for the visualization of the spatial and temporal trend in the least-expensive healthy diet across different locations. CoHD shows a rising trend over the period of analysis (Figure 8). At the national level, CoHD has increased from PKR 151 in July 2019 to PKR 290 in November 2023, approximately doubling during our period of analysis. This trend has been followed by the average CoHD at provincial level, with Islamabad reporting significantly above average levels of CoHD. The shaded regions highlight periods with significant exogenous shocks – the beginning of the Ukraine-Russia War and the duration of 2022 floods – to demonstrate how monitoring CoHD monthly can capture the impact of these types of events on access to healthy diets.

Figure 7: Historic trend in nominal CoHD at national and provincial levels



Notes: Figure shows the yearly trend of average CoHD at different geographical level.  
Source: Author's own elaboration.

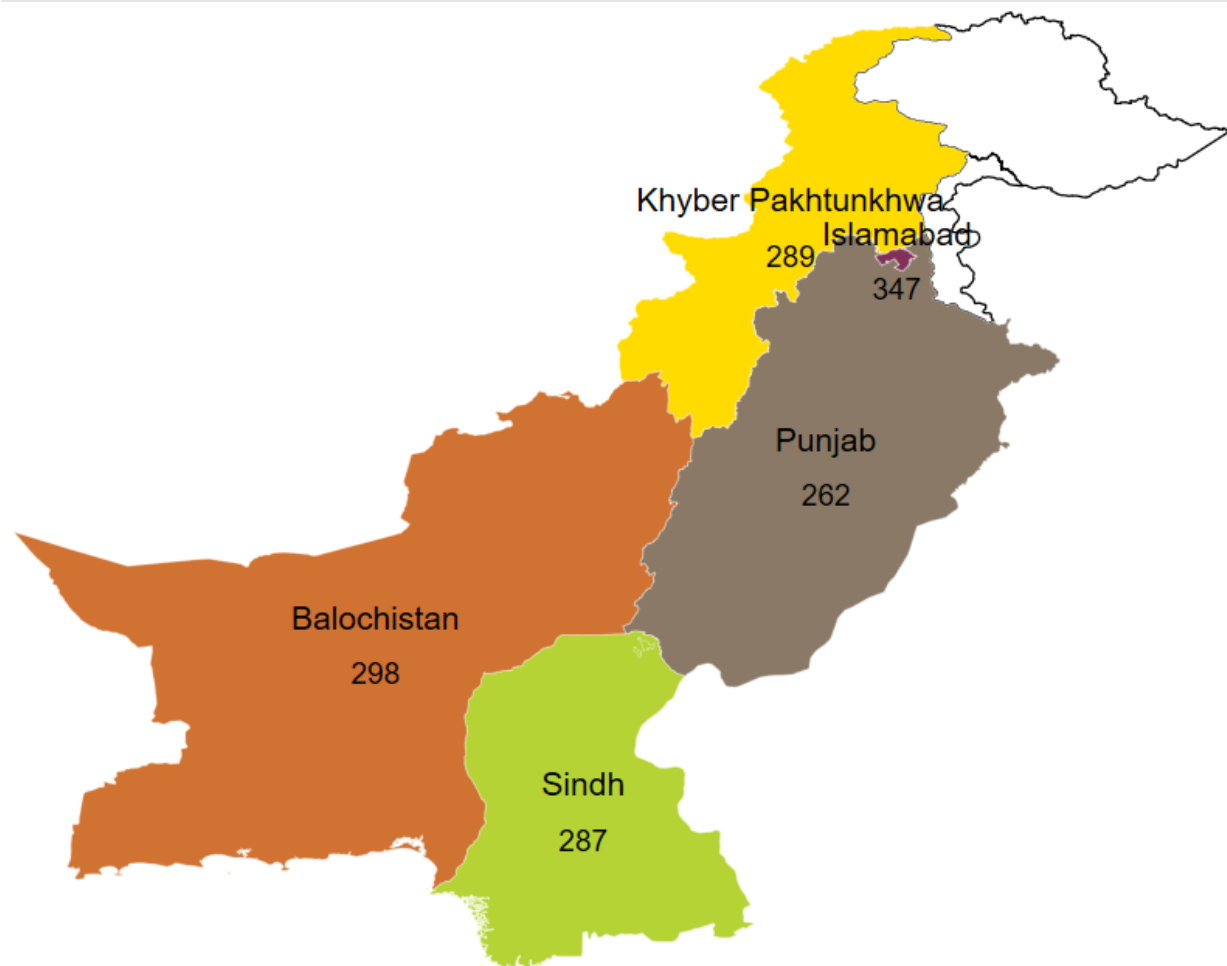
### Spatial variations in the CoHD



## Calculating Cost and Affordability of a Healthy Diet

The CoHD indicator also captures spatial variation in least-expensive food items across different markets. This variation is demonstrated in Figure 9, which shows the CoHD in the country at the broadest administrative level for the year 2023. The CoHD has been estimated as the average of all the relevant district-level CoHD for the year 2023, while ensuring that the calorie requirement for each food group is met and that the total remains fixed at 2,330 kcal. By averaging the CoHD values over all the months in 2023, seasonal variation in CoHD has been minimized. The lowest CoHD was estimated for the province of Punjab at PKR 262, followed by Sindh at PKR 287, Khyber Pakhtunkhwa at PKR 289, and Balochistan at PKR 298. The estimated CoHD was the highest for Islamabad at PKR 347. However, the food prices for Islamabad are only collected from urban markets which might account for the elevated level of CoHD in the region. Transportation and distribution cost might be a factor that is contributing to the higher level of food inflationary pressure in Islamabad (See Figure 2 for transportation price trend during the year 2023).

**Figure 8: Spatial variation in CoHD for the year 2023**



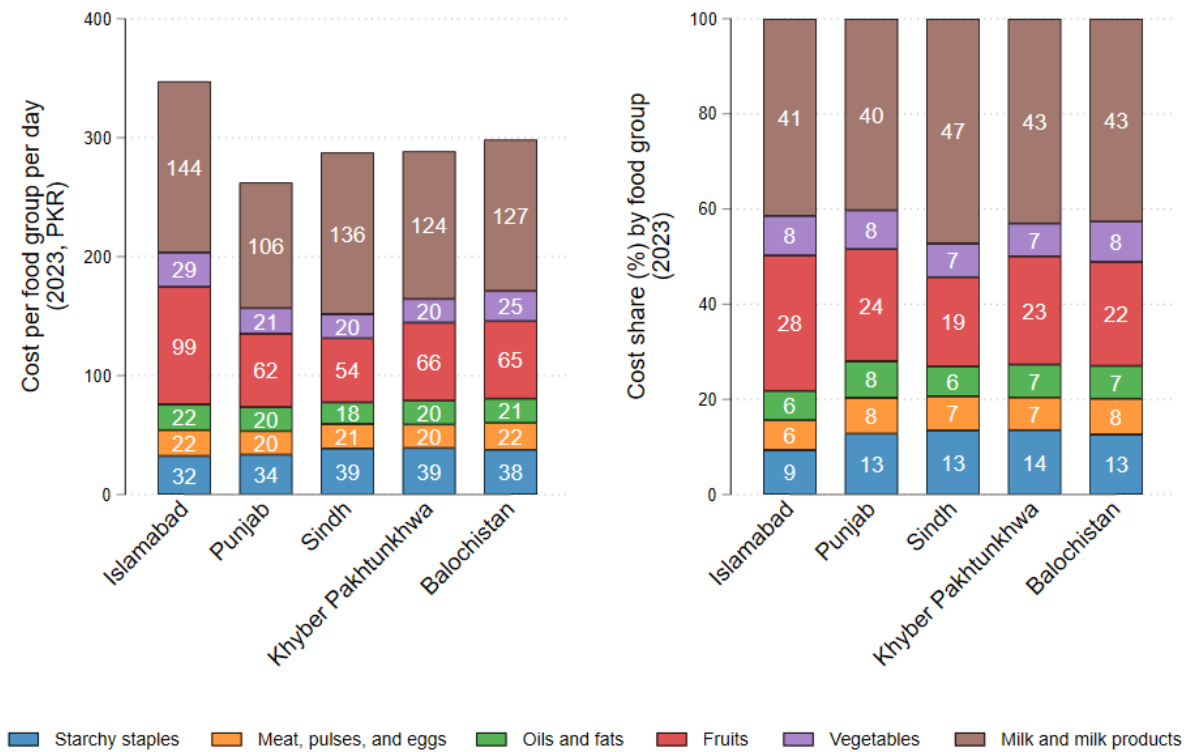
Notes: CoHD estimates have been rounded off to the nearest whole number and percentage. Data shows the variation in the breakdown of CoHD across different administrative regions in Pakistan for the year 2023.

The data in Figure 8 might differ slightly from the data shown in this figure because of the rounding off effect.

Source: Author's own elaboration.

Analysing the cost per food group per day, as shown in Figure 10, reveals that the main food groups contributing to CoHD are milk and milk products and fruits, across all five administrative regions. In Islamabad region, the nominal cost per food group for milk and milk products as well as fruits was significantly above the average reported by other regions, which might explain the elevated levels of CoHD for Islamabad. Fruits were also the least affordable in caloric terms (PKR 0.383 per calorie)<sup>1</sup> followed by vegetable (PKR 0.362 per calorie) and milk and milk products (PKR 0.300 per calorie) food groups for the Islamabad region. Conversely, the breakdown of Punjab’s CoHD reveals that not only was the nominal cost of milk and milk products significantly

**Figure 9: Breakdown of CoHD by food group for the year 2023**



Notes: CoHD estimates have been rounded off to the nearest whole number and are in nominal PKR terms. Data shows the variation in CoHD across different administrative regions in Pakistan for the year 2023 (except for the month of December, for which data was not available at the time of analysis).

The CoHD was not estimated for the regions of Azad Jammu and Kashmir, and Gilgit Baltistan as food price data was not available.

The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. The final status of Jammu and Kashmir has not been decided between Pakistan and India.

Source: Author’s own elaboration. Conforms to World Food Programme SDI. 2022. *Pakistan - Subnational Edge-matched Administrative Boundaries*. HUMANITARIAN DATA EXCHANGE [Shapefile]. Hague, UN.

<sup>1</sup> The cost per calorie is calculated as the cost of the entire food group divided by the total number of calories a food group provides. This represents the cost per calorie of the least-cost items at each time and place.

## Calculating Cost and Affordability of a Healthy Diet

more affordable, vegetables and meat, pulses and eggs were also relatively more affordable in Punjab, resulting in the lowest estimate of the CoHD indicator across all regions. The cost per calorie was highest for vegetables (PKR 0.267 per calorie) and fruits (PKR 0.240 per calorie) food groups in Punjab. Starchy staples are the cheapest in calorie terms across all regions, and also the largest contributor to the daily 2,330 calorie requirement.

District-level CoHD was averaged to estimate the CoHD at the national as well as at urban- and rural-regional levels, as shown in Table 3. While the national level CoHD was estimated to be PKR 281 for the year 2023, the estimate of CoHD for rural Pakistan was higher at PKR 285 than urban Pakistan CoHD estimated at PKR 278. The difference in CoHD at different regions can be explained by both differences in price and differences in the least-cost basket of food items available in each location. Starchy staples seem to be relatively more costly in rural Pakistan than in urban Pakistan given that it contributes 14 percent to the rural Pakistan's CoHD for the same percentage share of calories (40 percent). Conversely, vegetables and milk and milk products are relatively less costly in rural Pakistan than in urban Pakistan.

**Table 3: Percentage-wise breakdown of CoHD at different geographical levels for the year 2023**

	Starchy Staples	Meat, pulses, and eggs	Oils and fats	Fruits	Vegetables	Milk and milk products	Total	
<i>Share of calories per food group in FBDG</i>	40	11	14	11	3	21	100	
<i>Share of cost per food group in CoHD</i>								CoHD (PKR / day)
Pakistan	13	7	7	22	8	43	100	281
Urban Pakistan	12	7	7	22	8	43	100	278
Rural Pakistan	14	7	7	22	7	42	100	285
Urban Punjab	12	7	8	24	8	41	100	267
Rural Punjab	14	8	8	24	8	39	100	263
Urban Sindh	12	7	6	19	7	48	100	286
Rural Sindh	15	7	6	18	7	47	100	289
Urban Khyber Pakhtunkhwa	12	7	7	23	7	44	100	284
Rural Khyber Pakhtunkhwa	14	7	7	23	7	43	100	292
Urban Balochistan	12	7	7	22	9	44	100	295
Rural Balochistan	14	8	7	22	8	42	100	302

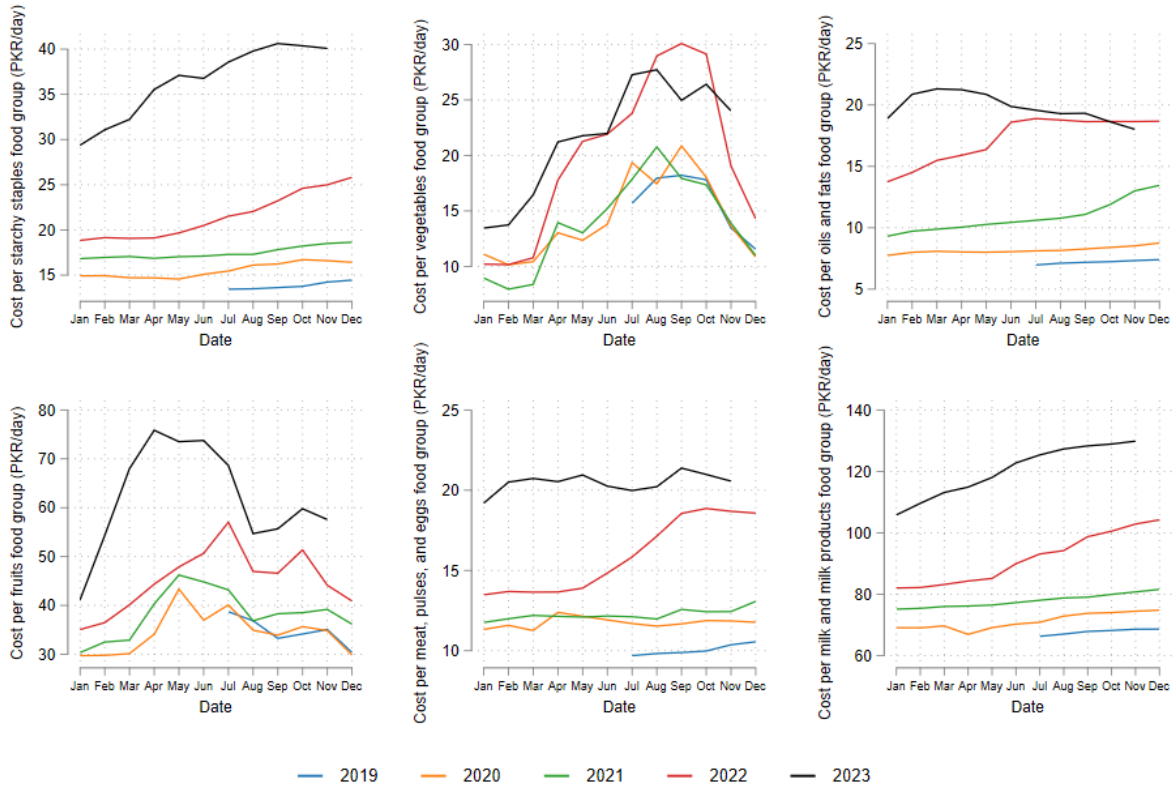
Notes: CoHD estimates have been rounded off to the nearest whole number. Data shows variation in percentage-wise breakdown of CoHD and CoHD per day across different administrative regions in Pakistan for the year 2023.  
Source: Author's own elaboration.

A similar pattern of the breakdown of CoHD is seen for urban and rural regions at the provincial level, however, greater variation is observed in the percentage share of different food groups. Starchy staples, fruits, and milk and milk products had the greatest variation in percentage share of CoHD across different regions, nonetheless, these variations follow the urban and rural national-level pattern. For starchy staples, rural provincial areas had greater percentage contribution to CoHD than in urban provincial areas. Fruits and milk and milk products combined accounted for roughly 65% of the CoHD across these regions. While milk and milk products accounts for almost 42 percent of the CoHD, it also contributes 20 percent to the total calorie requirement-second-highest contribution to total calorie requirement after starchy staples.

### Temporal variations in CoHD food basket

The CoHD is seasonally impacted therefore, understanding seasonal variations is a significant aspect in the monitoring of CoHD. The usage of monthly food price data allows us to capture

**Figure 10: Yearly and seasonal variation in CoHD by food group at national level**



Notes: Figure shows the yearly variation in the cost per food group of CoHD at the national level.  
Source: Author's own elaboration.

## Calculating Cost and Affordability of a Healthy Diet

seasonal variation. The emphasize on selecting the least-expensive food items in the composition of the CoHD food basket essentially minimizes cost and food item(s) variation for most food groups. Overall, the increase in CoHD is driven by rising cost of least-cost food items in food groups: starchy staples, oils and fats, and meat, pulses, and eggs. Variation in selected least-cost food items is stemming from availability of cheaper seasonal food items in food groups: fruits and vegetables.

At the national level, the cost per food group shows a clear yearly upward trend as shown in Figure 11. This trajectory shows little seasonality for starchy staples, milk and milk products and oils and fats. Vegetables and fruits show considerable seasonality, which is expected given their perishability and changing availability throughout the year. The cost of the meat, pulses, and eggs category showed less seasonality than fruits and vegetables, for some particularly in 2022 and 2023; this may be due to the diverse nature of this food group which includes perishable items as well as dried pulses, which are easier to store. For the starchy staples, and milk and milk products food groups, cost seems to be increasing however, for the oils and fats, and meat, pulses, and eggs food groups, the costs seem to be stabilising in the year 2023.

The food groups vegetables and fruits were the main source of variation in the selection of least cost food items for the CoHD food basket as shown in Figure 11. Cost per fruits food groups shows seasonal variation during the summer months, starting from April to July, and then a second fluctuation during the months of October and November. Cost per vegetables food group shows three cycles of variation: from March to May, from July to August, and then from September to October. Cost per fruits and vegetables food groups is the lowest during the winter months.

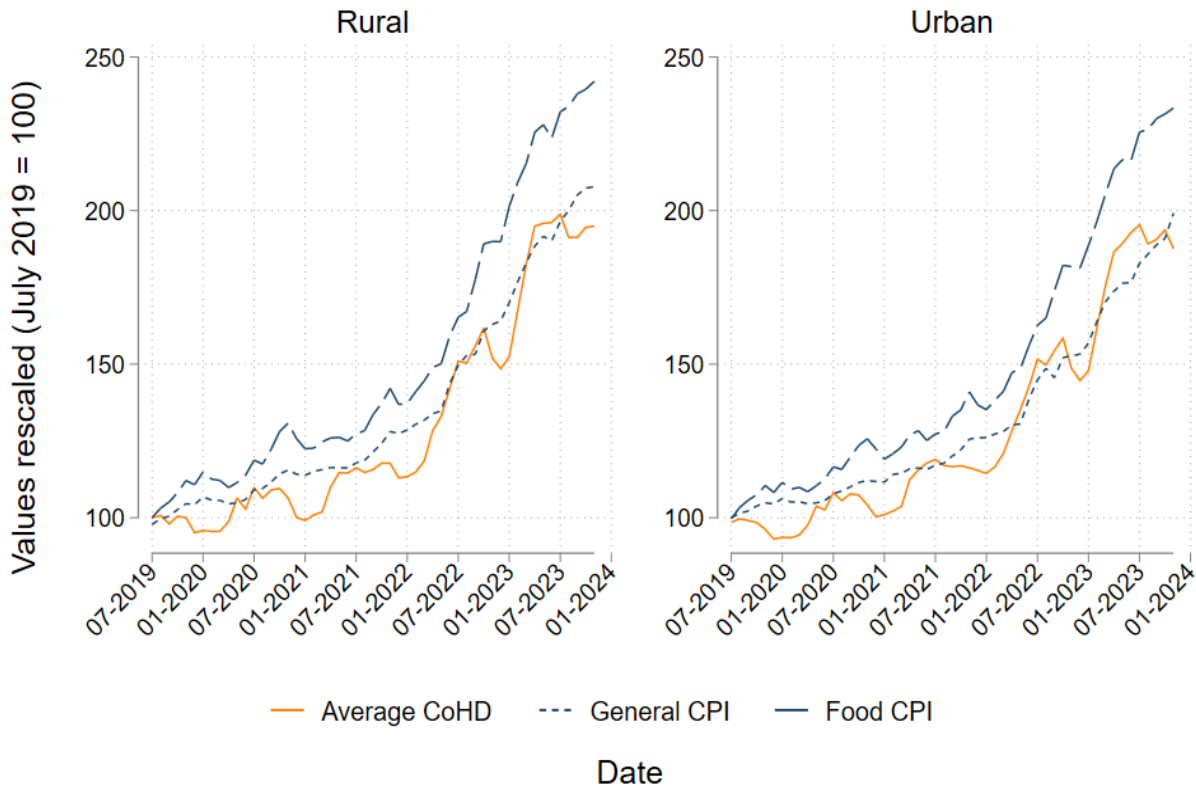
### **Understanding rising CoHD in the context of high inflation**

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This increase in the cost of least-expensive food that was being selected for the estimation of CoHD between mid-2019 and 2023 is not unexpected given unusually high inflation being observed in Pakistan during the same period. Aside from the inflationary pressure caused by the disruption of demand and supply during the pandemic, the Ukraine-Russia War and the 2022 floods, Pakistan has been experiencing unusual levels of inflationary pressure during this period due to several factors such as supply-side disruptions, worsening exchange rate, rising fuel and energy costs, and political instability (Javed and Dayo, 2023; Ministry of Planning, Development & Special Initiatives, 2022). These factors have exerted pressure on food and transportation costs especially, impacting both food and general inflation.

Since food prices have risen unusually during our period of analysis, CoHD analysis would be incomplete without a comparison with general and food inflation. The indexed trend of average CoHD, food and general inflation from July 2019 to November 2023 at urban and rural national level is shown in Figure 11. The base for all of these has been set at July 2019 to demonstrate the region-wise change during the period of our analysis. Overall, there seems to be greater inflationary pressure in rural region than in urban region. However, in both regions, the growth in indexed food inflation outpaced the increase in CoHD and general inflation. As CoHD is estimated using the least-cost food items in each food group whereas the food CPI is estimated using a large number of food items, including some which are excluded from this analysis such as infant formula or value-added food items, the relatively lower rate of increase of CoHD is expected.

**Figure 11: Indexed trend in CoHD, general and food CPI from July 2019 to November 2023**



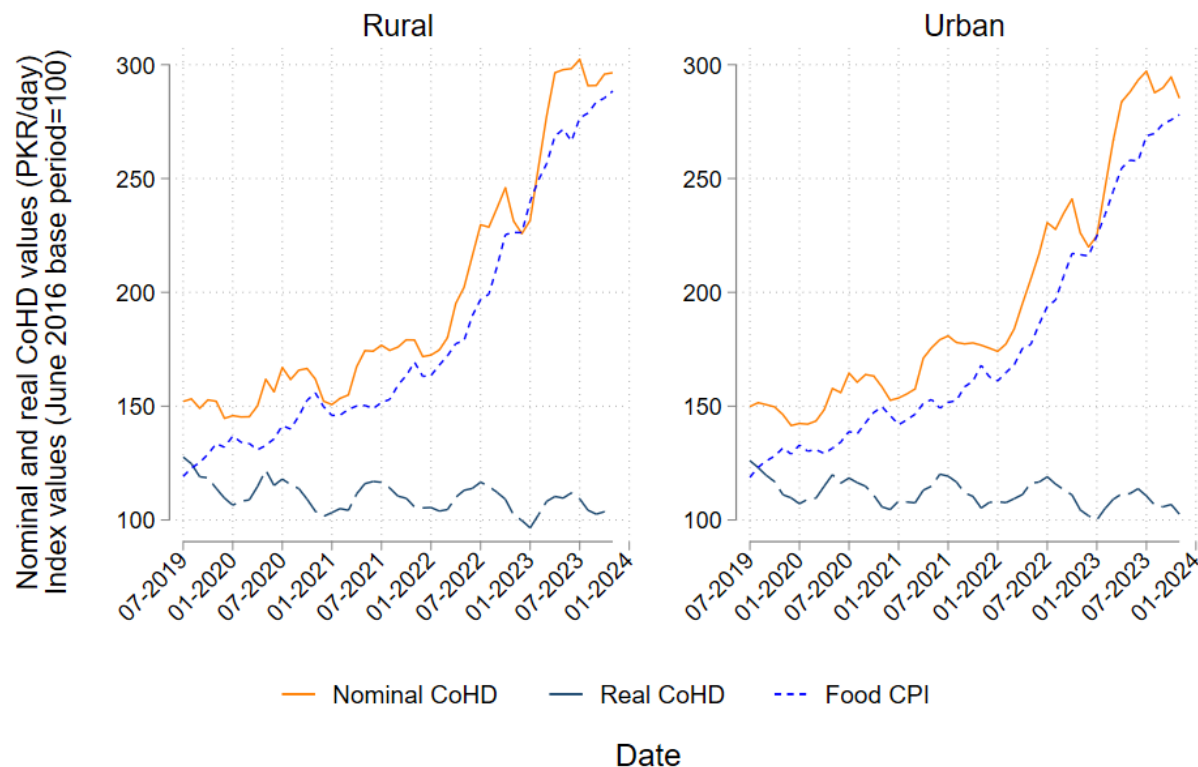
Notes: Figure shows the indexed trend in average CoHD, food and general inflation since July 2019 till November 2023 at the urban and rural national level.  
 Source: Author’s own elaboration.

A comparison of the nominal CoHD, real CoHD and food CPI at rural and urban national level is shown in Figure 14. The base period for both food CPI and real CoHD is June 2016. At both rural and urban level, nominal CoHD and food CPI follow a similar upward trajectory which accounts for the downward trajectory of real CoHD. In real terms, CoHD has reduced by 19.5 percent in

## Calculating Cost and Affordability of a Healthy Diet

rural region and 18.7 percent in urban region from July 2019 to November 2023. This brings some interesting insights to the second portion of the CoHD analysis: affordability.

**Figure 12: Historic trend of nominal CoHD, real CoHD and Food CPI from July 2019 to November 2023**



Notes: Figure shows the yearly trend of nominal CoHD, real CoHD and Food CPI at urban and rural national level. The base period for both Food CPI and real CoHD is June 2016. Source: Author's own elaboration.

## Affordability of a Healthy Diet

Assessing affordability of CoHD is a pivotal step in understanding and addressing divergences in nutrition choices and health outcomes of the population. Alternate methods of estimating affordability indicator are presented for a more nuanced examination of affordability of a healthy diet in Pakistan.

### Ratio of CoHD to real food expenditure per adult equivalent

A ratio was estimated of CoHD and real food expenditure per adult equivalent per day of all households in our sample. Daily real adult equivalent household food expenditure is used to make the comparison with CoHD for each year and at respective geographical levels.

At national level, CoHD is 1.6 times higher than the daily real adult equivalent food expenditure in 2023, with even greater disparity at rural level. This means that people would need to spend 60 percent more, on average, in order to afford even the least-expensive healthy diet. In urban Pakistan, the ratio of CoHD was 1.48 times higher than real food expenditure per adult equivalent per day compared to 1.72 for rural Pakistan in 2023.

Amongst the provinces, Punjab had the lowest ratio of CoHD to real food expenditure per adult equivalent across all years, aided by the Punjab having the lowest CoHD. The highest gap was estimated for Balochistan amongst the provinces, with rural Balochistan reporting the highest ratio of CoHD to real food expenditure per adult equivalent per day for the year 2023.

Temporal examination of this ratio shows that the ratio has been declining over the years across all geographic levels. This is attributed to the method of estimation utilized in calculating projected real food expenditure per adult equivalent to arrive at a realistic food budget for the estimation of our final unaffordability indicator. The ratio can only be improving as the denominator is increasing by a greater percentage than the rise in CoHD, as CoHD has been improving for the years and geographical levels presented in Table 4.

**Table 4: Ratio of the Cost of a Healthy Diet to real food expenditure per adult equivalent, by year and different geographical levels**

	2019	2020	2021	2022	2023
Pakistan	1.79 (0.8)	1.69 (0.7)	1.68 (0.7)	1.68 (0.7)	1.63 (0.7)
Urban	1.61 (0.7)	1.53 (0.7)	1.53 (0.7)	1.55 (0.7)	1.48 (0.7)
Rural	1.91 (0.8)	1.79 (0.7)	1.76 (0.7)	1.77 (0.7)	1.72 (0.7)
Punjab	1.68 (0.8)	1.58 (0.7)	1.58 (0.7)	1.60 (0.7)	1.54 (0.7)
Sindh	1.86 (0.7)	1.72 (0.7)	1.71 (0.7)	1.72 (0.7)	1.65 (0.7)
Khyber Pakhtunkhwa	2.01 (0.8)	1.95 (0.8)	1.89 (0.8)	1.87 (0.7)	1.86 (0.7)
Balochistan	2.28 (0.8)	2.15 (0.7)	2.04 (0.7)	1.98 (0.7)	1.95 (0.7)
Urban Punjab	1.52 (0.7)	1.46 (0.7)	1.48 (0.7)	1.49 (0.7)	1.42 (0.7)
Rural Punjab	1.77 (0.8)	1.65 (0.7)	1.65 (0.7)	1.66 (0.7)	1.61 (0.7)
Urban Sindh	1.65 (0.7)	1.55 (0.6)	1.55 (0.6)	1.55 (0.6)	1.48 (0.6)
Rural Sindh	2.11 (0.8)	1.92 (0.7)	1.90 (0.7)	1.92 (0.7)	1.85 (0.7)
Urban Khyber Pakhtunkhwa	1.89 (0.8)	1.81 (0.7)	1.77 (0.7)	1.80 (0.7)	1.72 (0.7)
Rural Khyber	2.03	1.98	1.91	1.88	1.89



## Calculating Cost and Affordability of a Healthy Diet

Pakhtunkhwa	(0.8)	(0.8)	(0.8)	(0.8)	(0.8)
Urban Balochistan	2.12	2.02	1.92	1.88	1.84
	(0.8)	(0.8)	(0.7)	(0.7)	(0.7)
Rural Balochistan	2.34	2.20	2.09	2.01	2.00
	(0.8)	(0.7)	(0.7)	(0.7)	(0.7)

Notes: Household sampling weights used. Ratio and standard deviation shown in the table.  
Source: Author's own elaboration.

The declining ratio over the period of study is expected given our finding that the CoHD rose at a slower rate than inflation; for the purposes of this analysis, food expenditure from the 2018-19 HIES was adjusted using the food CPI to real terms.

### Percentage of households that cannot afford CoHD

To assess the affordability of the healthy diet, the percentage of households whose estimated available food budget is below that required by CoHD are identified as those who cannot afford CoHD. In the estimation of this indicator, daily real adult equivalent household food expenditure is used to make the comparison with CoHD for each year and at respective geographical levels.

In 2023, 82 percent of households cannot afford CoHD. This percentage has risen slowly since 2019. This pattern seems to be consistent across the provinces as well with one notable exception: Balochistan. In Balochistan, the share of households who cannot afford CoHD has remained almost constant, around 95 percent, from 2019 to 2023. The most percentage of households (that belonged to our reference group and) that could afford a healthy diet belonged to Punjab throughout the period of analysis.

Unaffordability has risen by a greater degree in urban regions than in rural regions. In urban Pakistan, share of households who cannot afford a healthy diet rose from 68 percent in 2019 to 73 percent in 2023 whereas for rural Pakistan, this figure remained almost constant at 87 percent. Overall, affordability of CoHD fell across all provinces except for rural Sindh. In rural Sindh, affordability improved slightly from 95 percent in 2019 to 94 percent in 2023. In rural Balochistan, affordability remained constant over the period of analysis.

Punjab remains the province where the greatest share of households can afford CoHD. However, Punjab has the largest disparity in affordability amongst the rural and urban regions, with unaffordability having risen by a larger extent in urban Punjab than in rural Punjab. Similar disparity is also observed in the province of Sindh and its regions.

**Table 5: Share (%) of households that cannot afford a healthy diet, by year and different geographical levels**

	2019	2020	2021	2022	2023
Pakistan	79 (40)	78 (41)	78 (41)	81 (40)	82 (39)
Urban Pakistan	68 (47)	67 (47)	68 (47)	71 (45)	73 (45)
Rural Pakistan	87 (34)	85 (36)	85 (36)	86 (34)	87 (33)
Punjab	75 (43)	73 (44)	74 (44)	77 (42)	78 (41)
Sindh	83 (38)	81 (39)	82 (39)	83 (37)	85 (36)
Khyber Pakhtunkhwa	87 (34)	87 (34)	86 (35)	87 (34)	89 (32)
Balochistan	95 (22)	94 (23)	93 (25)	93 (25)	95 (22)
Urban Punjab	62 (49)	62 (49)	64 (48)	67 (47)	69 (46)
Rural Punjab	83 (38)	80 (40)	80 (40)	83 (38)	84 (37)
Urban Sindh	73 (44)	71 (45)	72 (45)	74 (44)	76 (43)
Rural Sindh	95 (23)	93 (25)	93 (26)	94 (24)	94 (23)
Urban Khyber Pakhtunkhwa	78 (41)	78 (42)	78 (42)	80 (40)	82 (39)
Rural Khyber Pakhtunkhwa	88 (32)	89 (32)	88 (33)	88 (32)	90 (30)
Urban Balochistan	89 (32)	88 (32)	87 (34)	88 (33)	90 (31)
Rural Balochistan	97 (17)	97 (18)	96 (20)	96 (20)	97 (17)

Notes: Household sampling weights used. Percentages and standard deviation shown in the table.  
Source: Author's own elaboration.

### An alternate approach to estimating affordability

An alternate threshold for reference group was also considered as household's that belong within 20 percent of the food poverty line. The 2015-16 food poverty line (Ministry of Planning, Development and Reform., 2017) was used to identify these households. The results from this method are similar to the results from our previous method of using households that fall in the second lowest quintile of total expenditure per adult equivalent.

## Calculating Cost and Affordability of a Healthy Diet

**Table 6: Share (%) of households that cannot afford a healthy diet in the year 2023**

	HH within 20% of Food Poverty Line	HH within second lowest quintile of total adult equivalent expenditure
Pakistan	81 (39)	82 (39)
Urban Pakistan	71 (46)	73 (45)
Rural Pakistan	87 (34)	87 (33)
Punjab	77 (42)	78 (41)
Sindh	83 (37)	85 (36)
Khyber Pakhtunkhwa	89 (32)	89 (32)
Balochistan	94 (23)	95 (22)
Rural Punjab	83 (38)	84 (37)
Urban Sindh	74 (44)	76 (43)
Rural Sindh	94 (24)	94 (23)
Urban Khyber Pakhtunkhwa	81 (39)	82 (39)
Rural Khyber Pakhtunkhwa	90 (30)	90 (30)
Urban Balochistan	88 (32)	90 (31)
Rural Balochistan	96 (19)	97 (17)

Notes: HH = households. Mean and standard deviation shown in table. Quintiles are computed using total expenditure at the national level. 2015-16 poverty line = 3250 PKR per adult equivalent per month. Household sampling weights used. Source: Author's own elaboration.

During our period of analysis, nominal CoHD displayed a rising trend combined with rising levels of unaffordability at different geographical levels. Unaffordability is likely rising due to lower real incomes relative to the CoHD, due to a larger rise in food inflation relative to nonfood inflation. In this analysis, our method relies on the assumption that expenditure rises at the same rate as inflation, which should be investigated further. If wages or incomes grew at a rate less than that of general inflation, our analysis underestimates the increase in unaffordability in Pakistan over the 2019-2023 period. This assumption is necessary as the latest consumption expenditure data available dates to 2018-19; new data from the next HIES will provide deeper insights, as could other sources of income and wage data.

Furthermore, given that food CPI rose faster than general inflation and CoHD, unaffordability is not rising at the same rate for all foods; least-cost items experienced less inflationary pressure than all food items during the 2019-2023 period, on average.

Altogether, these insights suggest that improving access to healthy diets in Pakistan could be best addressed by raising real wages or incomes, for example through social safety net programs like cash transfers or employment programs. Simultaneous work can address the high costs of certain food groups, such as milk and milk products. Improving availability or distribution could also be a way to bring down the cost of meeting dairy requirements.

### Limitations

#### *Availability, access, and coverage of retail food price data*

The CoHD methodology is designed to take advantage of the existing data collection mechanisms to understand and monitor cost of nutritious foods. While this reduces costs associated with data collection, the dependence on data collected by the statistical regulatory body has its drawbacks. Firstly, the complete list of food items for which monthly food prices is collected is not available in the public domain, thus access to data is limited. Secondly, the food items for which PBS collects monthly food prices is not comprehensive, so it may be missing some regionally important items or items that are less commonly consumed but still inexpensive. Thirdly, the list of food items for which data is collected is not uniform across regions. While the difference in the list of food items for urban and rural regions is based on observed food preferences, the disparity raises logical difficulties in rationalizing the estimates. For instance, Rice IRRI 6/9 is the cheapest rice available in the country, but its price is only collected for urban regions. Thus, when least-cost starchy staples are selected for rural food baskets, the relatively more costly basmati broken rice is sometimes selected for rural regions which results in relatively higher levels of CoHD in rural areas than in urban areas for some periods.

#### *Preferences*

The CoHD methodology is, by definition, designed to capture the least expensive way to purchase a diet which meets the recommendations of a dietary guideline. While this provides important data regarding the minimum cost of nutritious diet being faced by the population, preferences play an important role in determining actual food costs being borne. “The preference premium” is likely to add to the daily estimates of CoHD but would represent a more realistic estimate of cost of food as it reflects observed dietary patterns (Mahrt, et al. 2019). The cost of preference-based healthy diet is calculated using the weighted price of a larger basket of foods in each food group, rather than the least costly food items in each food group.

#### *Dietary guideline*

The CoHD estimates presented in this report are based on the information in Pakistan’s dietary guideline (see Pakistan’s FBDG). Using national dietary guidelines allows for the inclusion for cultural context when estimating the CoHD and is more policy relevant. However, the estimates of CoHD are impacted by how the food groups are defined. In the case of Pakistan, the inclusion of milk and milk products as a compulsory food group resulted in this food group accounting for

roughly 40 percent of the CoHD. The cost of food that falls under dairy and its products is not only high in magnitude, but it has been rising. Estimating CoHD using a different dietary guideline (e.g., an international dietary guideline standard) is likely to result in different estimates for CoHD estimates. The estimated of Pakistan's CoAHD reported in The State of Food Security and Nutrition in the World 2023 are estimated using the Healthy Diet Basket, an international standard developed for costing healthy diets (FAO et al., 2023).

### *Affordability estimates*

The HIES 2018-19 expenditure data was used to estimate how much households can spend on food, given past expenditure patterns and the spending of the relatively poor. Current expenditure, especially on food, may differ from our estimates based on 2018-19 data, thus, the affordability estimates would be recalculated once the latest HIES data is available. This analysis would benefit greatly if wages, incomes or consumption expenditure data is collected and disseminated with greater frequency.

## Way Forward

### *Extending the analysis*

The CoAHD estimates help us better understand how the cost of affordable nutritious food is changing over time. However, as food inflation is rising rapidly, monitoring the cost of a calorie-adequate diet as well as preference for healthy diet would further highlight how the cost of food is changing. Cost of calorie adequate diet could be a better indication of the food consumption behaviour of low-income households who would likely be substituting nutritious foods for energy-rich options as food costs increase. Similarly, estimating and monitoring the cost of preference-weighted healthy diet would allow us to observe how large the preference premium is in Pakistan.

### *Continued monitoring of CoAHD*

This report demonstrates that existing food price data can be harnessed to enrich food security monitoring systems through the integration of the CoAHD metrics. As the complete list of food price data is not released publicly, PBS themselves may be in the best position to monitor the CoHD, as they collect and analyse food price data monthly for inflation monitoring. The Food Prices for Nutrition project has developed tools and works with countries to set up monitoring systems. Similarly, the Ministry of National Food Security and Research, Ministry of Planning, Development and Special Initiatives, and Ministry of National Health Services, Regulations and Coordination might also be interested in tracking the CoAHD estimates because of its relevance to food security, poverty, nutrition, and health.

### *Targeted interventions and policies for improved access to a healthy diet*

The report provides data that can guide policymakers towards improving access to a healthy diet through targeted interventions. Access to healthy diets in Pakistan could be best addressed by raising real wages or incomes as the rise in food and non-food inflation might indicate that people might be substituting a nutritious diet for a more calorie adequate diet. Social safety net programs like conditional cash transfer or in-kind transfer can be leveraged to provide greater access to least-cost healthy food.

Simultaneously, food policy can try to address the high cost of certain food groups, such as milk and milk products. Improving availability or distribution could bring down the cost of meeting dairy requirements and thus, improve access to a healthy diet.

### *Focus on sustainable, climate resilient food and agriculture policies*

The 2022 floods have demonstrated that Pakistan's agriculture industry is especially vulnerable to climate shocks. Floods and similar climate-related events can have a negative impact on food and nutrition security as they impact the existing food supply, and lead to significant loss in crop yield. Transforming agriculture and food systems with the aim towards enhancing the systems sustainability and resilience is needed so that the country can enhance its buffer against future climate shocks. This will contribute towards improving nutrition and poverty outcomes among the most vulnerable as they generally live in the most climate vulnerable locations and are the most impacted by even small climate shocks. This transformation should be based on multiple approaches, from introduction of technological innovation to greater investment in human capital and research.



# Conclusion

In this report, monthly food prices and CPI data from July 2019 to November 2023 as well as household survey data on consumption expenditure for 2018-19 was used to explore various aspects of access to healthy diets in Pakistan. The objective was to estimate the Cost of a Healthy at national, subnational levels and evaluate the affordability of the estimates relative to household consumption expenditure. These estimates can better inform policy makers and donors regarding the drivers of nutrition and health outcomes in the country.

The CoHD has shown a rising trend from July 2019 to November 2023, with variations in costs across seasons, geography, and region, all those these increases have occurred at a slower rate than overall food inflation. Overall, CoHD tends to be higher in rural regions than urban ones. The CoHD estimates for Balochistan were higher compared with other provinces, on average, while the converse is true for Punjab. The most expensive food group recommendations to achieve are for milk and milk products, while the most affordable food group in terms of cost per calorie was starchy staples.

The majority of the households in Pakistan cannot afford a healthy diet, with the percentage of households that cannot afford CoHD increasing over time. Unaffordability is likely rising due to lower real wages or incomes, although more recent data is needed to confirm this finding. Geographical disparity was also observed in the affordability of a healthy diet, with households in Punjab being the most likely to be able to afford a healthy diet and those in Balochistan the least likely to afford a healthy diet. The affordability indicator illuminates the drivers behind poor nutrition outcome and vulnerability to non-communicable diseases: low levels of household income, and the persistently high cost of healthy food such as dairy, fruits, and vegetables. Future analysis should explore wages and incomes over time if that data is available or more recent HIES data becomes available.

This metric provides an important benchmark for the minimum cost of healthy diet however, the actual cost of healthy diet being faced by people would vary. Given that CoHD estimate does not consider preferences, the premium associated with preference is likely to inflate the CoHD and worsen affordability indicator. The estimation of preference based CoHD would provide us with clarity regarding what is the “preference premium” being paid by the people and how it is impacting the diet and nutrition outcomes in the country. Similar to the preference premium, CoHD would also be impacted if actual consumption is considered in devising the food groups rather than the dietary guidelines. Modifying the food groups is likely to impact the CoAHD indicators. This can

be achieved by using international dietary guidelines such as the Healthy Diet Basket Food to calculate the CoHD.

The report demonstrates that cost of healthy food can be estimated and monitored using existing food price data being collected by PBS, which has sufficient diversity of food items in each food group as required by the CoHD methodology. While the CoHD has risen at a slower pace than food inflation, nonetheless, healthy diets would be less affordable for a majority of the population. Targeted interventions, such as social safety net programs, as well as food and agriculture policies could be used to improve access to healthy diet.

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## Appendix 1

**Table A 1: List of food items\***

Item No	Item Name	Reported in	Included in Analysis
1	Wheat	Both	Yes
2	Wheat Flour (Average Quality)	Both	Yes
3	Wheat Flour Bag	Both	Yes
4	Suji	Both	Yes
5	Vermicelli (Packet)	Both	Yes
6	Besan	Both	No
7	Rice Basmati 385/386	Both	Yes
8	Rice Basmati Broken (Average Quality)	Both	Yes
9	Bread plain (Medium Size)	Both	Yes
10	Rusk (Papay) (Average Quality)	Both	No
11	Biscuit Bakery (Loose, Average Quality)	Both	No
12	Samosa (Vegetable, Average Quality)	Both	No
13	Nimko (Loose, Average Quality)	Both	No
14	Beef with Bone (Average Quality)	Both	Yes
15	Mutton (Average Quality)	Both	Yes
16	Chicken Farm Broiler (Live)	Both	Yes
17	Fish Fresh	Rural only	Yes
18	Milk fresh (Un-boiled)	Both	Yes
19	Curd	Both	Yes
20	Powdered Milk NIDO 390 grams Polybag	Both	Yes
21	Eggs Farm	Both	Yes
22	Mustard Oil (Average Quality)	Both	Yes
23	Vegetable Ghee DALDA/HABIB 2.5 kilograms Tin	Both	Yes
24	Vegetable Ghee DALDA/HABIB or Other superior Quality 1 kilogram Pouch	Both	Yes
25	Almonds (Badam) Kaghazi with Shell (Average Quality)	Both	Yes
26	Groundnuts (Moong Phali) with shell	Both	Yes
27	Kinnu (Average Quality)	Both	Yes
28	Apple (Average Quality)	Both	Yes
29	Grapes (Angoor) (Average Quality)	Both	Yes
30	Bananas (Kela) Local	Both	Yes

\* Rahu Fish was included in both urban and rural food price data but using slightly different names: Fish Rahu (Medium Size) in urban data and Fish Fresh in rural data.

## Appendix 1

31	Mango Kalmi (Average Quality)	Both	Yes
32	Guava (Amrood) (Average Quality)	Both	Yes
33	Watermelon (Turbooz)	Both	Yes
34	Muskmelon (Kharbuza)	Both	Yes
35	Pulse Masoor (Washed)	Both	Yes
36	Pulse Moong (Washed)	Both	Yes
37	Pulse Mash (Washed)	Both	Yes
38	Pulse Gram	Both	Yes
39	Gram Whole Black (Average Quality)	Both	Yes
40	Gram Whole Yellow (Average Quality)	Both	Yes
41	Beans Red/White (Lobia)	Both	Yes
42	Potatoes	Both	Yes
43	Chips (Loose)	Both	No
44	Onions	Both	Yes
45	Tomatoes	Both	Yes
46	Turnip (Shalgham)	Both	Yes
47	Radish (Mooli)	Both	Yes
48	Cauliflower (Phool Gobhi)	Both	Yes
49	Bottlegourd (Loki)	Both	Yes
50	Lady Finger (Bhindi)	Both	Yes
51	Peas (Matar)	Both	Yes
52	Spinach (Paalak)	Both	Yes
53	Tinda	Both	Yes
54	Turai	Both	Yes
55	Karela	Both	Yes
56	Chilies (Green)	Both	No
57	Carrot (Gajar)	Both	Yes
58	Cucumber (Kheera)	Both	Yes
59	Lemon	Both	No
60	Garlic (Lehsun)	Both	No
61	Sugar Refined	Both	No
62	Gur (Average Quality)	Both	No
63	Honey MARHABA Bottle 500 grams	Both	No
64	Sweetmeat (Mixed Mithai)	Both	No
65	Ice Cream Walls Cup (Large Size)	Both	No
66	Ginger (Adrak)	Both	No
67	Custard Powder RAFHAN 300 grams Packet	Both	No
68	Tea Lipton Yellow Label 190 grams Packet	Both	No
69	Cold Drink (PEPSI/COCA-COLA) 1.5 Liter Bottle	Both	No
70	Fruit Juice Small Packet 250 ml	Both	No
71	JAM-E-SHIREEN Standard Size (800 ml)	Both	No
72	Wheat Flour (Fine/Superior Quality)	Urban only	Yes
73	Rice Basmati (Superior Quality)	Urban only	Yes

Cost and Affordability of Healthy Diet in Pakistan

74	Rice IRRI-6/9 (Sindh/Punjab)	Urban only	Yes
75	Milk Tetra Pack 1 Liter (MILK PAK/HALEEB/OLPERS)	Urban only	Yes
76	LACTOGEN 400 grams Packet	Urban only	No
77	Butter Local Packed 50 grams	Urban only	Yes
78	Cooking Oil DALDA or Other Similar Brand (SN), 5 Liter Tin	Urban only	Yes
79	Peach (Average Quality)	Urban only	Yes
80	Cumin seed (Zeera) White NATIONAL 50 grams Packet	Urban only	No
81	Pepper Black NATIONAL 50 grams Packet	Urban only	No
82	Coriander Seed Powder NATIONAL 200 grams Packet	Urban only	No
83	Cardamom Large (Loose) (Average Quality)	Urban only	No
84	Cardamom Small (Average Quality)	Urban only	No
85	Salt Powdered (NATIONAL/SHAN) 800 grams Packet	Urban only	No
86	Chilies Powder NATIONAL 200 grams Packet	Urban only	No
87	Turmeric Powder NATIONAL 50 grams Packet	Urban only	No
88	Tomato Ketchup MITCHELLS/NATIONAL 1 kilogram Polybag	Urban only	No
89	Pickle MITCHELLS/NATIONAL Bottle (340 grams-400 grams)	Urban only	No
90	Mineral Water NESTLE 1.5 Liter	Urban only	No
91	Desi Ghee	Rural Only	Yes
92	Cooking Oil (Pouch)	Rural Only	Yes
93	Brinjal	Rural Only	Yes
94	Arvi	Rural Only	Yes
95	Coriander Seed Powder Loose	Rural Only	No
96	Salt Powder Loose	Rural Only	No
97	Chilies Powder Loose	Rural Only	No
98	Turmeric Powder Loose	Rural Only	No
99	Tea Lipton Yellow Label 200 grams Packet	Rural Only	No
100	Fish Rahu (Medium Size)	Urban Only	Yes



## Appendix 2

*Table A 2: List of districts\**

No.	District	Reported in
1	Bahawalpur	Both
2	Bannu	Both
3	D. G. Khan	Both
4	D. I. Khan	Both
5	Faisalabad	Both
6	Gawadar	Both
7	Khuzdar	Both
8	Gujranwala	Both
9	Loralai	Both
10	Multan	Both
11	Quetta	Both
12	Rawalpindi	Both
13	Sahiwal	Both
14	Mirpurkhas	Urban only
15	Karachi	Urban only
16	Hyderabad	Urban only
17	Islamabad	Urban only
18	Attock	Urban only
19	Lahore	Urban only
20	Sialkot	Urban only
21	Jhang	Urban only
22	Vehari	Urban only
23	Sargodha	Urban only
24	Mianwali	Urban only
25	Bahawalnagar	Urban only
26	R. Y. Khan	Urban only
27	Nawabshah	Urban only
28	Sukkur	Urban only
29	Larkana	Urban only
30	Dadu	Urban only

\* All the common districts were being reported by the same name in both datasets except for Karachi, Hyderabad and Mirpurkhas: Karachi is being reported in rural data as Karachi (Malir), Hyderabad is being reported in rural data as Hyderabad (Matari), and Mirpurkhas is being reported as Mirpurkhas in urban dataset and as Mirpur Khas in rural dataset. For the purpose of this analysis, only Mirpurkhas has been used in both datasets.

Cost and Affordability of Healthy Diet in Pakistan

31	Peshawar	Urban only
32	Abbottabad	Urban only
33	Mingora	Urban only
34	Turbat	Urban only
35	D. M. Jamali	Urban only
36	Khushab	Rural only
37	Hyderabad (Matiari)	Rural only
38	Karachi (Malir)	Rural only
39	Shahdad Kot	Rural only
40	Khairpur	Rural only
41	Shaheed Benazir Abad	Rural only
42	Mansehra	Rural only
43	Kohat	Rural only
44	Lower Dir	Rural only
45	Mardan	Rural only
46	Nowshera	Rural only
47	Nasirabad/Tamboor	Rural only
48	Sibbi	Rural only
49	Mirpur Khas	Rural only

## Annexure

### Glossary

#### Affordability

Affordability refers to the ability of people to buy foods. In this report, cost refers to the minimum people must pay for a healthy diet, while affordability refers to the cost relative to a person's food expenditure, keeping all other required expenses fixed. Affordability is determined by comparing the cost of a healthy diet with food expenditure data from HIES 2018-19. This allows for the computation of the percentage and number of people in each country who are not able to afford a healthy diet (see Methodology for the full description).

#### Diet quality

Contains four key characteristics: diversity, adequacy, moderation, and overall balance in macronutrient intake.

#### Economic shock

An unexpected and/or unpredictable event that is external to the economy and can either harm or boost it. An economic shock can impact the economy from either the demand-side, supply-side or both.

#### Energy-dense foods or energy-rich foods

Food with a high content of calories (energy) as compared to its mass or volume.

#### Flood

The accumulation of water over areas not normally submerged, or the overflowing of the normal confines of a stream or other body of water.

#### Food Insecurity Experience Scale (FIES)

An experience-based food security scale used to produce a measure of access to food at different levels of severity that can be compared across contexts. It relies on data obtained by asking people, through surveys, about the occurrence of conditions and behaviours that are known to reflect constrained access to food.

#### Food security

A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization and stability over time.

#### Healthy diet

Healthy diets: 1) start early in life with early initiation of breastfeeding, exclusive breastfeeding until six months of age, and continued breastfeeding until two years of age and beyond combined with appropriate complementary feeding; 2) are based on a great variety of unprocessed or minimally processed foods, balanced across food groups, while restricting highly processed food

and drink products; 3) include wholegrains, legumes, nuts and an abundance and variety of fruits and vegetables; 4) can include moderate amounts of eggs, dairy, poultry and fish, and small amounts of red meat; 5) include safe and clean drinking water as the fluid of choice; 6) are adequate (i.e. reaching but not exceeding needs) in energy and nutrients for growth and development and meet the needs for an active and healthy life across the life cycle; 7) are consistent with WHO guidelines to reduce the risk of diet-related NCDs and ensure health and well-being for the general population; and 8) contain minimal levels or none, if possible, of pathogens, toxins and other agents that can cause foodborne disease. According to WHO, healthy diets include less than 30 percent of total energy intake from fats, with a shift in fat consumption away from saturated fats to unsaturated fats and the elimination of industrial trans fats; less than 10 percent of total energy intake from free sugars (preferably less than 5 percent); consumption of at least 400 g of fruits and vegetables per day; and not more than 5 g per day of salt (to be iodized).

### **Malnutrition**

An abnormal physiological condition caused by inadequate, unbalanced, or excessive intake of macronutrients and/or micronutrients. Malnutrition includes undernutrition (child stunting and wasting, and vitamin and mineral deficiencies) as well as overweight and obesity.

### **Moderate food insecurity**

This refers to the level of severity of food insecurity (based on the FIES) at which people face uncertainties about their ability to acquire food and have been forced to reduce, the quality and/or quantity of food they consume due to lack of money or other resources.

### **Nutritious foods**

Food referred to as safe that contribute essential nutrients to healthy diets that are beneficial for growth, health, development, and guard against malnutrition.

### **Prevalence of undernourishment (PoU)**

An estimate of the proportion of the population that lacks enough dietary energy for a healthy, active life.

### **Severe food insecurity**

The level of severity of food insecurity at which people have likely run out of food, experienced hunger and, at the most extreme, gone for days without eating, putting their health and well-being at grave risk, based on the FIES.



Measuring the Cost and Affordability of a Healthy Diet (CoAHD) in Pakistan report is the combined effort of Food and Agriculture Organization of the United Nations (FAO), the Food Prices for Nutrition project based at Tufts University, Boston, USA, and the Government of Pakistan: Pakistan Bureau of Statistics (PBS), Ministry of Planning, Development and Special Initiatives, Ministry of National Food Security and Research and Ministry of National Health Services, Regulations and Coordination. This report measures the Cost and Affordability of a Healthy Diet and analyzes recent trends in the Cost of a Healthy Diet at the national, provincial, and regional (urban/rural) levels in Pakistan. The report uses retail food price data from markets across Pakistan collected by Pakistan Bureau of Statistics, as well as the Household Integrated Economic Survey (HIES) 2018-19 data. In addition, Pakistan's Dietary Guidelines for Better Nutrition, a joint publication of FAO and Government of Pakistan, has been used for the analysis.

Healthy diets are unaffordable to many people in Pakistan, due to the high cost of some recommended food groups and low income available for food. Regular monitoring of CoAHD in Pakistan can inform better policy and programmes across sectors, including agriculture and social protection, to improve access to healthy diets. It will also help in timely and evidence-based decision making to address gaps in food consumption at the national, provincial and regional (urban/rural) levels. Regular monitoring of CoAHD at the subnational level with existing monthly food price data can support timely and evidence-based decision-making by the Government towards improving food security, nutrition, and health outcomes.