The Impact of Food Price Increases on Consumer Welfare in Khyber Pakhtunkhwa, Pakistan

Rafiullah

MS in Economics Abdul Wali Khan University Mardan

rafi.iiui@gmail.com

Fazal Karim

Ph.D in Economics, Institute of Development Studies, The University of Agriculture, Peshawar.

karim.economist@yahoo.com

Shah Saud

Ph.D in Agriculture Extension, Agricultural Extension Education and Communication, The University of Agriculture, Peshawar

shah.saud1991@aup.edu.pk

Ihsan Ullah

MS in Economics, University of International Business and Economics UIBE Beijing China

ihsanayubi70@gmail.com

ABSTRACT

Limited research has examined the impact of food inflation on consumer welfare in Khyber Pakhtunkhwa (KP), Pakistan. This study utilizes nationally and provincially representative data from the Pakistan Social and Living Standards Measurement, Household Integrated Economic Survey (PSLM-HIES) 2018-19, comprising 4,464 households from KP. A Linear Approximate Almost Ideal Demand System (LA-AIDS) model is estimated to derive compensated own- and cross-price elasticities of demand for seven major food commodities: (1) rice, (2) wheat and wheat flour, (3) milk and milk products, (4) fruits, (5) vegetables, (6) meat (beef, mutton, and poultry), and (7) cooking oil. These elasticities are combined with observed food price inflation between 2018 and 2021 to simulate changes in consumption and assess welfare impacts measured through changes in poverty rates. Results indicate that food price inflation increased the provincial poverty headcount from approximately 15% in 2018 to 19% by 2021. The adverse effects are heterogeneous: poverty rose most sharply in the divisions of D.I. Khan and Bannu. Rural households experienced a larger welfare loss compared to urban households. Policy recommendations emphasize targeted price stabilization and social protection measures in the most affected divisions and rural areas.

Keywords: *Food inflation, consumer welfare, poverty, demand elasticities, Almost Ideal Demand System, Khyber Pakhtunkhwa, Pakistan.*

1. Introduction

Food is a basic necessity, and persistent increases in food prices pose a serious challenge in developing countries, including Pakistan. Rising food prices are driven by population growth, declining arable land, supply-chain disruptions, and global commodity shocks. In food-deficit regions, such price hikes can significantly erode consumer welfare, particularly among low-income households that allocate a large share of expenditure to food.

Khyber Pakhtunkhwa (KP) is a net food-deficit province in Pakistan, heavily reliant on imports from other provinces, especially Punjab. Agriculture dominates the provincial economy, while industrial and service sectors remain underdeveloped, contributing to high poverty rates. Consequently, KP households are particularly vulnerable to food price shocks.

This study examines the welfare implications of food price increases in KP between 2018 and 2021, focusing on changes in poverty as a measurable indicator of consumer welfare loss. It follows the approach of directly analyzing local price changes (Haq et al., 2008), bypassing the need to model international-to-domestic price transmission.

The effects of rising global food prices have generally been valued using two approaches. The first approach considers the impact of increases in international food prices on domestic prices using price transmission elasticity's and then estimates the impact of domestic food price increase so consumer expenditures and/ or poverty. In this research, I follow the second approach and directly see the impact of local food price hike on consumer welfare which is measured in terms of increases in the rate of poverty. This approach is implemented by first estimating the compensated own and cross price elasticity's of demand and then interacting these elasticities with the percentage increase in the price of individual food commodities to estimate the post-inflation amount of quantity of these items consumed by the consumers. These changes are then associated with changes in poverty level.

Throughout the modern history and all over the world price stabilization of major food commodities has been an important goal of government. A lot of resources were spent by governments to pursue these goals and Pakistan is not an exception. Since inception in 1947, Pakistan has pursued the policy of price stabilization especially in the case of staple food such as wheat and rice. In the 1970s, policy research was focused on how to achieve these goals (Newbery and Stiglitz, 1981), but since 1990s, governments are no longer interested in price stabilization policies and thus are pursuing more liberal and market determined prices. Resultantly, since the mid-1990s, prices of most of the food commodities have been witnessing severe changes (Cashin and McDermott 2002; Jacks et al. 2009; Roache 2010). The volatility of food prices was the highest in December 2010 (Food and Agriculture Organization 2010). Resultantly, governments have again started taking interest in finding innovative ways to ensure food price stabilization. The reason behind this is that in democratic society's household value price stabilization a lot.

While discussing about the impact of food price hike on poverty levels, one should not ignore the opportunity it brings for agricultural households whose income come from sale of food commodities (Kane et al., 2015). However, this might not be the case in Pakistan where land ownership is highly skewed. In Pakistan just 26 percent are wheat producers whereas only 9 percent households are rice producers (Haq et al., 2008).

Therefore, this research hypothesizes that the recent food inflation in Pakistan would have sever implications for poverty level in the country. This research also hypothesizes that there is a great deal of disparity in the impact of food inflation on poverty. Specially, rural areas would be severely impacted as compared to urban areas because of lack of other sources of income or employment in rural areas. To test these hypotheses, this research used a nationally representative large data and focus primarily on the province of Khyber Pukhtunkhwa by using the 4464 households sample from the province.

1.2 Research Problem

Price stability is costly for the governments. It has further been made difficult by the recent Covid-19 pandemic. Food security in the time of global pandemic is an important area of research especially in the developing world. Does the food inflation increase the rate of poverty in a developing country like Pakistan? Is there any regional difference in the impact? These questions are the main subject of this research which is answered in a systematic and detailed way in the next few chapters.

1.3 Objectives

The goal of this study is to estimate the impact of food price hike on consumer welfare in K.P. The objectives of the study are as follows:

1. To develop technical empirical models for quantifying the price volatility and demand elasticities of consumers in K.P.

2. To compare the poverty level before and after the food price hike.

3. To estimate the elasticity of food demand due to changes in prices of0 that in K.P.

1.4 Research Questions

Following research questions will be explored in the study.

1. Do food prices affect the poverty level in K.P?
2. What are the division-wise as well as rural and urban wise impacts of food price hike on consumer welfare in K.P?

1.5 Organization of the Study

The remainder of this research is organized in seven sections. Sections (2) presents the review of previous literature about the topic, chapter (3) explains the data used in the analysis, and chapter (4) explains the research methodology adopted in this research. Chapter (5) contains the descriptive results to understand the properties and characteristics of the households in the sample. Chapter (6) presents the impacts of the recent food price increase on poverty while chapter (7) concludes the study and offers various policy recommendations on the basis of the study.

1.6 Research gap

Worldwide there is a plenty of research that deals with the implications of food inflation for poverty and hunger. However, in Pakistan and especially in Khyber Pukhtunkhwa there has been a lack of such studies that use a large dataset to see the impact of food price inflation on the poverty, consumer welfare and standards of living. Khyber Pukhtunkhwa is a food scarce province of Pakistan where majority of households purchase food from market and therefore is impacted strongly by the changes in food prices.

2. Literature Review

A large number of studies exist that examine the impact of food price hike on consumer welfare in the last two decades. While some studies concluded no statistically significant relationship, the majority of researchers found a significant impact of food inflation on welfare of consumers. Barret and Dorosh (1996), found that a rise in the variance or mean of rice prices has a significant and negative impact on household welfare in Madagascar. Similarly, Leyaro (2009) showed that during 1990s and 2000s price increases negatively impacted consumers' welfare in Tanzania. It is also highlighted in the literature very few studies are available on the data of Pakistan's economy in the literature.

Haq et al., (2008) estimates the impacts of food inflation on poverty in rural and urban areas of Pakistan by using income and expenditure data of households for 2004/2005 to empirically

determine elasticities of demand using LA-AIDS function. The analysis in this study is based on the estimation of own and cross price elasticities of demand using the Linear Approximate Almost Ideal Demand System (LA-AIDS) and by using these estimated elasticities to capture the impact of unexpected portion of food price inflation on poverty across the country. The LA-AIDS is generally a first-order approximation to the household expenditure function. It satisfies the major axioms of consumer choice (Byrne et al., 1996). LA-AIDS estimation in the context of Pakistan is also useful because of the absence of compensated and own price elasticities in the existing literature.

Kane et al., (2013) analyses the welfare implication of the country's food price volatility on Cameroonian consumers by estimating QUAIDS function. The study uses price elasticities to determine the compensating variation. The findings of the paper are (a) poorer people are likely to be the most affected by hike in food prices and (b) the loss of welfare depends on the range of food inflation.

Robles and Keefe (2011) analyses the impact of simulated increases in food prices in Guatemala during the time of international food-crisis of 2007-2008 by estimating QUAIDS function. They conduct separate estimations for urban and rural households so as to better explain the differences in the pattern of consumption between the two regions.

Vu and Glewwe (2011) examines the impact of food prices on welfare in Vietnam. There are worries that rising food prices may make poor worse-off, but at the same time poor household are also the food producers in developing countries. So the net impact is not clear. The results of this study show that welfare of households has been improved by food inflation in Vietnam. Vietnam is a net food exporter and thus is expected to benefit from food price hike in international markets.

Bellemare et al. (2013) investigates the impact of commodity price volatility on welfare of rural households in Ethiopia. They find that contract to expectations, welfare gains from reduction of price volatility increase with increase in income level of the households.

Barrett & Dorosh (1996) explores the impact of price volatility of multiple commodities by taking a two-period agrarian household and then calculating the matrix of household price risk aversion. It paper uses nonparametric density functions and various smoothing techniques to examine the impacts of changes in rice price in Madagascar. They find that majority of the farmers do not participate in rice markets. They also find that one-third of farmers who are below the poverty line are significantly and negatively impacted by the rice price volatility. On the hand, gains from the price volatility accrue to large scale farmers in Madagascar.

Agbola (2003) investigates the pattern of food demand in South Africa by estimating a LA-AIDS function. The paper uses a nationally representative data from 1993. The paper finds that demand for products such as fish, meat, grains, dairy, fruits and vegetables are price elastic. The paper also highlights that increase in income of households increases the consumption of meat, fish and grains, whereas the consumption of dairy products, vegetables, and fruits are likely to decrease.

Kuzi et al (2021) investigates political and economic reform in Bangladesh and the data is taken from Bangladesh Bureau of Statistics. They use QUAID model for estimation. They use HIES data of 2000, 2005, 2010 and 2016 and 14 food items are taken in the analysis. The paper shows that the increase in food price hike increase the poverty level and reduces the welfare

of consumer of Bangladesh as a developing country. Rice has 62% share in food budget. Increase in price of food items will affect the consumer welfare.

Prifti et al (2016-17) investigates the food price increase and its impact on consumer in Lesotho where main staple food is maize. They find that a 50% increase in price of maize may lead to reduction in consumption of 17% and to an increase in poverty of two percentage points. They use AIDS model for estimation. The study found that, for every 1% increase in the price of cereals there is an equivalent reduction in the consumption of that staple.

3. Methodology

Literature about the welfare implications of food inflation widely uses Almost Ideal Demand System (AIDS) model for empirical estimation of consumer demand functions. From this model compensated own and cross price elasticities of demand for individual food items are obtained and then used to calculate the impact of increase in food prices on consumption. After obtaining the changes in quantity consumed and the amount of inflation, then we can conduct poverty analysis by comparing food expenditure before and after the food inflation.

3.1 Almost Ideal Demand System (AIDS)

Deaton and Muellbauer (1980) first used the concept of demand estimation through AIDS modeling. An AIDS modeling is generally specified as:

$$w_{ih} = \alpha_i + \sum_{j=1}^{j} \lambda_{ij} \ln P_{jh} + \beta_i \ln\left(\frac{X_h}{P_h^*}\right) + u_{ih} \quad i = 1, 2, \ldots, I \; ; \; h = 1, 2, \ldots, n \quad (3.1)$$

where w_{ih} is the budget share of the ith good consumed by h^{th} household in the sample. P_{jh} is the price of the good j for the hth household, whereas, X_h is the total expenditure on food incurred by the household. α_i, λ_{ij} and β_i are the main parameters of interest (intercept, coefficient on prices and coefficient on total expenditure, respectively) that need to be estimated using the household level data. u_{ih} is the error term.

It should be noted that P_h^* is an index of prices which need to be constructed before fitting the above equation. There are many ways of creating the price index but Deaton and Muellbauer (1980) recommend using $\ln(P) = \sum_j w_j \ln(P_j)$ as the linear approximation of the price index and thus such an estimated model is called Linear Approximate Almost Ideal Demand System (LA-AIDS) (Agbola, 2003). The LA-AIDS model provides a first-order approximation of the expenditure and consumption functions which satisfies the axioms of consumer choice and which allows for investigating interdependence among consumer products (Byrne et al., 1996).

During estimation of the LA-AIDS model of equation (3.1), certain theoretical properties of ideal demand system are imposed, which are: (i) Adding up i.e., $\sum_{i=1}^{j} \alpha_i = 1$, $\sum_{i=1}^{j} \lambda_j = 0$, $\sum_{i=1}^{j} \beta_i = 0$ (ii) homogeneity i.e., $\sum_{i=1}^{j} \lambda_{ij} = 0$, (iii) $\lambda_{ij} = \lambda_{ji}$.

3.2 Household Demographics

A set of household level demographics z that relates to the income and consumption of the household, such as, education of the household head, age of the household head, employment status of the household head, number of adult members in the household, beneficiary of a government social security program, rural/urban status, can be added to equation (3.1) to reduce the error in the estimation.

$$w_{ih} = \alpha_i + \sum_{j=1}^{j} \lambda_{ij} \, lnP_{jh} + \beta_i ln\left(\frac{X_h}{P_h^*}\right) + \theta z_i + u_{ih} \qquad (3.2)$$

3.3 Compensated Elasticities of Demand

Using Eq. (3.2), we can derive Hickson compensated demand function, and elasticities.

The Hickson elasticity (e_{ij}) for good i with respect to good j will be

$$e_{ij} = \frac{\lambda_{ij}}{w_i} + w_j - \delta_{ij}$$

Where the last term δ_{ij} is conceptually the Kronecker delta which = 1 for own price elasticity and 0 for cross-price elasticities.

Eq. (3.2) is estimated using the STATA module called *quaids*. Quaids imposes all the theoretical properties on the demand system.

If a surveyed family does not consume a product, then the price for that product is absent. So in order to keep these (missing) observations in the study missing values are replaced by average values (Cox and Wohlgenant, 1986).

3.4 Food Items

In this research take the main food items consumed by Pakistani consumers into the analysis. The items were selected on the basis of Haq et. al, (2008). Precisely, seven major food items/groups used in the analysis are (1) rice including all kinds used as food (2) wheat and wheat consumed as flour etc. (3) milk and its products (4) fruits and its products (5) vegetables (6) meats and its kinds like (beef mutton and poultry) (7) cooking oil. The fruits, vegetable and milk categories consist mainly of fresh products.

In order to focus on the welfare implications of food inflation only, the research assume the prices of non-food items to be constant overtime.

Data

To generate reliable and trustworthy empirical results in a social sciences research, the need for a quality and approved data is highly paramount. Moreover, the methods that has to be applied in analysis has to be feasible with the data and thus a low quality data does not allow much space to the researcher to apply a broad spectrum of methodologies to test his/her hypotheses.

Thus the data used for this research is a well-tested and high quality data from Pakistan Bureau of Statistics which is a government mandate organization for the collection of statistics about the Pakistan economy. The research uses the 2018-19 PSLM-HIES data which is a cross sectional data of 24809 households in all over the country. However, for this research only focus on the province of Khyber Pukhtunkhwa as Khyber Pukhtunkhwa is a net food deficient country and relies on other provinces for its food requirement. Any changes in the market prices of food commodities also have pronounced implications for the welfare of the consumers in the province. In this data the total sample from the province of Khyber Pukhtunkhwa is 4464 households.

4.3 Division-wise distribution of sample

The sample used in the study comes from all the seven divisions of Khyber Pukhtunkhwa. The number of households in each division is according to the population of that division. Table 1 contains the details of sample distribution.

Table 1: Division wise distribution of sample

S. No	Name of division	Sample size
1	Malakand	959
2	Hazara	844
3	Mardan	472
4	Peshawar	1225
5	Kohat	369
6	Bannu	265
7	Kohat	330
	Total	4464

The total sample size in the data is 4464 which are collected as 959 households belong to Malakand division, 844 to Hazara division, 472 households are from Mardan division. From Peshawar division 1225 households' data are collected out of the 4464 total sample size. From Kohat, Banu, and Dera Ismail Khan respectively 369, 265 and 330 sample are collected which in total gives 4464 sample size and it cover the entire Khyber Pukhtunkhwa (KPK) province and its seven divisions.

Table 4.2: Rural and Urban wise distribution of sample

	Sample size	Percentage
Rural	3018	67.6
Urban	1446	32.4
Total	4464	100

The sample also covers urban and rural areas of K.P.K, as shown in table 2, and the sample size from rural area is 3018 out of 4464 which is 67.6 % of overall sample and urban sample size is 1446 out of 4464 which makes 32.4% of the overall sample size. The share in our data is high from rural area and 2/3 of sample is being collected from rural area and 1/3 from urban area. It should be kept in mind that this is because the proportion of rural population is higher in the province as compared to urban population.

Descriptive Statistics

This chapter presents the summary statistics which are important in understanding the nature of the data as well as the context about which the study is talking about.

5.1 Household characteristics

Descriptive statistics about household socio-economic characteristics are used to describe or review the characteristics of a sample or data set such as the variable's mean, standard deviation etc. Inferential statistics can help us understand the collective properties of the elements of a data. Table 3 contains the basic household characteristics of the sample.

Table 5.3: Descriptive statistics of basic household characteristics

Variable	Obs	Mean	Std. Dev.	Min	Max
Household head education	4,464	4.920	5.389	0	28
Household head age	4,464	47.532	13.892	16	99
Employment status of HH head	4,464	0.726	0.446	0	1

Marital status of HH head	4,464	0.923	0.266	0	1
Adult members in Household	4,464	4.075	2.243	1	27
Annual earnings of Household	4,464	342694	423697	0	2,000,000
Agricultural land area (acres)	4,464	0.429	3.100	0	100
Own residence	4,464	0.851	0.356	0	1
Kaccha house	4,464	0.183	0.387	0	1
Zakat beneficiary	4,464	0.022	0.145	0	1
BISP beneficiary	4,464	0.157	0.363	0	1
Urban household	4,464	0.324	0.468	0	1
Total monthly expenditure on selected food items	4,459	7242	3679	75	40978.57
Total monthly expenditure of household	4,464	58915	53483	0	959326.2

Average household head education is 4.920 (primary level) in the sample implying that most of the households have low education in the province and at maximum they have post doc and at minimum they are illiterate and have zero level schooling. Among the 4464 households, household head age's maximum is 99 year and minimum is 16 years and the mean value for household head age is 47.53 years but the standard deviation is high which 13.89 years are. As employment status in the sample is 72.6% which mean that 72.6% household heads are doing some job and earn and the remaining 27.4% household heads are unemployed due to some reason. It shows that most of household heads are earners and doing some jobs. The marital status of household head shows that 92.3% are married and the remaining 7.7% are unmarried – so most of household heads are married people. The number of adult people in household is maximum 27 people and minimum 1 person but on average about 4 adult persons live in each household, it shows that in each household adult people are there which also take part in decision with household head.

Annual earnings of household at average is Rs. 342,694 with standard deviation of 423,697 the maximum level of household earning is Rs. 12,000,000. Agriculture land area in acre at average is 0.429 acres with standard deviation of 3.1 and maximum land of household is 100 acre and minimum 0 acre so most of households own very small area of land.
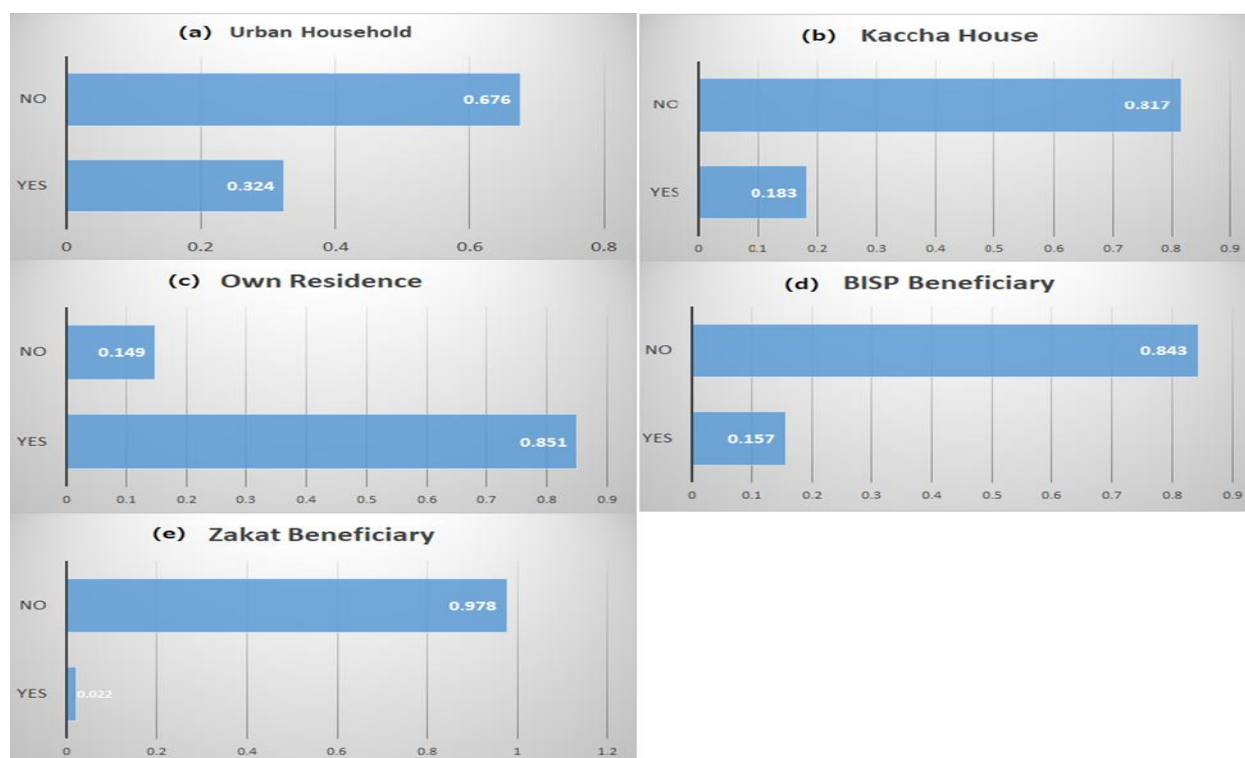
Figure 5.1: Graphical depiction of categorical variables in Table 5.3

Table 5.3 also contains statistics related to certain categorical variables showing the socio-economic status of households. Figure 5.1 shows a graphical depiction of these variables. 85.1% households have their own residence and the remaining 14.9% do not have their own residence with standard deviation 0.35. Moreover, 18.3% households live in kaccha (made of mud and wood) house and 81.7% household live in pakka (made of bricks, concrete and iron) house with standard deviation 0.387 so most of houses is not kaccha. Proportion of households which get zakat from Bait-ul-Mal is 2.2% and this is very few as the remaining 97.8% households do not get zakat. The households which get Benazir Income Support Program (BISP) beneficiary are 15.7% and the remaining 84.3% do not get BISP social security. The proportion of urban households is 32.4% and that of rural household is 67.6% so most of household data is from rural area. With standard deviation 0.468. Total monthly expenditure on the selected food items i.e., wheat, rice, fruits, vegetable, milk and edible oil at average is 7,242 PKR with standard deviation of 3679 and maximum 40978.57 PKR and minimum 75 PKR. And total monthly expenditure of household (on all items) in the sample is 58,915 PKR at average with standard deviation of 53483 and the maximum level is 959326.2 PKR.

Table 5.4: Division wise descriptive statistics of basic household characteristics

	Malakand	Hazara	Mardan	Peshawar	Kohat	Bannu	Dera Ismail Khan
Household Head Education	3.8	5.19	4.54	5.37	5.32	5.96	5.13
	(5.22)	(5.26)	(5.02)	(5.64)	(5.14)	(5.39)	(5.51)
Household Head Age	46.79	48.26	48.48	47.45	48.3	45.81	47.44
	(14.06)	(13.13)	(14.34)	(13.65)	(15.03)	(14.75)	(13.39)

Employment Status Of Hh Head	0.67	0.77	0.7	0.74	0.69	0.79	0.78
	(0.47)	(0.42)	(0.46)	(0.44)	(0.46)	(0.41)	(0.42)
Marital Status Of Hh Head	0.95	0.9	0.9	0.93	0.91	0.92	0.93
	(0.22)	(0.30)	(0.30)	(0.25)	(0.29)	(0.27)	(0.26)
Adult Members In Household	4.18	3.55	4.12	4.27	4.18	4.23	4.11
	(2.36)	(1.80)	(2.22)	(2.36)	(2.43)	(2.09)	(2.25)
Annual Earnings Of Household	330,991	318,375	287,523	406,735	300,872	353,406	318,233
	(419587)	(311599)	(271175)	(585681)	(297405)	(268099)	(336426)
Agricultural Land Area (Acres)	0.27	0.32	0.33	0.17	0.35	1.44	1.56
	(1.25)	(1.81)	(2.53)	(1.88)	(1.60)	(6.62)	(7.40)
Own Residence	0.85	0.87	0.85	0.81	0.86	0.88	0.95
	(0.36)	(0.34)	(0.35)	(0.39)	(0.35)	(0.33)	(0.22)
Kaccha House	0.13	0.1	0.11	0.16	0.24	0.44	0.49
	(0.33)	(0.30)	(0.31)	(0.36)	(0.43)	(0.50)	(0.50)
Zakat Beneficiary	0	0.02	0.02	0.03	0.01	0.05	0.03
	(0.06)	(0.15)	(0.14)	(0.17)	(0.10)	(0.22)	(0.16)
BISP Beneficiary	0.27	0.11	0.21	0.13	0.12	0.08	0.08
	(0.45)	(0.31)	(0.41)	(0.34)	(0.32)	(0.28)	(0.28)
Urban Household	0.2	0.19	0.37	0.53	0.28	0.17	0.33
	(0.40)	(0.40)	(0.48)	(0.50)	(0.45)	(0.38)	(0.47)
Total Monthly Expenditure On Selected Food Items	7870	7546	6313	7350	6449	7456	6289
	(3874)	(3358)	(2935)	(4125)	(3203)	(3133)	(3423)
Total Monthly Expenditure Of Household	59,189	58,107	52,798	69,213	59,318	45,820	41,450
	(48118)	(55414)	(41124)	(62998)	(56641)	(36322)	(38479)
Total Sample	959	844	472	1225	369	265	330

Table 4 contains a division wise comparison of the socio-economic characteristics so as to understand the geographical disparities among the population of the province. We can see that education of household head is highest in the division of Bannu and lowest in the division of Malakand. Similarly, household head age is also smallest in the division of Bannu. Likewise, employment of household head is lowest in the division of Malakand (67 percent) and highest in the division of Bannu (79 percent). Annual earnings of household are lowest in Mardan and highest in Peshawar. In the division of Bannu the proportion of household with Kaccha house is highest (44 percent). The proportion of BISP beneficiary is highest in Malakand and lowest in Bannu and Dera Ismail Khan Division. Total household expenditure is highest in Peshawar, Kohat Malakand and Hazara whereas in Bannu and Dera Ismail Khan it is the lowest.

5.2 Share of selected food items in household expenditure

In table 5.5 the research will show the part of income which are spent on selected food items i.e., wheat, rice, fruits, vegetable, milk and edible oil.

Table 5.5: Share of selected food items in total monthly household expenditure in percentage

Rice share	1.16
	(1.222)
Wheat share	4.65
	(3.281)
Fruits share	1.33
	(1.241)
Vegetables share	2.75
	(1.731)
Milk share	1.21
	(1.803)
Edible oil share	2.53
	(1.378)
Meat share	2.12
	(2.099)
N	4463

Note: Standard deviation in parenthesis

So, the rice share is 1.16% of total monthly expenditure of household and the share of wheat is 4.65%. The share of fruits in the total monthly expenditure is 1.33%, 2.75% on vegetables, 1.21% on milk, 2.53% on edible oil and 2.12% on meat. The total spending on these 7-food items is 15.75% of the total monthly income. It is thus evident that an increase in the prices of these items will have implications for the welfare of the households.

5.3 Poverty level in different regions

Table 5.6: Baseline estimates of poverty (in 2018) in Khyber Pukhtunkhwa

Division	2018 Poverty Head Count	Total Number of Households in the Sample
Malakand	0.138	959
Hazara	0.091	844
Mardan	0.191	472

Peshawar	0.130	1,225
Kohat	0.160	369
Bannu	0.204	265
Dera Ismail Khan	0.297	330
Total	**0.15**	**4,464**

Note: In this table we use the official poverty line of 3776 Rs. per adult which is taken from:
https://www.pide.org.pk/pdf/PIDE-Knowledge-Brief3.pdf

 Table 5.6 indicates that the overall rate of poverty in the province is 15 percent. The 15% is the mean (average) value of all divisions. However, this rate varies greatly from division to division. The lowest rate of poverty is observed in Hazara division which is 9.1 percent whereas the highest rate of poverty is observed in the Dera Ismail Khan division which is about 30 percent. Likewise, in the district of Malakand the rate of poverty is about 14 percent. In the division of Mardan the rate of poverty is 19.1 percent whereas in the division of Peshawar the poverty rate is 13 percent. And in Kohat division the poverty rate is 16 percent and in Bannu division the poverty level is 20.4 percent. By this result the poverty level in Dera Ismail Khan is maximum and poverty level in Hazara division in minimum.

Table 5.7: Estimation results of the LA-AIDS

	COEF.	ROBUST STD. ERR.	Z	P>Z	[95% CONF.	INTERVAL]
ALPHA						
ALPHA_ RICE	0.145	0.007	20.690	0.000	0.131	0.158
ALPHA_ WHEAT	0.866	0.018	49.240	0.000	0.832	0.901
ALPHA_ FRUITS	0.005	0.009	0.510	0.609	-0.014	0.023
ALPHA_ VEGETABLES	0.074	0.019	3.960	0.000	0.037	0.111
ALPHA_ MILK	-0.093	0.013	-6.980	0.000	-0.119	-0.067
ALPHA_ OIL	-0.110	0.020	-5.570	0.000	-0.148	-0.071
ALPHA_ MEAT	0.113	0.016	6.870	0.000	0.081	0.145
BETA						
BETA_ RICE	0.005	0.005	1.090	0.275	-0.004	0.015
BETA_ WHEAT	0.030	0.008	3.750	0.000	0.014	0.046
BETA_ FRUITS	0.002	0.011	0.200	0.838	-0.019	0.024
BETA_ VEGETABLES	-0.099	0.010	-9.860	0.000	-0.119	-0.080
BETA_ MILK	0.025	0.008	3.210	0.001	0.010	0.041
BETA_ OIL	-0.064	0.008	-8.000	0.000	-0.080	-0.049
BETA_ MEAT	0.101	0.008	12.720	0.000	0.085	0.116
GAMMA						
GAMMA_ RICE _ RICE	-0.056	0.003	-18.340	0.000	-0.062	-0.050
GAMMA_ WHEAT _ RICE	0.015	0.004	3.250	0.001	0.006	0.023
GAMMA_ FRUITS _ RICE	0.009	0.002	3.930	0.000	0.005	0.014
GAMMA_ VEGETABLES _ RICE	0.034	0.003	12.640	0.000	0.029	0.039
GAMMA_ MILK _ RICE	0.003	0.004	0.890	0.376	-0.004	0.011
GAMMA_ OIL _ RICE	0.023	0.003	8.510	0.000	0.017	0.028
GAMMA_ MEAT _ RICE	-0.028	0.003	-10.340	0.000	-0.033	-0.023
GAMMA_ WHEAT _ WHEAT	0.588	0.014	41.000	0.000	0.560	0.616
GAMMA_ FRUITS _ WHEAT	-0.081	0.005	-16.960	0.000	-0.090	-0.071
GAMMA_ VEGETABLES _ WHEAT	-0.084	0.006	-14.570	0.000	-0.096	-0.073
GAMMA_ MILK _ WHEAT	-0.278	0.010	-26.990	0.000	-0.298	-0.258
GAMMA_ OIL _ WHEAT	-0.112	0.007	-15.760	0.000	-0.126	-0.098
GAMMA_ MEAT _ WHEAT	-0.047	0.005	-8.870	0.000	-0.058	-0.037

GAMMA_ FRUITS _ FRUITS	0.067	0.004	17.260	0.000	0.059	0.074
GAMMA_ VEGETABLES _ FRUITS	-0.004	0.003	-1.420	0.157	-0.009	0.001
GAMMA_ MILK _ FRUITS	-0.005	0.004	-1.420	0.155	-0.012	0.002
GAMMA_ OIL _ FRUITS	-0.008	0.003	-2.900	0.004	-0.013	-0.003
GAMMA_ MEAT _ FRUITS	0.022	0.003	8.200	0.000	0.016	0.027
GAMMA_ VEGETABLES _ VEGETABLES	0.086	0.005	18.340	0.000	0.076	0.095
GAMMA_ MILK _ VEGETABLES	-0.014	0.004	-3.420	0.001	-0.022	-0.006
GAMMA_ OIL _ VEGETABLES	-0.022	0.004	-5.800	0.000	-0.030	-0.015
GAMMA_ MEAT _ VEGETABLES	0.005	0.003	1.580	0.113	-0.001	0.012
GAMMA_ MILK _ MILK	0.333	0.012	27.820	0.000	0.310	0.357
GAMMA_ OIL _ MILK	-0.023	0.005	-4.260	0.000	-0.033	-0.012
GAMMA_ MEAT _ MILK	-0.017	0.004	-4.210	0.000	-0.026	-0.009
GAMMA_ OIL _ OIL	0.136	0.007	20.070	0.000	0.123	0.149
GAMMA_ MEAT _ OIL	0.006	0.003	1.830	0.067	0.000	0.013
GAMMA_ MEAT _MEAT	0.060	0.006	10.300	0.000	0.048	0.071
ETA						
ETA_HHH_EDU_ RICE	0.000	0.000	1.410	0.158	0.000	0.000
ETA_HHH_EDU_ WHEAT	0.002	0.000	4.500	0.000	0.001	0.003
ETA_HHH_EDU_ FRUITS	-0.001	0.000	-4.310	0.000	-0.002	-0.001
ETA_HHH_EDU_ VEGETABLES	0.001	0.000	3.260	0.001	0.000	0.002
ETA_HHH_EDU_ MILK	-0.001	0.000	-3.970	0.000	-0.002	-0.001
ETA_HHH_EDU_ OIL	0.001	0.000	4.230	0.000	0.001	0.002
ETA_HHH_EDU_ MEAT	-0.002	0.000	-5.430	0.000	-0.003	-0.001
ETA_AGE_ RICE	0.000	0.000	0.150	0.885	0.000	0.000
ETA_AGE_ WHEAT	0.000	0.000	1.040	0.300	0.000	0.000
ETA_AGE_ FRUITS	0.000	0.000	-1.510	0.132	0.000	0.000
ETA_AGE_ VEGETABLES	0.001	0.000	5.880	0.000	0.001	0.001
ETA_AGE_ MILK	0.000	0.000	-2.720	0.007	0.000	0.000

ETA_AGE_ OIL	0.000	0.000	3.600	0.000	0.000	0.001
ETA_AGE_ MEAT	-0.001	0.000	-7.050	0.000	-0.001	-0.001
ETA_HHH_EMP_ RICE	-0.002	0.002	-1.170	0.242	-0.005	0.001
ETA_HHH_EMP_ WHEAT	0.006	0.003	1.690	0.091	-0.001	0.012
ETA_HHH_EMP_ FRUITS	0.006	0.003	1.890	0.059	0.000	0.013
ETA_HHH_EMP_ VEGETABLES	-0.006	0.003	-1.790	0.073	-0.013	0.001
ETA_HHH_EMP_ MILK	0.008	0.003	2.950	0.003	0.003	0.014
ETA_HHH_EMP_ OIL	-0.007	0.003	-1.960	0.050	-0.014	0.000
ETA_HHH_EMP_ MEAT	-0.005	0.003	-1.700	0.090	-0.011	0.001
ETA_ADULT_MEM_ RICE	0.000	0.000	0.000	0.997	-0.001	0.001
ETA_ADULT_MEM_ WHEAT	-0.003	0.001	-2.680	0.007	-0.005	-0.001
ETA_ADULT_MEM_ FRUITS	0.003	0.001	3.380	0.001	0.001	0.004
ETA_ADULT_MEM_ VEGETABLES	-0.002	0.001	-2.880	0.004	-0.004	-0.001
ETA_ADULT_MEM_ MILK	0.005	0.001	5.620	0.000	0.003	0.007
ETA_ADULT_MEM_ OIL	-0.006	0.001	-5.030	0.000	-0.008	-0.003
ETA_ADULT_MEM_ MEAT	0.003	0.001	3.800	0.000	0.001	0.004
ETA_BISP_BEN_ RICE	-0.007	0.002	-2.830	0.005	-0.011	-0.002
ETA_BISP_BEN_ WHEAT	-0.010	0.005	-1.970	0.049	-0.019	0.000
ETA_BISP_BEN_ FRUITS	0.009	0.002	3.900	0.000	0.005	0.014
ETA_BISP_BEN_ VEGETABLES	-0.005	0.004	-1.310	0.190	-0.013	0.003
ETA_BISP_BEN_ MILK	0.013	0.003	4.170	0.000	0.007	0.020
ETA_BISP_BEN_ OIL	-0.016	0.005	-3.070	0.002	-0.026	-0.006
ETA_BISP_BEN_ MEAT	0.015	0.005	3.110	0.002	0.005	0.024
ETA_URBAN_ RICE	0.008	0.002	4.580	0.000	0.005	0.012
ETA_URBAN_ WHEAT	0.001	0.003	0.300	0.765	-0.005	0.007
ETA_URBAN_ FRUITS	-0.010	0.003	-3.120	0.002	-0.017	-0.004
ETA_URBAN_ VEGETABLES	0.010	0.004	2.590	0.010	0.002	0.017
ETA_URBAN_ MILK	-0.024	0.005	-5.400	0.000	-0.033	-0.016
ETA_URBAN_ OIL	0.013	0.004	3.460	0.001	0.006	0.020
ETA_URBAN_ MEAT	0.003	0.003	0.940	0.347	-0.003	0.009

RHO						
RHO_HHH_EDU	0.124	0.047	2.670	0.008	0.033	0.215
RHO_AGE	0.093	0.030	3.130	0.002	0.035	0.152
RHO_HHH_EMP	-0.103	0.304	-0.340	0.734	-0.700	0.493
RHO_ADULT_MEM	0.395	0.089	4.440	0.000	0.221	0.570
RHO_BISP_BEN	-0.130	0.408	-0.320	0.751	-0.929	0.670
RHO_URBAN	0.296	0.403	0.740	0.462	-0.493	1.086

Note: Alpha = intercept, beta = coefficient on expenditure variables (expenditure elasticities of demand), gama = coefficient on price variables (price elasticities of demand)

Table 5.7 contains the results of the regression that is used to estimate the LA-AIDS function as explained in chapter 3 above. STATA command *quaids* is used for this estimation. Table 5.7 not only contains coefficients on price and expenditure variables but also coefficients on household demographic variables such as household head education, age, household income, rural, urban etc. We can see that most of the demographic variables are significant determinants of food demand for individual food item. For instance, education is positively related to demand for rice but negatively related to demand for fruits, vegetables and meat. Similarly, employment status of household head is negatively related to the consumption of rice, vegetables and oil and meat whereas it is positively related to the consumption of wheat, fruits and milk.

5.4 Own and cross price elasticities of demand

	Rice	Wheat	Fruits	Vegetables	Milk	Oil	Meat
Rice	-1.681	0.474	0.215	0.644	0.120	0.482	-0.254
Wheat	0.124	1.362	-0.198	-0.110	-0.912	-0.221	-0.044
Fruits	0.179	-0.632	-0.159	0.135	0.020	0.080	0.378
Vegetables	0.269	-0.175	0.067	-0.376	0.013	0.006	0.197
Milk	0.114	-3.305	0.023	0.029	3.350	-0.092	-0.118
Oil	0.213	-0.373	0.042	0.006	-0.043	-0.050	0.205
Meat	-0.139	-0.093	0.248	0.258	-0.068	0.253	-0.458

Table 5.8 contains the estimates of own and cross price compensated elasticity's of demand for the selected seven food items which are estimated using the *quaids* function in STATA. The research shows that if price of wheat increases by one percent, the quantity demand of rice increases by 0.47 percent. Similarly, a one percent increase in the price of vegetables increase the quantity demanded of rice by 0.64 percent and in fruit one percent increase in price will increase quantity of rice by 0.21 percent. If the price of milk increases by one percent, the quantity consumed of rice increases by .12 percent. When price of oil increases by one percent, the quantity consumed of rice increases by .48 percent and meat and when price of meat increase one percent the quantity demand of rice will decrease by .25 percent.

And when the price of rice increases by one percent the quantity demand for rice will decrease by 1.68 percent. so as increase in price of rice have negative relation with rice and meat quantity demand.

As research shows that if price of rice increase by one percent the quantity demand of wheat increase by .12 percent. Similarly, one percent increase in wheat price quantity demand for wheat will increase 1.16 per own price elasticity is positive. One percent increase in fruit price leads to decrease in quantity demanded of wheat by 0.19 percent. One percent increase in vegetable price leads to decrease in quantity demanded of wheat by 0.11 percent. One percent increase in milk price leads to decrease in quantity demanded of wheat by 0.91 percent. One percent increase in oil price quantity demand of wheat will decrease .22 percent. One percent increase meat price quantity demand of wheat will decrease .044 percent.

If price of rice increase by one percent, the quantity demand of fruits increase by .17 percent. Due to one percent increase in wheat price quantity demand for fruits will decrease by .63 percent. Due to one percent increase in fruits prices quantity demanded for fruits will decrease by 0.15 percent. We see that if price of vegetables increases by one percent the quantity demand of fruits increases by .13 percent. As like that if price of milk increase by one percent the quantity demand of fruits increase by .020 percent. We see that if price of oil increase by one percent the quantity demand of fruits increase by .08 percent. As like that if price of meat increase by one percent the quantity demand of fruits increase by .37 percent. The study shows that if price of rice increases by one percent the quantity demand of vegetable increase by 0.26 percent. Similarly, due to one percent increase in wheat price quantity demanded for vegetable will decrease by 0.17 percent. Likewise, due to one percent increase in fruits price quantity demand for vegetable will increase by .067 percent. The research finds that if price of vegetable increase by one percent the quantity demand of vegetable will decrease by .37 percent. As like that if price of milk increases by one percent the quantity demand of vegetable increase by .013 percent. The research finds that if price of oil increase by one percent the quantity demand of vegetable increase by .006 percent. Similarly if price of meat increase by one percent the quantity demand of vegetable increase by 0.197 percent.

As research finds that if price of rice increases by one percent the quantity demand of milk would increases by .11 percent. Similarly due to one percent increase in wheat price quantity demand for milk will decrease by 3.305 percent. One percent increase in fruits price quantity demand for milk will increase by .023 percent. Research finds that if price of vegetable increase by one percent the quantity demand for milk increases by .029 percent. As like that if price of milk increases by one percent the quantity demand of milk will increase by 3.35 percent. Research finds that if price of oil increase by one percent the quantity demand for milk decreases by .092 percent. As like that if price of meat increase by one percent the quantity demand for milk decreases by 0.118 percent.

As the study finds that if price of rice increase by one percent the quantity demand of edible oil would increase by .21 percent. Same as one percent increase in wheat price quantity demand for oil will decrease by .373 percent. One percent increase in fruits price quantity demand for oil will increase by .042 percent. Finding shows that if price of vegetable increase by one percent the quantity demand for oil increase by .006 percent. Like that if price of milk

increases one percent the quantity demand for oil will decrease by .043 percent. We see that if price of oil increases by one percent the quantity demand for oil decreases by 0.05 percent. As like that if price of meat increases by one percent the quantity demand for oil increase by 0.205 percent.

As research finds that if price of rice increases by one percent the quantity demanded of meat will decrease by 0.13 percent. Same as one percent increase in wheat price quantity demand for meat will decrease by .093 percent. Due to one percent increase in fruits price the quantity demanded for meat will increase by 0.248 percent. We see that if price of vegetable increase by one percent the quantity demand of meat will increase by 0.258 percent. As like that if price of milk increases by one percent the quantity demanded of meat will decrease by .068 percent. We see that if price of oil increases by one percent the quantity demanded for meat would increase by 0.253 percent. As like that if price of meat increase by one percent the quantity demand for meat decreases by .458 percent.

In research analysis the data is taken about the food inflation in Pakistan from the Pakistan Bureau of Statistics website which publishes a monthly report of consumer prices in the country. Table 8 contains the food inflation data in the most recent years i.e., from 2018 to 2021.

Table 5.9: Three years (2018-2021) food inflation in Pakistan

Food item type	Price index (Base 2015-2016)				Three years price change
	Dec-18	Dec-19	Dec-20	Dec-21	
Price index of non-perishable food items	112.20	124.97	145.38	165.99	47.90%
Price index of perishable food items	89.10	162.44	161.53	145.01	62.70%

Among the seven food items used in the analysis three are non-perishable (rice, wheat and oil) whereas four items are perishable (fruits, vegetables, milk and meat). Based on the figures in Table 9, the prices of non-perishable food items increased, on average, by 47.9 percent from December 2018 to December 2021 whereas the prices of perishable food items increased, on average, by 62.7 percent in the country during December 2018 to December 2021. It should be kept in mind that this time period coincides with the Covid-19 epidemic as well as the recent global commodity prices increases. The price increase in covid-19 era is high because of low level of care for crops and also transport is affected due to lock down and also people activity to go out. The price hike is high of perishable than non-perishable food item.

Impact Estimation Results

In this chapter the research will explain the results obtained for the impact of the recent food inflation in the past three years on the rate of poverty in the province and try to differentiate the impact across the various administrative divisions of the province. For this purpose, the study uses the step by step methodology as explained below:

Step 1: By using the estimated direct compensated own price elasticities of demand (as given in Table 7) and cross-price compensated elasticities, and the percentage price changes

between 2018 and 2021 shown in Table 8, new estimates of household food consumption in 2018/2019 are obtained. These consumption quantities are such that the consumer's utility before and after the price change remain the same, whereas only the quantity demanded changes.

Step 2: Using the estimates of quantity consumed, we can derive the expenditure on each food item as well as on total food items. This gives us an estimate of the compensating variation (Rs. 405 per adult per month). It measures how much more consumers have to pay to remain at the 2018/2019 utility level. It is assumed that consumer prices and expenditure on non-food items do not change during the three years.

Step 3: Subtract the compensating variation obtained in Step 2 from the actual expenditure per capita in 2018/2019 and then use the new smaller expenditure per capita to obtain the adjusted poverty level (i.e., after food inflation). By essence, the impact of food inflation is largely similar to a decrease in total expenditure or income, and thus increases poverty levels.

6.1 Impact of Rising Food Prices on Poverty Across Divisions

Table 6.10 compares the actual poverty rate in 2018 with the poverty rate obtained after accounting for the recent food inflation between 2018 and 2021. Overall, in the province of Khyber Pakhtunkhwa, the poverty rate increased from 15 percent to 19 percent due to food inflation of the selected seven main food items. The most pronounced change in poverty rate is seen in the division of D.I. Khan, where the poverty rate was not only the highest before food inflation but also experienced the largest increase due to the price rise. Therefore, this division should be a special focus of poverty alleviation programs in the province.

Table 6.10: Division wise impact of increase in food prices on poverty in Khyber Pukhtunkhwa

2018 POVERTY LINE = RS. 3776			
DIVISION	Actual poverty in 2018 (Percentage)	Poverty after food inflation (Percentage)	Percent change in poverty
MALAKAND	13.80	16.16	2.36
HAZARA	9.10	12.32	3.22
MARDAN	19.10	23.52	4.42
PESHAWAR	13.00	18.12	5.12
KOHAT	16.00	20.87	4.87
BANNU	20.40	25.28	4.88
DERA ISMAIL KHAN	29.70	36.06	6.36
TOTAL	**15.00**	**19.15**	**4.15**

Source: Author's own estimation from PSLM-HIES 2018/2019 Data

The second highest rate of poverty in the province is in the division of Bannu where the poverty stood by 20.4 percent before the food inflation and 25.28 percent after the recent food inflation.

On the other hand, the lowest rate of poverty is observed in the division of Hazara where it is lowest before the food inflation and also the lowest after the food inflation. Due to the food inflation, the poverty has increased by a minor 3.22 percent in Hazara. Likewise, the poverty rate has increased by only 2.36 percent in the division of Malakand which implies that the people of the division are not much impacted by the recent food inflation.

The poverty headcount ratio, which is the percentage of people living below the poverty line in a population has been computed using the official poverty line of Rs. 3776 per adult equivalent per month. This figure has been obtained from the Pakistan Bureau of Statistics.

6.2 Impact of rising food prices on poverty in rural and urban areas of KP

Next research analyzes the impact of food inflation on poverty across the urban and rural areas of the province. Table 11 contains the results for the welfare implication of food inflation on rural and urban areas.

Table 6.11: Rural-urban wise impact of increase in food prices on poverty in Khyber Pukhtunkhwa

AREA	2018 POVERTY LINE = RS. 3776		
	Actual poverty in 2018 (Percentage)	Poverty after food inflation	Percent change in poverty
RURAL	18.32	22.56	4.24
URBAN	8.02	12.03	4.01
TOTAL	**14.99**	**19.15**	**4.17**

Source: Author's own estimation from PSLM-HIES 2018/2019 Data

First research shows that actual poverty level in rural areas is 18.32 percent in 2018 before price hike and due to food price hike the poverty level in rural areas move to 22.56 percent which is an increase of 4.24 percent in the rural areas of the province. In urban areas the actual poverty level in 2018 was lower as compared to rural areas i.e., 8.02 percent before price hike and due to increase in food prices the poverty level in urban area move to 12.03 percent – an increase of 4.01 percent. These results indicate that rural areas not only have higher rate of poverty as compared to the urban areas of the province, but the change is poverty level due to the recent food price hike is stronger in rural areas as compared to urban areas.

Conclusion and Policy Recommendations

7.1 Discussion

This research examines the potential impacts of the increase in food prices on consumers' welfare in Pakistan and its possible diversity across rural and urban areas. Why K.P.? 1st agriculture is the predominant sector of the economy of the region. Secondly poverty rates are high in the region due to lack of activities other than agriculture such as industry and services. Thirdly, the province is net food deficient and relies on other provinces, especially the province of Punjab for its food requirements.

While discussing about the impact of food price hike on poverty levels, we should keep in mind the opportunity it brings for agricultural households whose income come from sale of food commodities. However, this might not be the case in Pakistan where land ownership is highly skewed. In Pakistan just 26 percent are wheat producers whereas only 9 percent households are rice producers.

Literature about the welfare implications of food inflation widely uses Almost Ideal Demand System (AIDS) model for empirical estimation of consumer demand functions. From this model compensated own and cross price elasticities of demand for individual food items are obtained and then used to calculate the impact of increase in food prices on consumption. The items were selected on the basis of Haq et. al, (2008). Precisely, seven major food items/groups used in the analysis are (1) rice including all kinds used as food (2) wheat and

wheat consumed as flour etc. (3) milk and its products (4) fruits and its products (5) vegetables (6) meats and its kinds like (beef mutton and poultry) (7) cooking oil. The fruits, vegetable and milk categories consist mainly of fresh products. The main household level data used in the study has been collected in 2018/2019. Therefore, this research records the food inflation from 2018 to 2021, a three years' duration for analysis. It should be noticed that these three periods coincide with the emergence of the Covid-19 pandemic and the subsequent global food commodities inflation especially since 2020. the household income and expenditure part is used to collect data on the household income, receipts and sources, consumption and non-consumption expenditure and pattern of savings, assets and liabilities held by households, in various geographical areas. This research estimated the impacts of rising world food prices on poverty in division and in rural and urban areas of K.P. The official headcount ratio, that is, the proportion of the population below the poverty line for 2018 is derived using Rs. 3776 per adult equivalent per month as the poverty line. However, Rs. 3778 is derived on the adult equivalent basis while the headcount ratio needs to be derived on a per capita basis. As compared to 2015/2016 the unexpected food price hike resulting from the food crisis increased poverty by 4.15 percent percentage points (19.15%), severely affecting the urban areas where poverty doubled. And it effects the Dera Ismail Khan division severely.

The estimates show that 19.15 percent people in the province of Khyber Pakhtunkhwa are unable to meet one-half of the expenditure of the poverty line. As far as the food inflation is concerned, I observed that between 2018 and 2021 the prices of perishable food items increased by a massive 62.7 percent whereas the price of non-perishable food items increased by 47.9 percent. The sample has been collected from all seven divisions of K. P. and as from our results the Hazara division has the least poverty in the province and Dera Ismail Khan Division has the most poverty. The impact of food inflation on poverty is substantial as the poverty rate before the food inflation is 15 percent whereas after the food inflation it is 19 percent. We also checked the impact of food price hike on consumer welfare in urban and rural area which shows that the price hike effect rural areas slightly more than urban areas.

7.2 Policy Implications

In order to cope with the poverty increasing effects of food inflation, the study recommends the following policy implications to the concerned entities:

- The impact of food inflation varies from area to area. In the province of Khyber Pukhtunkhwa the divisions of Dera Ismail Khan and Bannu are more prone to food inflation as compared to other divisions and thus a government intervention to eradicate the impact of food inflation needs to focus first on these areas.
- The impact is also stronger in rural areas as compared to urban areas and thus rural areas should not be ignored in policy making for poverty reduction.
- Food inflation in recent years of the Covid pandemic is strong and it is hurting a large part of population. Post pandemic policy and planning should keep food security of the population a priority.
- There is a need about more detailed province level data to study the economy of the province on micro level. The best statistics available about the province are at the federal level with federal agencies. The province of K. P. needs to obtain its own socio-economic statistics for a better monitoring of the wellbeing of the population.

- ▪ The research about the economy of the province in scarce and thus the government planning and policy making departments need to encourage and support research about the province.

References

Agbola, F. W. (2003). Estimation of food demand patterns in South Africa based on a survey of households. Journal of Agricultural and Applied Economics, 35(3), 663-670.

Barrett, C.B., and P.A. Dorosh (1996). 'Welfare and Changing Food Prices: Nonparametric Evidence from Rice in Madagascar'. *American Journal of Agricultural Economics,* 78(3): 656–69.

Baulch, B., & McCulloch, N. (2002). Being poor and becoming poor: Poverty status and poverty transitions in rural Pakistan. *Journal of Asian and African Studies*, *37*(2), 168-185.

Bellemare , M. F., Barrett, C. B., & Just, D. R. (2013). The welfare impacts of commodity price volatility: evidence from rural Ethiopia. American Journal of Agricultural Economics, 95(4), 877-899.

Cheema, A. R., & Sial, M. H. (2012). Incidence, profile and economic determinants of poverty in Pakistan: HIES 2005-06. Management Science and Engineering, 6(2), 120-129.

Cranfield, J.A., & Haq, Z.U. (2010). What impact has food price inflation had on consumer welfare: a global analysis (No. 421-2016-26839).

Cranfield, J.A., & Haq, Z.U. (2010). What impact has food price inflation had on consumer welfare: a global analysis (No. 421-2016-26839).

Cudjoe, G., Breisinger, C., & Diao, X. (2010). Local impacts of a global crisis: Food price transmission, consumer welfare and poverty in Ghana. Food policy, 35(4), 294-302.

Cudjoe, G., Breisinger, C., & Diao, X. (2010). Local impacts of a global crisis: Food price transmission, consumer welfare and poverty in Ghana. Food policy, 35(4), 294-302.

Deaton, A. (1997). The analysis of household surveys: a micro econometric approach to development policy. World Bank Publications.

Deaton, A., & Muellbauer, J. (1980). An almost ideal demand system. The American economic review, 70(3), 312-326.

Haq, Z. U., Nazli, H., & Meilke, K. (2008). Implications of high food prices for poverty in Pakistan. Agricultural Economics, 39, 477-484. http://www.pakinformation.com/population/kpk.html

Kane, G. Q., Mabah Tene, G. L., Ambagna, J. J., Piot-Lepetit, I., & Sikod, F. (2015). The impact of food price volatility on consumer welfare in Cameroon (No. 2015/013). WIDER Working Paper.

Leyaro, V. (2009). 'Commodity Price Changes and Consumer Welfare in Tanzania in the 1990s and 2000s'. CREDIT Research Paper No. 10/01. Nottingham, UK: University of Nottingham, Centre for Research in Economic Development and International Trade.

Robles, M., & Keefe, M. (2011). The effects of changing food prices on welfare and poverty in Guatemala. Development in Practice, 21(4-5), 578-589.

Vos, R., Glauber, J., Hernandez, M., & Laborde, D., (2022, February 11). COVID-19 and rising global food prices: What's really happening? *IFPRI Blog.* https://www.ifpri.org/blog/covid-19-and-rising-global-food-prices-whats-really-happening

Vu, L., & Glewwe, P. (2011). Impacts of rising food prices on poverty and welfare in Vietnam. Journal of Agricultural and Resource Economics, 14-27.

Rahman, K. T., Shanoyan, A., & Hovhannisyan, V. (2021). Food Commodity Price Hikes, Public Policy, and Consumer Welfare: Lessons from Bangladesh.

Prifti, E., Daidone, S., & Miguelez, B. (2017). Impact of increases in food prices on consumer welfare in Lesotho. *African Journal of Agricultural and Resource Economics*, *12*(311-2017-729), 52-61.