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# Measuring Food Security for Pakistan Using 2007-08 HIES Data

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## *Measuring Food Security Using HIES 2007-08 data for Pakistan*

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### *Abstract*

Food is one of the most basic rights of every one living on this earth to get food. Food insecurity has very serious consequences in term of undermining people's health, productivity and even their very survival. Sufficient food policy should not distract us from the need to find ways to address hunger. In this study we have calculated food security indicators related to food access and utilization by using Household Integrated Economic Survey(HIES) 2007-08 data. Almost 25% of the population is suffering from high food insecurity and 40% population is suffering from medium level of food insecurity. Cereals comprise more than 50% of the calories consumed by all income groups. Better educated household heads have lower food insecurity level than less educated after controlling income effect. Household size and food security are negatively related. Sind province has the highest percentage of food insecure population while in absolute number Punjab has the highest number of food insecure people.

### *Introduction*

“Society is composed of two great classes, those that have more dinners than appetite and those who have more appetite than dinners”.( **French Essayist Sebastian R Nicholson**)  
“a hungry man cannot see right or wrong. He just sees food” (**Pearl S.Buck ,Female Nobel Laureate**)

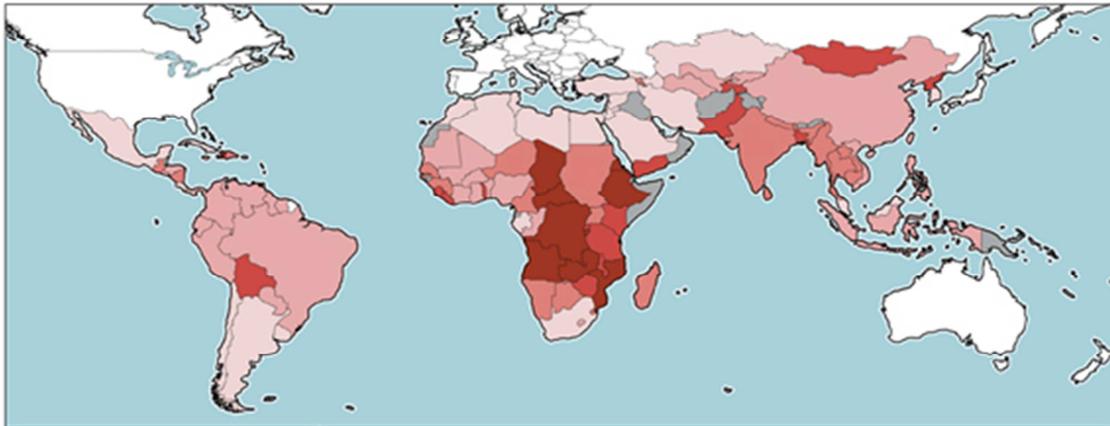
Food security is an important issue faced by the world in the 21<sup>st</sup> century. Providing food security to citizens is a commitment made by all the governments in the UDHR, 1947, International Covenant on Economic, Social and Cultural Right (ICESCR 1966) and World Food Summit (WFS-1996). In 2000, world's leaders declared halving hunger by 2015 as the first millennium development goal (MDG). FAO estimates that a total of 925 million people are undernourished in 2010 compared with 1.023 billion in 2009. But if food prices continue to rise, hunger level will increase and it will not be possible to meet the MDG of reducing hunger by half.

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## FAO Hunger Map 2010

Prevalence of undernourishment in developing countries

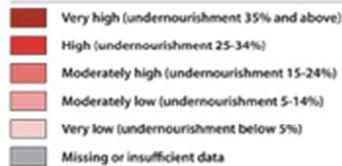


Source: FAOSTAT 2010 ([www.fao.org/hunger](http://www.fao.org/hunger))

Note: The map shows the prevalence of undernourishment in the total population of developing countries as of 2005-7 – the most recent period for which complete data are available. Undernourishment exists when caloric intake is below the minimum dietary energy requirement (MDER). The MDER is the amount of energy needed for light activity and a minimum acceptable weight for attained height, and it varies by country and from year to year depending on the gender and age structure of the population.

The designations employed and the presentation of material in the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

### Prevalence of undernourishment in developing countries (2005-07)



[www.fao.org](http://www.fao.org)

According to FAO Hunger Map, Pakistan has 25-34% population whose minimum dietary energy requirements are not met and thus it is among high food insecure countries. Only sub-Saharan Africa and couple of other countries have undernourishment higher than that of Pakistan. Article 38(d) of the Constitution of Pakistan explicitly guarantees the right of food to the people of Pakistan but it has attracted little attention of policy makers since its promulgation. It states as “The State shall provide basic necessities of life, such as food, clothing, housing, education and medical relief, for all citizens, irrespective of sex, caste, creed or race, as are permanently or temporarily unable to earn their livelihood on account of infirmity, sickness or unemployment”.

The world at large is suffering due to financial, food and fuel (FFF) crisis. Pakistan is suffering with two additional crisis i-e Fiscal and Frontier (war against terrorism in the frontier province). In a recent report on food security situation in Pakistan, “Pakistan’s government has pushed food prices too high for an impoverished population, as malnutrition levels rise despite the recovery of crops after devastating floods. You may have the country full with food but people are too poor to buy it,” (Wolfgang Herbing, director for the World Food Programme

(WFP) in Pakistan, 24 March 2011). This implies that self-sufficiency in food or food sovereignty at the national level is a necessary but not a sufficient condition for food security at the household level. Pakistan is not food deficient but a large part of its population has its nutritional requirement not fulfilled. As Nobel Laureate Amartya Sen “starvation is the characteristic of some people not having enough food to eat. It is not the characteristic of there being not enough food to eat. While the latter can be a cause of the former, it is but one of many possible causes”. Furthermore, Amartya Sen (2000) South Asia in terms of undernutrition is no better than that of Sub-Saharan Africa despite the latter is in general self-sufficient in food. This is because “self-sufficiency” is based on the fulfillment of the market demand. Based on Purchasing Power Parity, market demand understates the food needs. So food availability is not a guarantee to food security.

Highly volatile food prices, particularly in the last couple of years, put extra burden on the national economy in order to sustain the provision of food. An increase in real per capita GDP, population growth, urbanization, change in taste and preference etc are likely to change the demand prospects for food in future. There is a need to understand the concept of food security issues to cut hunger and for designing effective policy mechanism. Food security has been a major problem across the world resulting into poor health, productivity and often their very survival. Ensuring food security requires that there should be an accurate measurement of food secure and food insecure people at the household level. Identification of household behavior relating to food access serves as a critical building block for the development of policies and programs for helping people who are at risk, effectively targeting assistance and evaluating the impact of assistance. (Smith and Subandro (2007)

FAO and other international agencies provide international level aggregate indicators yet these indicators not provide sometimes useful information at micro level. Undernourished population increased from 9% to 12% and hunger has increased from 985 million to 1 billion in 2010. This information is hardly useful for any particular country for its effective policy related to hunger and food policy.

Country specific household survey measures permit reasonably accurate assessment of food insecure people within different geographical units of country. It is important to analyze which part of the country is the most food insecure. This will help in distribution of scarce resources to the neediest. Moreover, it provides information about who are the most vulnerable

to shocks such as rise in food prices, drought, low wage, floods etc. It is important that while thinking about food security people should be the center of focus not the production.

Effectiveness of a policy depends on targeting the most vulnerable population and remove food poverty. Delays in assistance during floods, earthquakes etc. have deadly consequences.

The most important factor to remove food security is targeting the food insecure efficiently. It should be ensured that assistance reach the most needy. Currently research is appropriately and increasingly moving toward survey based anthropometric and perception measures to improve the disaggregated identification of food insecure sub-population and their targetable characteristics and behaviors. (Barrett 2010)

According to von Braun et.al(1992) due to gradual shift over time from planned economy to market-oriented food policies, there is need to consider the entire range of instruments in the context of new economic policies. In order to devise such policies it is necessary to have measurement of food security indicators. There cannot be a single indicator by which one gauges the food security status of a country. National food security can be monitored in terms of gap between demand and supply, stock and trade indicators, percentage of food deficient population, malnourishment among women and children, food budget share of household etc. von Braun et.al further mention that household food security situation analysis requires disaggregated consumption information at the household level, based on surveys. Analyzing socioeconomic, demographic and nutritional variables such as real wage rates, unemployment, inflation, and anthropometric indicators can help in designing appropriate policy instruments in improving food security.

Measuring food security is a very challenging task due to its complex and multidimensional. The issue remains important as millions of people go hungry on daily basis. Food price surge in the last four to five years makes it all the important for analyzing food security situation in the country. The **objective of this paper is** to find and analyze food security indicators relating to food access and food utilization following international guidelines. This study will **contribute** to better understand the nature of food insecurity, help in efficiently targeting highly food insecure population, designing effective and optimal policy instruments to make people food secure in future. Though there are measurement and definitional problems in analyzing food security indicators but this should not be used an excuse for not devising and implementing policies and programs to improve food security.

Most of the studies in Pakistan on food security and related policies have mainly focused on availability of food in the country. The Sustainable Development Policy Institute (SDPI) has conducted a comprehensive study on food security. Food security and 'Hunger' are a security threat more than humanitarian issue. The SDPI has carried out Food Security Analysis (FSA) to assess which districts require immediate donor or government interventions; to plan result oriented implementation of development projects in food insecure areas. Food access, law and order situation both affect each other in crucial ways, while governance can play an active role in determining food inflation and affordability.

It has been recommended in the SDPI report that there is need for intensive investment in research, technology and extension services to enhance productivity. Safety nets for the poor should be provided particularly related to their health issues. It has also been emphasized that friendly relations between nations are highly desirable in pursuing a food secure future. The SDPI report emphasize on the role of government in dealing with food security problem as: "Using the food security governance nexus in Pakistan as a case study, this report argues that various factors leading to increase in global food prices in the developed world have very little relevance for developing countries." Main reason for food inflation in developing countries, which are food producing countries too, is bad governance and flawed distribution policies, "global efforts to solve food crises at the national level could prove useless in the absence of national efforts to improve governance". Moreover, it is mentioned in the report that recent food crises mainly due to bad management and governance.

We have used data at Household level and we have calorie based approach. Patterns of the results for food access are more or less similar though numbers differ in absolute terms. In terms of expenditure share on food, our results are in close match with those of the SDPI.

Rest of the study is organized as: Section 2 describes what is food security, why food security and what are the consequences of food security, section 3 is about data description, section 4 is about calculating food security indicators using Household Integrated Economic Survey (HIES) data 2007-2008 and finally we conclude our findings with some recommendations to solve the problem of food security.

### **Food Security**

Food is one of the most basic needs for human survival and it is the basic right of every human to have access to food. There is a link between nutritional status or health on the one hand

and human effort and productivity on the other. Hunger affects the ability of individuals to work productively, think clearly, and resist disaster. Hunger may lead to lower output and hence poor wages. Hunger is thus both cause and effect of poverty. Problems like anemia among women and stunted growth among children might result due to hunger. Hunger can also be equated with chronic food insecurity as both refer to a situation in which people consistently consume diets inadequate in calories and essential nutrients. This often happens due to the inability to ‘access’ food for lack of purchasing power. Due to long deprivation of sufficient food and recurring uncertainty about its availability these people are forced to lose their dignity through foraging and begging, debt bondage and low end highly unpaid work; self denial, and sacrifice of other several basic needs like medicine or children’s education, and thus transferring their misery to the next generation(Mander 2008).

Food security leads towards healthy lives and minimum level of health can only be maintained provided there is minimum level of food intake. For sustainable food security, there is a need to make sure on the part of the government not only to make efforts for having self-sufficiency at the national level but also at the household level. There is a need to continuously monitor the state of food security both at the national and household level. Definition of food security adopted at 1996 World Food Summit: “*Food security ...[achieved] when all people, at all time, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*” (FAO 1996b). So food security is a complex mechanism which has four basic components i-e availability, accessibility, utilization and stabilization. These four basic components are defined in detail as follows (Amit Mitra (2010):

- *Availability*:physical existence of food whether from country level production or on the markets. Food availability is a function of a combination of factors:
  - *Domestic food stocks ,commercial food imports, food aid and domestic food production*
  - *Availability at the regional and national level*
- *Access*:All households and all individuals within household have sufficient sources to obtain appropriate foods for a nutritious diet (Riely et al.1995). Food access is also a function of physical environment, social environment and policy environment, which determine how effectively household are able

to utilize their resources to meet their food security objectives. Droughts, floods threaten food access.

To the extent these shocks often lead to the loss of productive assets such as livestock, they also have severe implications for future productive potential of households, and therefore, their long-term food security (Riely et al.1999).

- *Utilization*: It is a socio-economic and biological aspect. This comes if the first two conditions are satisfied. What to consume? It mainly deals with the nutritional aspect. Socio-economic aspects are determined by knowledge and habit.

*“Utilization requires not only an adequate diet, but also a healthy physical environment, including safer drinking water and adequate sanitary facilities (so as to avoid disease) and an understanding of proper health care, food preparation and storage process”*

- *Stability or Sustainability*: This refers to temporal dimension of nutrition security i-e the time frame over which food security is considered.

In food security literature we have chronic food insecurity and transitory food insecurity. Former is the inability to meet food needs on an ongoing basis.

Latter is the inability to meet food needs is of a temporary nature (Maxwell and Frankenberger 1992).

*“food security is commonly conceptualized as resting on three pillars: availability, access and utilization. These concepts are inherently hierarchical, with availability necessary but not sufficient to ensure access, which is in turn necessary but not sufficient for efficient utilization”* (Web et al. J.Nut 136, 2006)

*“Access to food, availability of food and risks related to either access or availability are the essential determinants of food security. Food production, stockholding, and trade are the primary determinants of national, regional, and local availability of food. Variations in availability or prices can contribute to food insecurity by causing fluctuations in food consumption. Poverty is a major determinant of chronic food insecurity; the poor don’t have adequate means to gain access to food in the quantities needed for a healthy life”.* (von Braun et al(1992))

All the above mentioned discussion indicate that hunger may prevail in the country despite there is overall economic growth and food is available at the national level. The reason why hunger and malnutrition may persist in spite of adequate aggregate food supplies is the fact that millions of the most deeply poor and hungry are caught in a vicious circle of hunger and poverty. Hunger is not only result of poverty but also its major cause. Poverty deprives people of the means to produce or buy food. On the contrary, food insecurity has large human sufferings i-e hungry people cannot work to their full potential and are more vulnerable to disease. This in turn affects their productivity and earning capacity. This leads to malnourishment among children which affects their learning capacity. The most vulnerable are women and children.

The concept of food security is multidimensional in nature and is determined by a whole range of issue such as domestic production of food, purchasing power of people to access food as well as factors that influence absorption of food in the body. Different elements that influence food security can be classified into three broad dimensions –food availability, food access and food absorption. Inter-linkages between these factors are not explored in detail and food insecurity is seen as an inability to produce/grow food. Little attention is paid to the distributional factors (access) that have strong local, regional, socio-economic dimension. Due to insufficient attention to other three pillars of food security Pakistan and other South Asian countries are suffering from high level of malnourishment, Low Birth Weight babies despite reasonably comfortable level of agriculture production. To understand these linkages, interdisciplinary research among economists, agricultural scientists, nutritionists, and biological sciences is need of the hour. Improving household food security is an issue of high importance to millions of people in Pakistan who are suffering from persistent hunger and undernutrition. We also have to protect those who may potentially fall into this trap. Though Pakistan has to keep its focus on increasing food production by increasing yield per hectare, using scarce water prudently, building more area into cultivation through building water reservoirs, investing in R&D in agriculture etc., yet far more serious threat to Pakistan is accessibility of food at household level even if we ignore nutritional security and hidden hunger for the time being.

Lack of access to food implies hunger among poor, and hunger kills more people than natural disasters or calamities or suicide blasts. Deaths due to chronic hunger far more than deaths due to calamities. Death of of 30 children by in a road accident was big news for media coverage but many more deaths happen daily of chronically hungry and malnourished children

which go unnoticed. One can imagine how much effort and determination has been shown to curb terrorism in the world. The tragedy of malnourishment fails to stir such outrage or determination. Our hunger problem is spreading widely in all parts of the country but not getting our serious attention.

According to Pinstrep(2009) “*National food security was confused with self-sffuiciency i- e country produces enough to meet its demand. But problem is whether all its citizens have access to enough food to meet its energy requirement. Food self-sufficiency is not highly desirable as all countries might strive to equate demand and supply at whatever price results. National food sovereignty was and is used to measure the extent to which a country has the means to make available to its people the food needed or demanded, irrespective of whether food is imported or produced*”.

In Pakistan main focus so far has been on production of agriculture to achieve self-sufficiency but little attention has been paid to make food accessible to poor masses. According to Surabhi (2009) Pakistan has no food security policy in terms of access and utilization. It has only one organization PASCO whose job is to procure mainly wheat and no serious attention has been paid to other dimensions of food security. We shall highlight some of the policies necessary to ensure food security at the country level with respect to accessibility and utilization of food in the last section.

### **Data Description**

The data used in this study is taken from the HIES 2007-08 which was conducted as a part of the Pakistan Social and Living Measurement Survey (PSLM). The Federal Bureau of Statistics (FBS) conducted the Household Integrated Economic Survey (HIES) in 1963 for the first time and it has been repeated periodically since then. HIES 2007/2008 involves a sample of 15512 households. A two-stage stratified random sample design was adopted to select the households. In the first stage, primary sampling units (enumeration blocks) were selected in the urban and rural areas of all four Pakistan provinces. In the second stage, the sample of 15512 households was randomly selected from these primary sampling units. This data set meet all data requirement which are necessary to estimate such models; household expenditure by commodity, quantity of each commodity consumed and individual characteristics. Given expenditure and quantity data, the unit value and expenditure shares can be calculated for each household.

Consumption details is one of the main part of the HIES, therefore, it is possible to estimate food security indicators by using this data. Moreover, we have used calorie conversion table approved by The Planning Commission of Pakistan to find out calories consumed by each household. To process data in order to calculate food security indicators we have followed the strategy described by Smith and Subandro (2007) as described briefly in the Box1. We have tried to answer the following questions:

- What is the level of food insecurity at country level, Regional (urban/rural) and provincial level?
- Is it diet quality problem or quantity or both?
- What are major components of important food in the diet of different socioeconomic group?
- What are the caloric consumption patterns of bottom deciles and top deciles?

**Box 1. Data Processing and Cleaning Steps**

1. Assemble the raw household data into one file, and conduct initial data cleaning.
2. Clean and process metric conversion factors, metric prices, and proportionate weights of ingredients in prepared dishes.
3. Calculate the number of household members and adult equivalents.
4. Calculate household energy requirements.
5. Calculate metric quantities of foods acquired by households.
6. Clean the metric food quantities.
7. Estimate metric food quantities to replace errors and missing values.
8. Calculate the total quantity of each food acquired daily by each household.
9. Estimate food-level expenditures to replace errors and missing values.
10. Calculate total daily household food expenditures.
11. Calculate total daily household energy acquisition.
12. Clean total daily household energy acquisition

Smith, Lisa C., and Ali Subandoro. 2007 Page 57 Ch.5

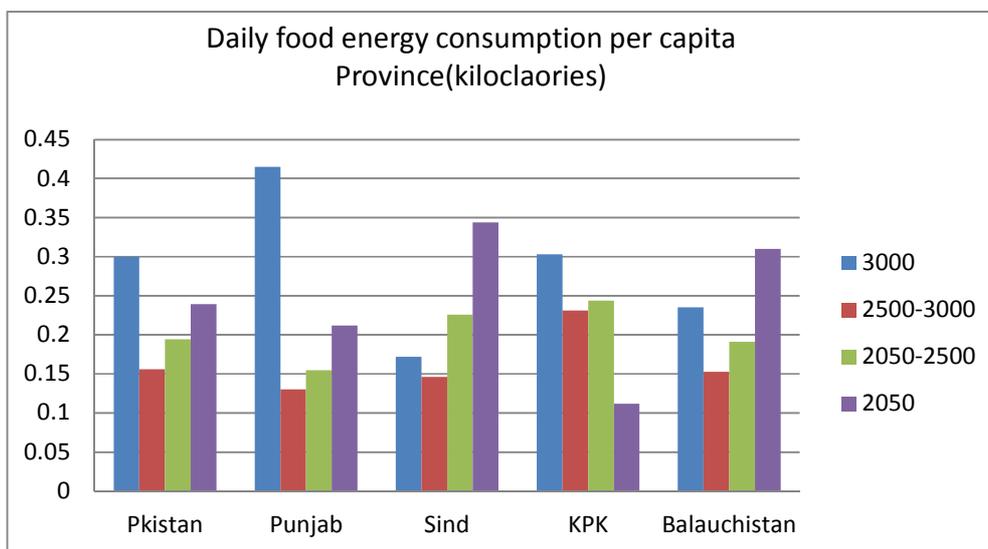
## 4. Food Security Indicators

### 4.1 Daily Food Energy Consumption Per Capita (Kcalories)

**Table 4.1 Daily food energy consumption per capita**

	Pakistan	Punjab	Sind	KPK	Baluchistan
<b>3000+; high</b>	0.3	0.415	0.172	0.303	0.235
<b>2500-3000;</b>	0.156	0.13	0.146	0.231	0.153
<b>Medium</b>					
<b>2050-2500; low</b>	0.194	0.155	0.226	0.244	0.191
<b>&lt;2050; very low</b>	0.239	0.212	0.344	0.112	0.31

**Fig 4.1 Daily food energy consumption per capita**



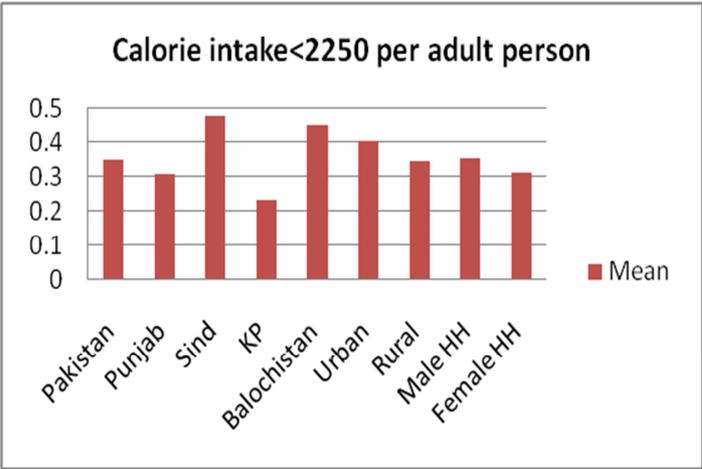
We notice that KPK has the lowest food insecurity if we follow <2050 as the bench mark for very low food security. Punjab has lower food insecure people in terms of percentages than Sind and Baluchistan but in terms of absolute number Punjab has the highest number of food insecure people. Punjab has population of more than 70 million and 21% of 70 million will be a big number. This is important as in terms of hunger every individual matters rather the percentage of hungry population.

### 4.2 Percentage of Food Deficient Population (<2250 calories per adult person per day)

Table 4.2: %age of Food Deficient Population

	Cal<2250
Pakistan	0.348
Punjab	0.307
Sind	0.476
KP	0.230
Balochistan	0.446
Urban	0.399
Rural	0.342
Male HH	0.352
Female HH	0.311

Figure 4.2: %age of Food Deficient Population

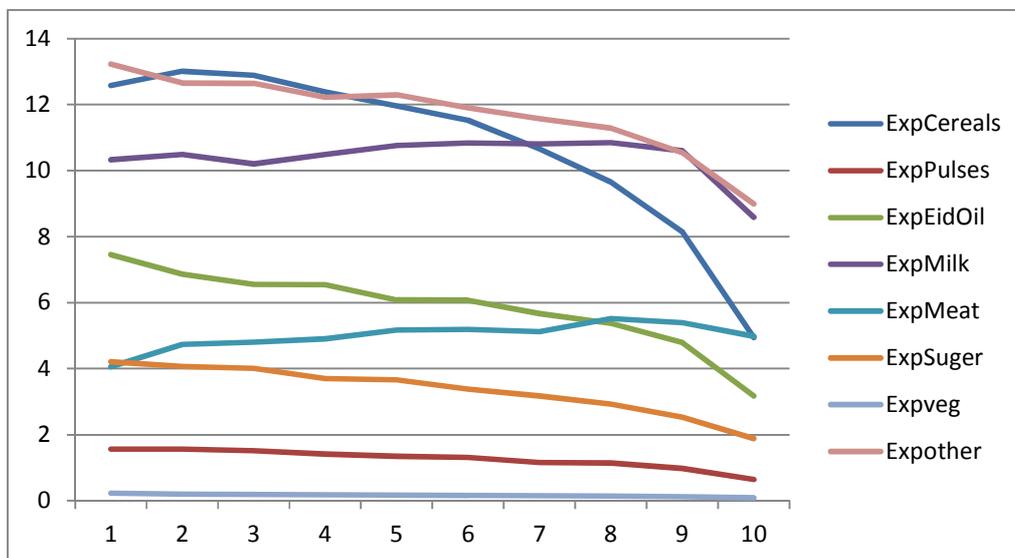


If we set 2250 calories per adult person per day as the minimum dietary energy requirement (MDER), we observe that urban population has slightly higher percentage of food insecure population than rural population besides observing some differences across provinces. Why rural population seems more food secure than urban? Some of the possible explanations are given here. Due to difference in physical activity level between urban and rural population we need to set 2500 calories per adult person per day for rural population. This will lead to higher food insecurity level in rural area than urban. For India minimum calorie level for urban population is set out to be 2100 calories and for rural population it is 2400 calories per person per day. We

have followed suit but set calorie quantity per person per day slightly higher than India as is usually the case in many studies on poverty in Pakistan.

Second explanation for high food insecurity in urban area may be highly dynamic nature of consumption basket. Over the last couple of decades we have observed that urban population has to spend a reasonably high portion of their budget on children education as school fees, mobiles, high utility bills etc. In the absence of significant increase in income, urban population has to either divert its expenditure from food to other expenditures or to replace calorie with cheap sources of food intake. This squeeze in food budget has also been mentioned by Pronob Sen (2005) while discussing the question that why it is that people around the current poverty line are purchasing many fewer calories than the 2400 (rural) and 2100 (urban) recommended allowances that played a part in the purchasing power of original derivation of the lines. He points out because “the cost of meeting the minimum food budget has increased”(p-4612). Thirdly, food consumed outside home is not covered in HIES data. This may introduce bias in our results for urban population.

**Figure 4.3: Calories Consumption Pattern from Different Food Groups**



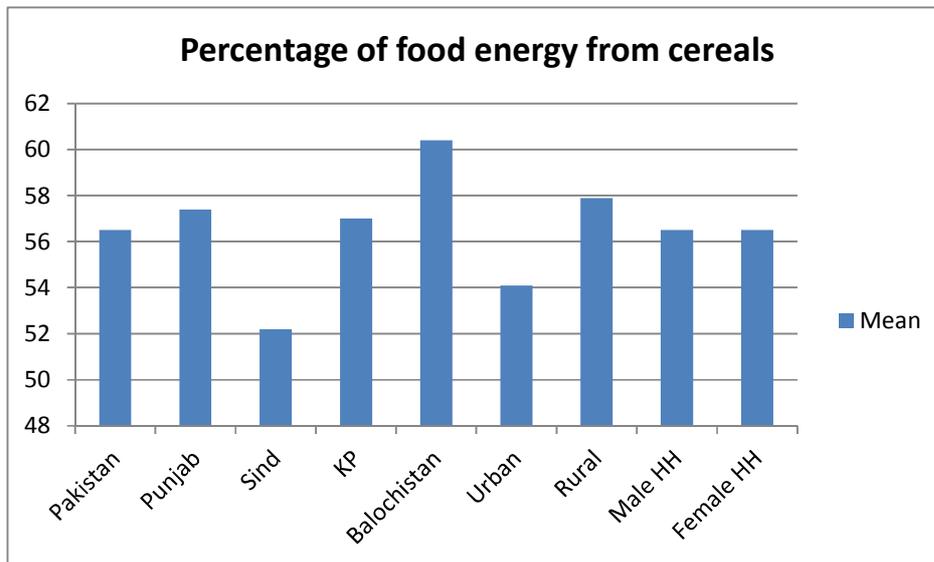
**a) Cereals**

**Table 4.3 : Percentage of food energy from cereals**

Percentage of food energy from cereals	Mean
<b>Pakistan</b>	<b>56.5</b>

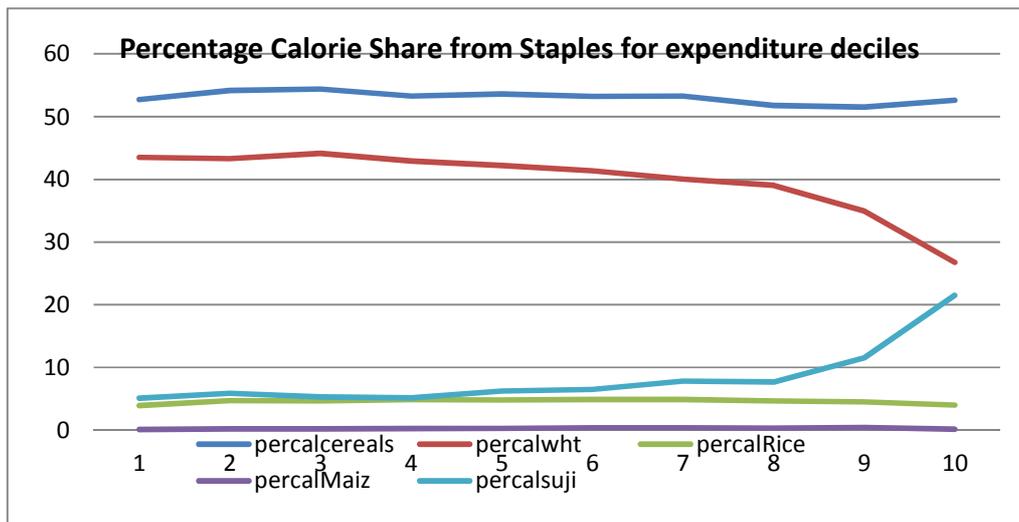
<b>Punjab</b>	<b>57.4</b>
<b>Sind</b>	<b>52.2</b>
<b>KP</b>	<b>57</b>
<b>Balochistan</b>	<b>60.4</b>
<b>Urban</b>	<b>54.1</b>
<b>Rural</b>	<b>57.9</b>
<b>Male HH</b>	<b>56.5</b>
<b>Female HH</b>	<b>56.5</b>

**Figure 4.4: Percentage of food energy from cereals**



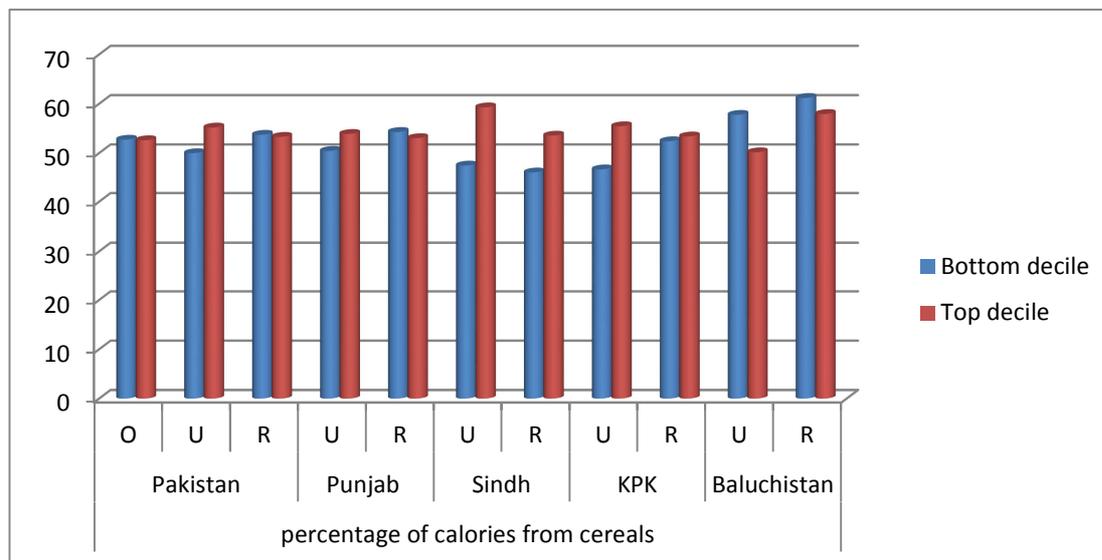
Cereal is the most important source of food for majority of Pakistani population. Cereals' share is 50 to 60% of total calories consumed. This is also in agreement with other developing countries as cereals are the cheapest source of food. Nevertheless, it is interesting to note that cereals contribution to total calorie intake for lower income and upper income deciles is more or less same. Almost 50% calories are obtained from all income deciles. An increase in real per capita GDP leads to higher valued consumer ready products. This phenomenon is not emerging very strongly in case of Pakistan. However, there is difference in form of cereal consumption that is poor consume wheat flour while upper income decile consume wheat flour, rice and wheat flour products (Macronies, Noodles, Corn Flakes, Suji, Maida, Basan, Noodles etc). Other explanation for similarities in consumption of calorie from cereals: eating habits and upper income decile may be spending a good share of budget on cereals to provide food to home servants working in the same kitchen.

Figure 4.5 : Percentage Calorie Share from Staples for expenditure deciles



Wheat is one of the most basic sources of calorie consumption for Pakistani population. Therefore, its availability and accessibility are must for ensuring food security. Rice has not very high share in total calories and it is around 5%. Other food grains (*Bajra, Jawar, Makai* etc) share is almost negligible. These coarse grains are considered as a good source of micronutrients and there is need to make this food group as part of our daily food basket as it has potential to lessen hidden hunger.

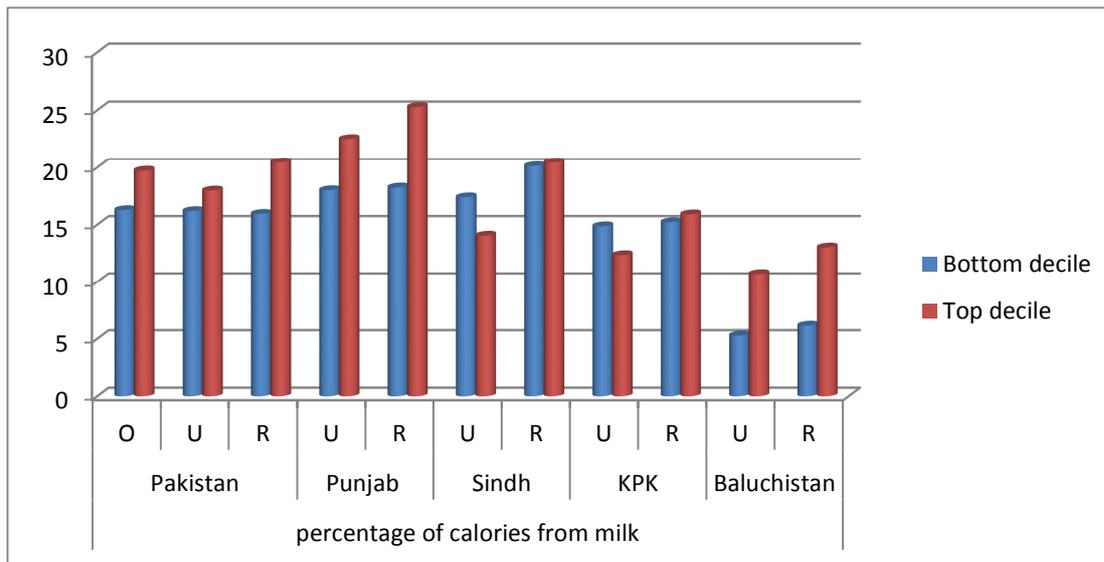
Figure 4.6 : Percentage of calories from cereals as per expenditure deciles



**b) Milk, Milk and Dairy Products**

After cereals, this food group has the highest share in calories consumed. It varies from 6% to 25%. There is large variation in calorie intake from this food group. Expenditure wise it stands very close to cereal expenditure but calories from this food group are four to five time costly than cereals. Lowest share of calories in this group is in Baluchistan and highest is in rural Punjab by the top income deciles. Pakistan is one of the largest milk producers in the world. There is an increase observed in consumption of this food group but main driver in increasing this food consumption is population. We expect to observe further increase in its consumption by the lower middle and upper income classes. It is a major source of fat. Though fat has become a bad name in developing countries yet it is one of the most important food for children in their development. This food group should be one of the main sources of calories particularly for children. But due to higher cost per calorie from this food group it is out of reach for the poor masses and leading to malnourishment among their children.

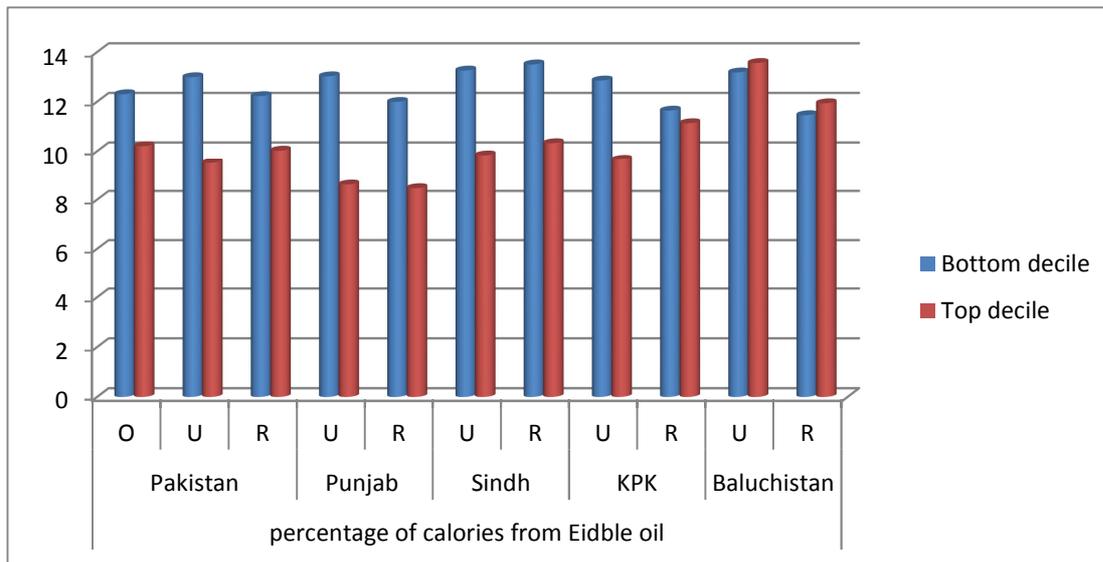
**Figure 4.7: Percentage of calories from milk and milk products**



**c) Edible Oil, Animal Fat**

This is the third largest source of energy provision after cereals and milk food group. Consumption of oil and vegetable ghee makes a significant share of calories for all income groups in all provinces. It has high cost per calorie for lower income group. Budget share for this food group varies from 2 to 19% for top income deciles from Punjab and lowest income deciles from Sind respectively. Calorie consumption share is significantly higher for lower income deciles than upper income deciles but Baluchistan.

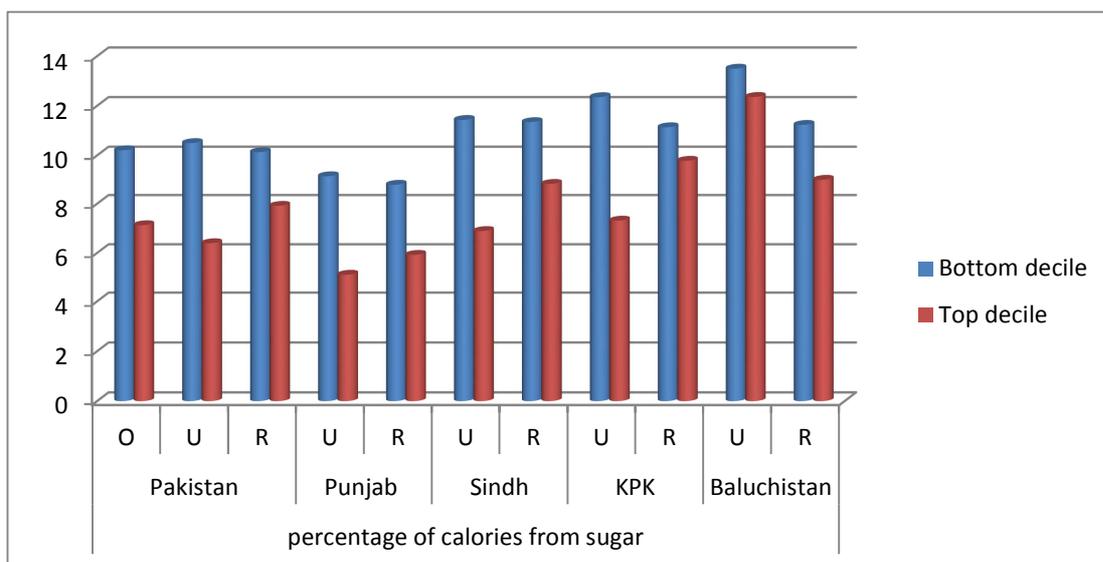
Figure 4.8: Percentage of calories from Edible Oil



**d) Sugar, Carbonated beverages and drinks**

This food group also has around 8-10% calorie share. Lower income group consume higher calories from this food group than upper income group in all provinces. This patterns exists both for urban and rural population. Increase in use of these drinks may be because these are available at lower cost than fresh fruit drinks, high investment by the companies in media campaign and last but not least all times an easy access. As these drinks are mainly composed of carbohydrate regular consumption may cause obesity problem which leads to diabetic and many other medical problems.

Figure 4.9 : Percentage of calories from Sugar and Drinks



**e) Meat (Beef, Mutton, Chicken, Fish etc)**

This food group is the most important source of protein rich food. Its share in food consumption basket is around 1 to 4%. Moreover, poultry meat makes major share of calories in this food group. People think that chicken meat is a good substitute of beef or mutton (Khalid and Zahid 2010). Fish contributes negligible in calorie share. It is expected that meat demand will increase mainly because of increase in population thus putting extra burden on food grains availability. One kg of beef needs minimum 7 Kg of food grains. So high demand for meat products from upper income deciles will put extra burden on poor to compete for food grains.

**f) Pulses**

Pulses share in daily calorie intake is 1-2% and its budget share is also almost 1-2%. It is considered as poor man's meat as it is a very cheap source of protein when eaten with other staples.

**g) Vegetable, Fruits, Roots and Tubers**

Though fruits and vegetables don't make a significant contribution to macronutrients intake yet they are very important for dietary fiber. Consumption of vegetable both in raw and cooked form is very important for developing countries' population since it constitute a staple for along with cereals. Their share in terms of calorie intake is about 2% and require less than 1% budget share. Inadequate intake of vegetables and fruits is a major problem worldwide. To meet micronutrient deficiencies there should be efficient market mechanism so that these are accessible and more affordable for poor households as well as ensuring access to markets by small producers.

**4.4 Percentage of Expenditure on Food**

If the food budget share is high then the household is very vulnerable to food insecurity. Budget share as per expenditure deciles varies from 25% top decile to 62% for the bottom decile at province level. So if we follow the following guidelines:

75+: very high (very vulnerable to food insecurity)

65-75: high

50-65: medium

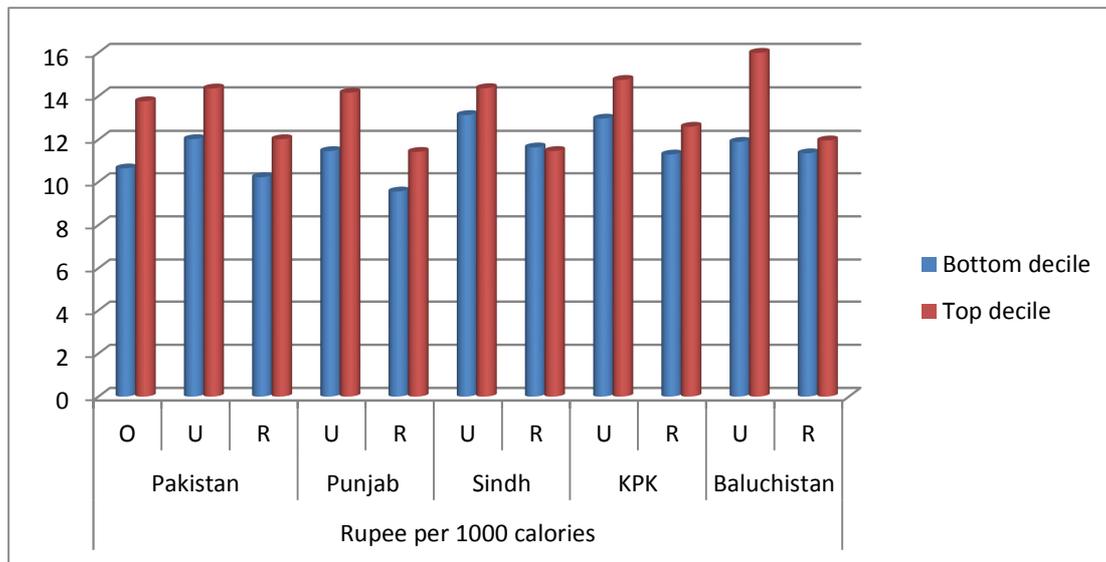
<50: low

Most of the households are at medium level of food security as per this indicator. Food budget share is around 50%.

**Table 4.6 Percentage of Expenditure on Food for (Expenditure Deciles)**

Expdeciles	1	2	3	4	5	6	7	8	9	10
Expsh(Pakistan)	53.64	53.59	52.8	51.84	51.46	50.37	48.32	46.89	43.12	33.29
Expsh(U)	48.38	47.45	47.06	46.43	45.42	43.52	42.93	39.04	36.41	26.93
Expsh(Ru)	54.54	55.38	55.17	54.8	54.36	53.71	53.45	51.4	50.42	43.81

Figure 4.10: Rupee per 1000 calories



From table 4.6 we observe that for urban household food expenditure share of Pakistan, bottom10% spend 48.37% of their total expenditure on food while top10% spend 26.93% of their expenditure on food items. This implies a difference of 21.45% between the food expenditure for the lower and upper income deciles. So any increase in food price will hurt lower income group more than upper income groups.

#### 4.4 Expenditure Per 1000 Calories

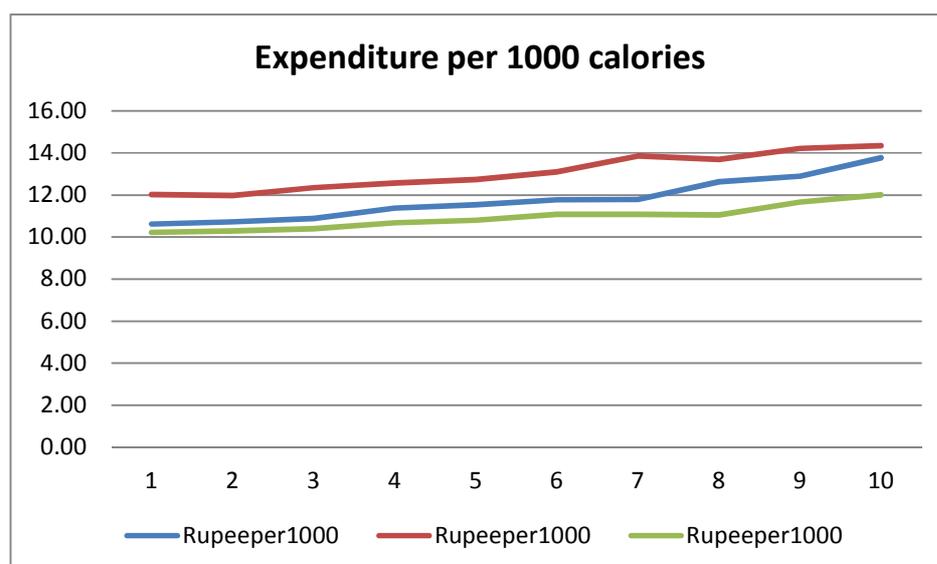
In general rich consumers expenditure per calorie is higher than lower income groups. As income increases consumer switch from cheap calories food to costly calorie food and there is more diversity in their food. They normally switch from cereal calories to costly calories from

meat, milk and other products. Expenditure per 1000 calories for different income deciles are given as follows:

Table 4.7: Expenditure per 1000 calories

Expdeciles	1	2	3	4	5	6	7	8	9	10
Rupeeper1000	10.62	10.73	10.88	11.38	11.53	11.77	11.78	12.63	12.89	13.76
Rupeeper1000	12.02	11.98	12.35	12.57	12.74	13.11	13.86	13.7	14.2	14.35
Rupeeper1000	10.22	10.29	10.4	10.68	10.79	11.08	11.08	11.05	11.66	12.02

Figure 4.11: Expenditure per 1000 calories



Urban households of Pakistan on average spend Rs.13.18 per 1000 calories while the lowest decile spend Rs.12.48 rupees/1000 calories and with the best-off spends.14.35/1000 calories. This difference does not seem large when we compare the richest with the poorest. Reason behind this is that both groups of consumers get almost 50% calories from staples which are the cheapest source of energy. Only difference is in the kind of cereals consumed between the two income groups. Less expenditure per 1000 calories by the lowest deciles implies that poor masses get their calorie share from cheap sources of energy and therefore, may be nutritionally insecure even if we assume they are food secure. Difference between the lowest deciles and

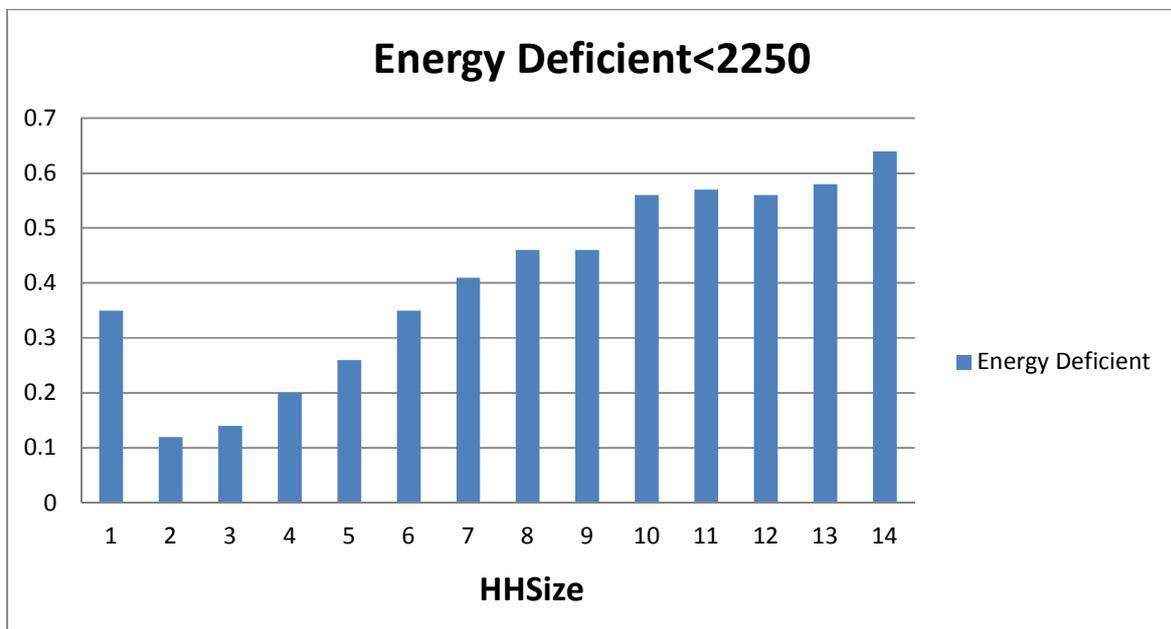
upper income deciles for rural area is not very different as far as food expenditure is concerned is not very different. In rural population poorest households spend 54.5% of their total expenditure on food while the richest people spend 43.1% of their budget on food. Expenditure per 1000 calories between the two deciles is Rs.10.21 and Rs.12.02. Similar results can be found at provincial level but are not reported due to space limitations.

Our results for food expenditure share and Rs./1000 calories support SDPI report results that the most common strategy to overcome the effect of increase in prices is to rely on less preferred and less expensive food i-e cereals.

We have measured food utilization in terms of food diversity and find that cereals are a major share of food. Fruits, vegetables, meat products, and milk products share in the calorie intake of the poor is small. SDPI has measured this third pillar on the basis of sanitation, access to drinking water, and safe drinking water. In future third pillar of food security i-e utilization should involve both of these aspects.

#### 4.5 Household Size and Food Security

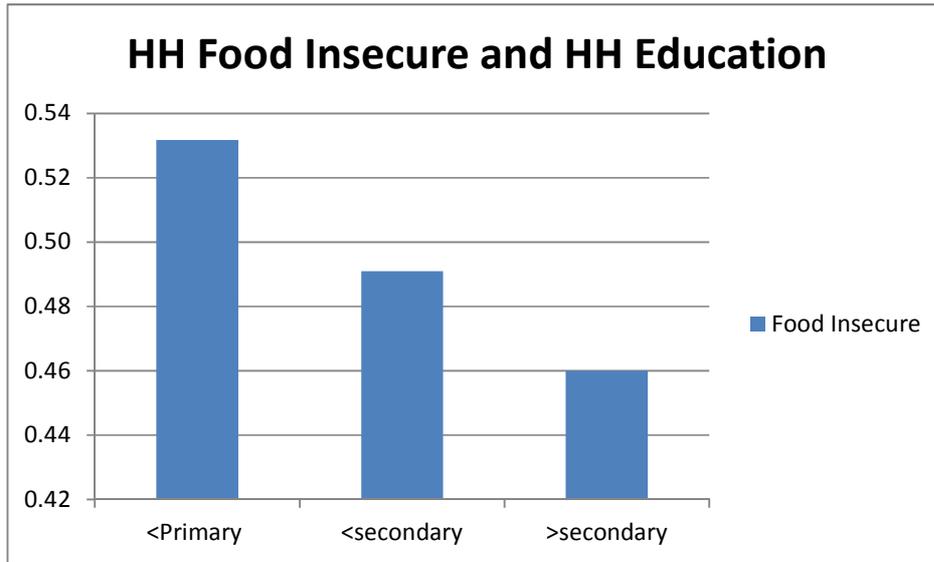
As household size increase there is an increase in food insecurity level. Figure 4.12 Household size and food insecurity



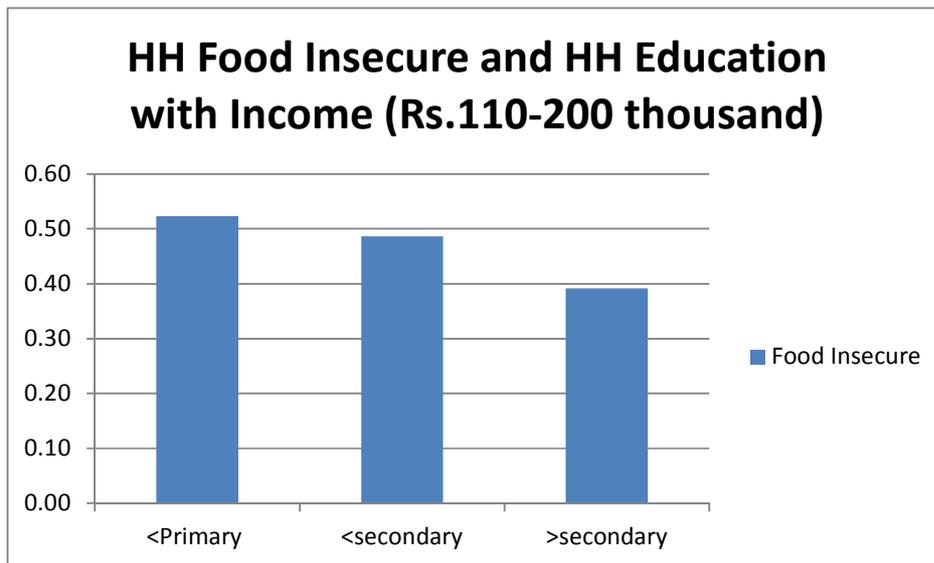
From figure 4.13. we observe that household head education and food insecurity are inversely related. One might assume that better educated have higher income and therefore, more food secure. In order to control the effect of income we have selected income range (Rs.110000-

Rs.200000 per household). The choice for this income group is to select those individual who are above median income with varying levels of education (Rs.110000 is the median income). These results are given in figure 4.14 Though we have sample size small for better educated population but since standard errors for all the three education groups are very close to each other so our results hold valid for all education categories.

**Figure 4.13 Household head education and food insecurity**



**Figure 4.14 Household head education and food insecurity with Income (Rs.110-200 thousand)**



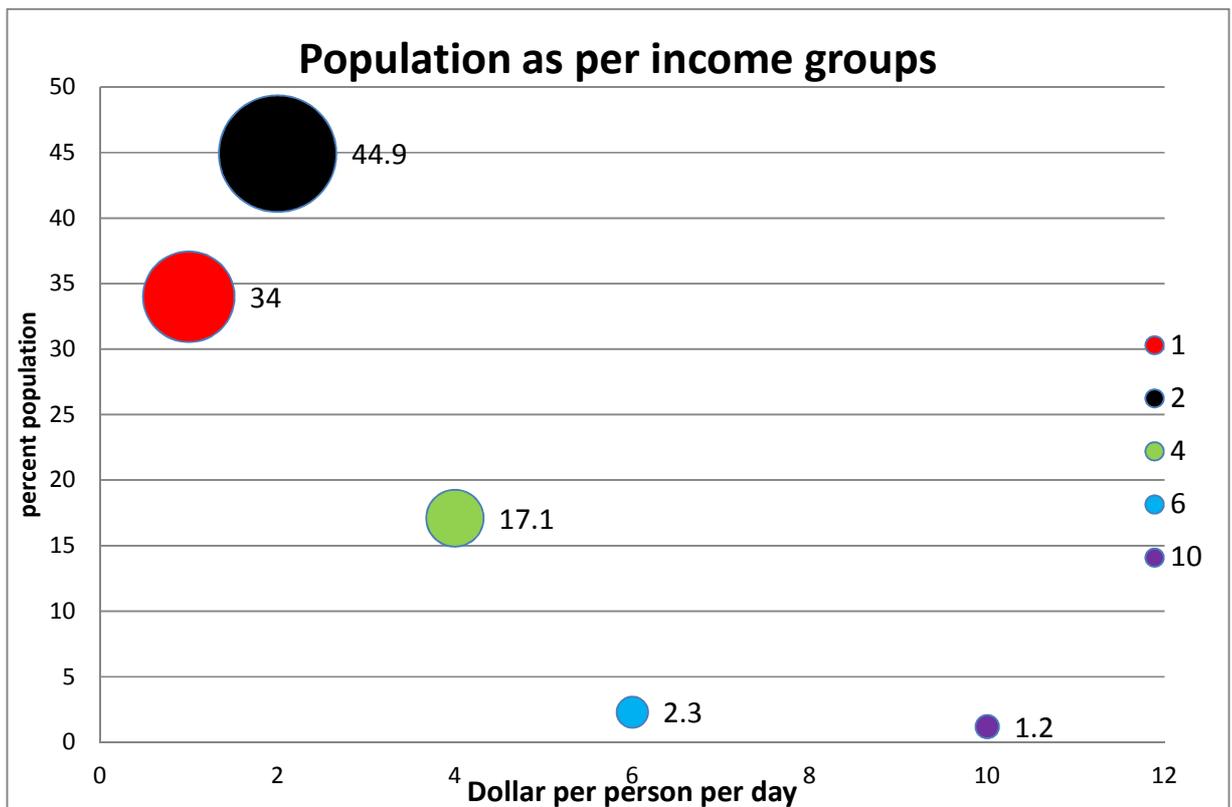
**Conclusions**

Food is an issue which we cannot put till tomorrow. Reducing hunger to zero level should be the first priority of the government. Brazil government made strong commitment fifteen years back

to bring hunger to zero level and has been by and large successful in achieving its goal. This needs first understanding of the seriousness of the issue to have political will and strong commitment on the part of the government to implement policies effectively, allocate resources which promote not only economic growth but also pro-poor growth. There is need to think on designing optimal policy instrument to resolve the problem of food insecurity.

An efficient food policy will be the one which ensure adequate dietary intake for all households within a very short time and is sustainable in the long run. No single policy can deliver this objective. There is need for having an optimal policy instruments which can help significantly in reducing if not completely eradicating hunger. This should include high economic growth rate on macroeconomic front, social protection to the most vulnerable through targeted interventions at micro level and developing policies to ensure nutrition and health through agricultural policies by developing close liaison among researchers besides high investment in agriculture, regional and international trade, use of modern technology etc.

Figure 4.15 Population Distribution by Income Per capita



On macroeconomic front, there is need to have high economic growth rate which will lead to more employment and hence food security. High economic growth rate is the key to provide food security

and reducing poverty from the country. Pakistan has about 80% population which is living on less than \$2 per day. Total fertility rate for this income bracket is still around 6. There will be high increase in population in this income bracket which means adding many millions into poverty every year. This number will increase alarmingly in the next 3 to 4 decades. Only viable solution to take care of this problem is to bring these people out of poverty. This will lead to a decline in population growth rate and this is possible only way to bring these people out of poverty bracket is to have high sustainable growth rate. As income per capita goes up people start thinking in terms of welfare of the children rather their own welfare in old age other way round. They will invest more in their children education, health and recreation expenditures by shifting focus from quantity of children to quality of children. This will lead to increase in literacy rate, low child mortality rate, increase in life expectancy, better health and nutrition and, all these factors will ultimately lead to more productivity in all sectors of the economy. Not only policies related to direct food and agriculture are effective in sustainable food security but policies that have implications for controlling price (particularly fuel), income, and employment will help in reducing poverty and hence improving food security.

Secondly, social protection programs like BISP need to be strengthened in order to provide food security to the most vulnerable segments of the society. Otherwise achieving food security for the households may have very high cost in terms of time, health. Some households try to achieve food security by selling their assets accumulated over whole life e.g piece of land, livestock etc. Such households become very vulnerable to any shock or natural disaster such as floods and lose their main source of earning. Therefore, transfer to the poorest in the form of cash payments or vouchers or direct food transfers are highly recommended particularly in times of rapid food price increases. In the long run there is need to control prices but keeping in mind that incentives to the farmers are not reduced.

Whether food subsidy or cash transfer policy will help in providing food security needs careful analysis. It is believed that providing food subsidies leads to improvement in nutrition rather providing cash transfer to hungry people. But this has not been proved correct by Jensen and Miller (2011). They show through a randomized controlled experiment (RTC) conducted in extremely food insecure poor people of China that food subsidies led to reduction in nutrition rather increase. They justify that it may be taste-preference that households getting subsidy reduced rice consumption but used that income for eating shrimps. Other possible reason may be

that people think that rice has lower calories than that of Shrimp and hence started consuming less calories than before. This experiment results are quite interesting and one needs to pay serious attention for having optimal policy mechanism for providing food security to the vulnerable groups. We should also start analyzing the impact of providing different subsidy programs for the welfare of people and need to devise the mechanism which provides maximum returns through minimum resources.

Recently there has been a conference in New Delhi (10-12 Feb, 2011) on leveraging agriculture to improve nutrition and health. To ensure nutrition and health through agriculture the very first step is to develop liaison among agriculturalists, economists (particularly working in area of development economics), nutrition and health professionals to work on the issue of food security jointly. Young graduates should have some exposure of these areas so that they understand the language of each other when they graduate. This will facilitate the task of long term economic growth, increase in agricultural productivity, nutritional security and healthy population. This may seem bit ambitious but this is highly important for a developing country like Pakistan for long and sustainable pro-poor growth.

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