Multi-facet approach for food security in Pakistan

Muhammad, Kabeer and Asghar, Zahid

20 June 2012

Multi-facet Approach for Food Security in Pakistan

Dr.Kabeer Ahmed, Dr.Zahid Asghar, [1]

Abstract

Business as usual will not be enough to tackle the critical issue of having sustainable increase in agricultural productivity and food security, which Pakistan is facing at the moment and in future it can become very alarming. Innovative approach is essential for food policy, for enhancing agriculture productivity on sustainable basis and ensuring food security. This paper figures out how sustainable increase in agriculture productivity and food security is linked with a comprehensive food policy. Agriculture productivity respond to the external environment more than tailor made targeted schemes for agriculture. New Growth Strategy GOP (May, 2011) includes all the basic ingredients, which are important for changing this external environment. These include growth of *prosperous cities which derive* demand for food upward and compel market activities sequentially create employment, *connectivity* which makes the flow of market information process efficient besides reducing the cost of transportation as well as reduce post harvest losses, *entrepreneurship* in agri-business leads to fair market competition and standardization and certification of products. These external aspects complement in enhancing productivity as well as solve the problem of food insecurity by augmenting the purchasing power of the masses. In addition there should be a *National strategy* in which federal and provincial governments should develop a strategy of bringing hunger to zero level in next 5 to 8 years.

Key word: New Growth Strategy (NGS), megacities, connectivity, entrepreneurship malnutrition

[1] Authors belong to NIBAF, State Bank of Pakistan and usual disclaimer applies.

1. Issue of food insecurity in Pakistan

Pakistan's estimated population is over 187 million making it the world's sixth most-populous country and growing at the rate of 1.8%, raises many concerns. The huge and growing population cause constantly increasing demand for food augment the issue of food security. The term food security reflects the desire to eliminate hunger and malnutrition. According to World Food Organization (WFO) food security is defined as "all people at all times have physical and economic access to sufficient, safe and nutritious food to meet the dietary needs and food preferences for an active and healthy life". This definition implies that food security has three pillars, i.e., physical availability of food, socio-economic access to food and food absorption. Jean – Luc Dubois (2003), states that food insecurity is one of the most acute forms of poverty when poverty is calculated on the basis of per capita calorie requirement of people. About 47 million people in Pakistan are living below the poverty line, means facing acute food insecurity. As is often said "Business as usual" will not be enough to tackle the critical problem of food security which Pakistan is facing at the moment or in future.. There is need for innovative solutions in agriculture sector which have an impact on achieving high growth, ensuring food security, generating new jobs and developing SMEs sector particularly related to agro-based industry.

This paper is an attempt to highlight the broader contours of the comprehensive strategy, which aims at ensuring food security and enhancing agriculture productivity on sustainable basis by means of policies lie outside the farms. We shall deviate from the traditional approach which is aimed at making direct interventions in the agriculture sector to increase productivity, and introducing some social programs to provide food to the food insecure population. Solution to food insecurity problem neither lies only in increasing agriculture productivity nor sustainable increase in agriculture productivity is possible with policies directly related to farms. Government of Pakistan has developed several comprehensive policies and plans for the past six decades and achieved success in increasing our yield but these achievements were short-lived and didn't materialize on sustainable basis. There is no dearth of policies and plans related to increase in agriculture production. We at the country level spend a lot of time what to do but very little effort is made on how to do? Agriculture sector performed well when there was full support for it in the form of fertilizer and fuel subsidies, access to interest free credit etc. Ahmad

and Farooq (2010) mentioned that the major hurdle to develop the agriculture sector in general and food grains production in particular is the lack of holistic policy approach. This paper is an effort in this direction.

Our focus in this study will be to figure out how food security and sustainable increase both in agriculture productivity and economic growth is linked with a comprehensive food security strategy supported by external factors. The most important aspect of this approach is to change the external environment if we want to have sustainable high economic growth and our agriculture productivity to be increased on sustainable basis. Farmers respond to the external environment and increase their productivity more than tailor made schemes by the government. These include growth of cities which generate demand for food and market activities and generate employment opportunities, better connectivity which makes the flow of market information process efficient besides reducing the cost of transportation as well as post harvest losses, entrepreneurship in agri business which promotes fair market competition and standardization and certification of products , etc. New Growth Strategy (NGS) of the Planning Commission of Pakistan includes all the basic ingredients, which are important for changing the external environment. So if the NGS is implemented and researched properly it will lead to increase agriculture productivity and ensure food security to all by having sustainable increase in economic growth.

The rest of the paper is organized as follows; after Introduction in section 1, section 2 highlights the issue of food insecurity in Pakistan, section 3 analyzes the demand and supply situation of wheat production (main staple food of Pakistani population) in Pakistan. In section 4 we assess food security situation in Pakistan using 2007-08 HIES data. In section 5 we discuss multi-facet approach which links external factors and food policy. In section we conclude the paper with advocacy of our approach for the problem.

2. Issue of food insecurity in Pakistan

"Society is composed of two great classes, those that have more dinners than appetite and those who have more appetite than dinners" (Sebastian R Nicholson).

Physical and economic accesses to food in conjunction with calories intake are determinant factors of food security. In developing countries physical and economic access and feeble health conditions are main constraints to prevail over food insecurity. Pakistan's economy is under pressure and passing through most difficult times of its history facing many challenges, the biggest one is long lasting war at various levels. Another big challenge is energy crisis, which has adversely affected the economy. At the same time increasing in power tariff and frequent power breakdowns cause widespread reduction in economic activities and employment opportunities. On one hand deteriorating input supplies due to high cost and on the other hand declining consumption demand due decline in income severely affecting the economic activities. Similarly increase in price of essential commodities and the reduction of state subsidies due to international debt burden has negatively affected physical and economic availability of food. Social development and livelihoods sources are gradually depleting and these contribute in the government's and household's priorities in spending. Consequently, the household as well as State, curtail expenditure on health, education, improved drinking water and sanitation thus negatively affecting the absorption of food. The overall impact of all these factors is increased food insecurity in Pakistan.

Many studies reveal that the state of food insecurity is not uniform in the country, as some of the provinces are affected more severely than others. Food insecurity in Pakistan (2009) evaluated the severity of the food insecurity in Pakistan by dividing the country into four categories, in respect of food security; (i) extremely insecure, (ii) insecure, (iii) at the borderline, and (iv) reasonably secure. Their results show that Pakistan at the household, district, province and country level has become more food insecure compared to 2003. Many districts became food insecure, while others became extremely food insecure. The food security situation at the household level is much more severe. The widening gap between income and market prices has compelled many households to reduce their food intake or opt for cheaper food sources.

The increase in extremely food insecure districts depicts an alarming situation, where people could not be able to meet their requirements adequately. Punjab, being the bread basket of Pakistan and host to many industrial units, suffered a severe setback in the past few years. The industrial crisis due to power shortages, increases in production costs and insignificant growth in

income of households are some of the reasons for increasing vulnerability to food insecurity. In Sindh, the number of extremely food insecure districts increased in comparison to 2003. Similarly, Khyber Pakhtunkhwa's deteriorating security situation causing worst price hike hit. The shortage of food in markets, comparatively higher prices of food and depleting livelihood sources played a significant role in making people food insecure. A sharp decline in the level of food security has created many social problems in the area. Federally Administered Tribal Areas (FATA) has the highest level of food insecurity compared to other regions of the country. Educated people of FATA migrate to urban areas of the country for livelihoods, while many migrated because of war. Likewise, Baluchistan is in the extremely low food insecurity groups. No district in Baluchistan qualifies for the food secure group.

The intensity of food insecurity in the country has increased. Many households have become insecure due to deteriorating socio-economic conditions. The increase in prices of food commodities has pushed many people below the food security line. Across the country, 48.6% of the population is in various degrees of food insecurity out of which 22.4% are extremely food insecure.

Table No. 1 Food Insecure Population in Pakistan 2009

Province	% Food insecure
Punjab	38.5
Sindh	44.3
Khyber Pakhtunkhwa	56.2
Baluchistan	61.2
FATA	67.7
Pak Administered Kashmir	46.9
Gilgit Baltistan	52.4
Islamabad	23.6

Source: Food Insecurity in Pakistan 2009 (Sustainable Development Policy Institute, Swiss Agency for development and cooperation and World food program, Pakistan)

Pakistani population meet its calorie needs from wheat (45%) and rice (5-8%), therefore growth in wheat consumption will continue to be at very high rate in Pakistan. Moreover, Chand (2007) mentions that food grains are important for nutrition security because; (i) wheat and rice are staple foods, so chances of substitutions between cereals and other foods are not very high, (ii)

Any increase in other food will not be able to meet in calorie need particularly of poor people, (iii) Food grains are the cheapest source of energy as compared to other foods. Therefore in the next part of the paper we analyze the demand and supply of the cereals in Pakistan to better judge the harshness of the food insecurity.

Undernourishment affects the ability of individuals to work productively, think clearly, and resist disaster. Starvation may lead to lower output and hence poor wages. Appetite is thus both cause and effect of poverty. Problems like anemia among women and stunted growth among children might result due to malnutrition. 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).

3. Demand and supply situation and future projections of cereal production in Pakistan

In this section our focus is to present the demand and supply trends and projections of wheat as this is our main staple food and major source of calories intake in Pakistan. For sustainable food security, there is a need to make sure on the part of the government to make efforts for having self sufficiency or self reliance at the national level. Food self-sufficiency generally emphasizes the production of various food items by domestic producers, while self-reliance focuses on the availability of various food items for domestic consumers. There is a need to continuously monitor the state of food security both at the national and household level.

Pakistan's ability to feed its rapidly increasing population depends on its capacity of food supply. As population rises, more people need to be fed, and as income grows more household's income is available for food consumption. It is obvious that in future there will be positive growth, many more people to be fed, a crucial question is at what rate our food demand is expected to increase and for how long we shall be able to match supply. For demand growth projection, role of growth in income distribution is very important. As per Engle's law, when

income increases household's demand for food increases less than proportionally. Hence as household become richer, their share of expenditure on food decreases until reaching a saturation point, after which food demand is hardly responsive to any income increases. Cirea and Masset (2010) imply that future food demand will be linked with income distribution and is determined how income will be distributed among the households. Accuracy of forecast for food demand will depend on the long run assumptions regarding three key variables: population growth, income growth and income distribution even if we are successful in fitting a 'perfect model'.

On supply side there has been impressive achievement in Pakistan so long as availability of food grains at national level is concerned over the decade of 60s, 70s and 80s. But such availability by itself is not a guarantee that this will facilitate more equitable distribution, while reverse will happen if there is scarcity of food.

Therefore, it is important to analyze food grain demand and supply situation for the years to come. Relatively high population growth, rise in per capita income, urbanization, change in taste and preferences, economic growth, etc are likely to change the demand prospect for food in future. There are very few studies on projecting demand and supply of food grain for the next two decades using appropriate econometric modeling. Ahmad (2009) estimates that net annual requirement of wheat for population of 165 million including seed requirement is more than 21 million metric tons besides unavoidable post production losses and carries over. He calculated per capita per annum availability of wheat for consumption and found it to be 128 kg per capita per annum. He mentioned that his estimates are very close to international standards (126kg per capita per person). Sher and Ahmed (2003) used univariate ARIMA models for forecasting wheat demand for Pakistan. Their forecast for the next two years was appropriate; however this univariate method has a limitation of forecasting only two to three years ahead. Ahmed and Siddiquie (1995) forecasted wheat and rice supply and demand for the period 2009-10. They calculated demand for wheat to grow from 17.4 million tons in 1994-95 to 26.5 million tons by 2009-2010. Production of wheat was expected to grow to 20.0 million tons in 2009-2010 from 14.8 million tons in 1991. Their forecast missed the realized value by a very wide margin despite the fact that they used sophisticated econometrics modeling techniques and made good use of economic theory.

For analyzing demand for next 20 years we need to calculate expenditure elasticities for wheat demand. For estimating expenditure elasticity of demand for wheat we used survey data of Federal Bureau of Statistics (FBS), Pakistan under HIES (2007-08) in order to assess food consumption behavior of our population. Given expenditure and quantity data, the unit value and expenditure shares can be calculated for each household. In order to project supply of food grains we shall use time series data and choice of time period depends upon the data availability.

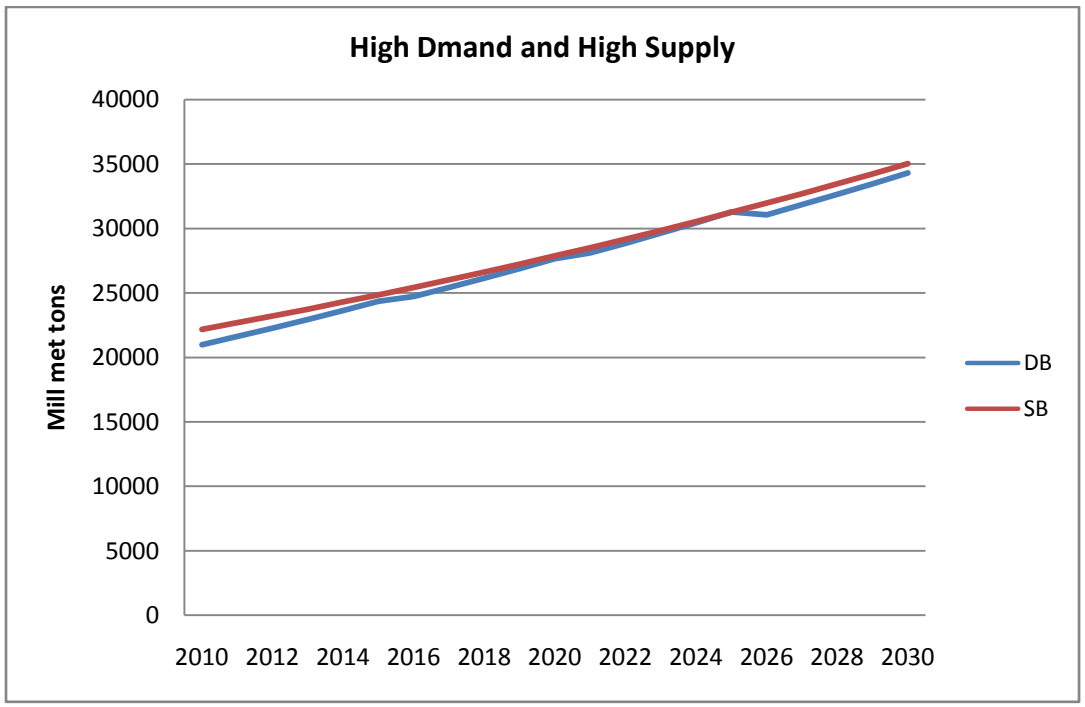
For estimating expenditure/income elasticities we have used the Linear Expenditure System (LES) as applied by Stone (1954) instead of Linear Almost Ideal Demand System since there is no price variation reported in the survey for wheat across households, regions and provinces. We have also included dummies in the Engle equation and Working Leser equation both for provinces and urban/rural area in order to capture the variation across provinces and regions.

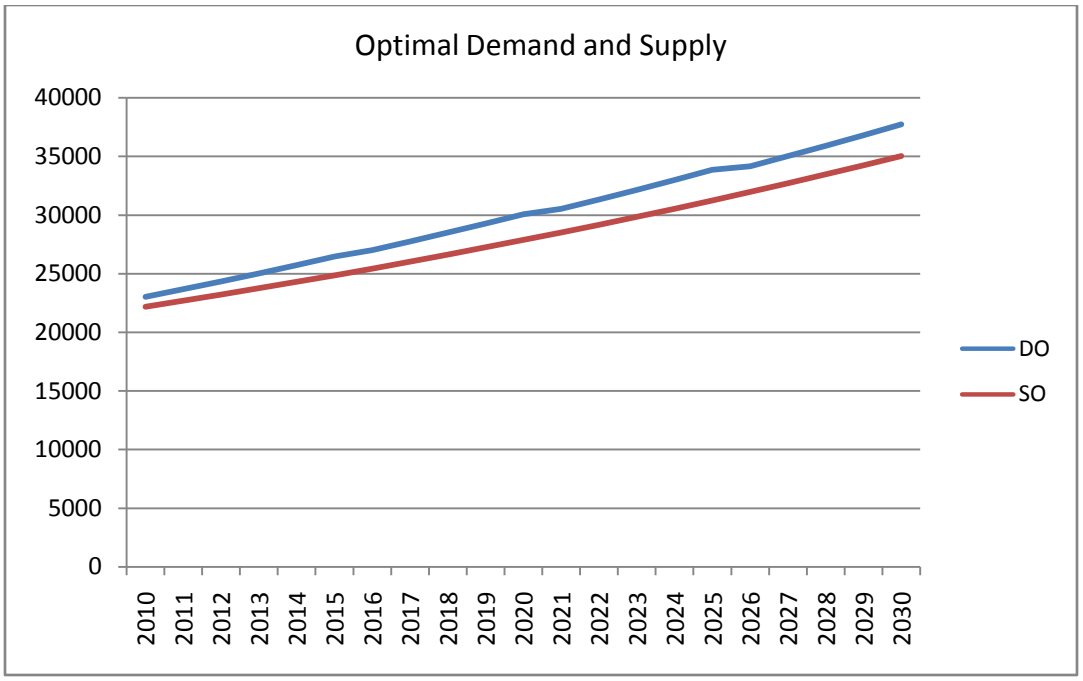
On supply side we projected our wheat production for the next 20 years based on calculating annual compound growth rates for area, yield per hectare and production. Goyal and Singh (2002) and Mittal (2008) also used the same procedure for projecting food supplies for India. Growth in production is a cumulative effect of area expansion, investment in R&D, development of irrigation, enhanced use of fertilizers and plant protection measures. Nevertheless, this production is on average decelerating slowly over decades.

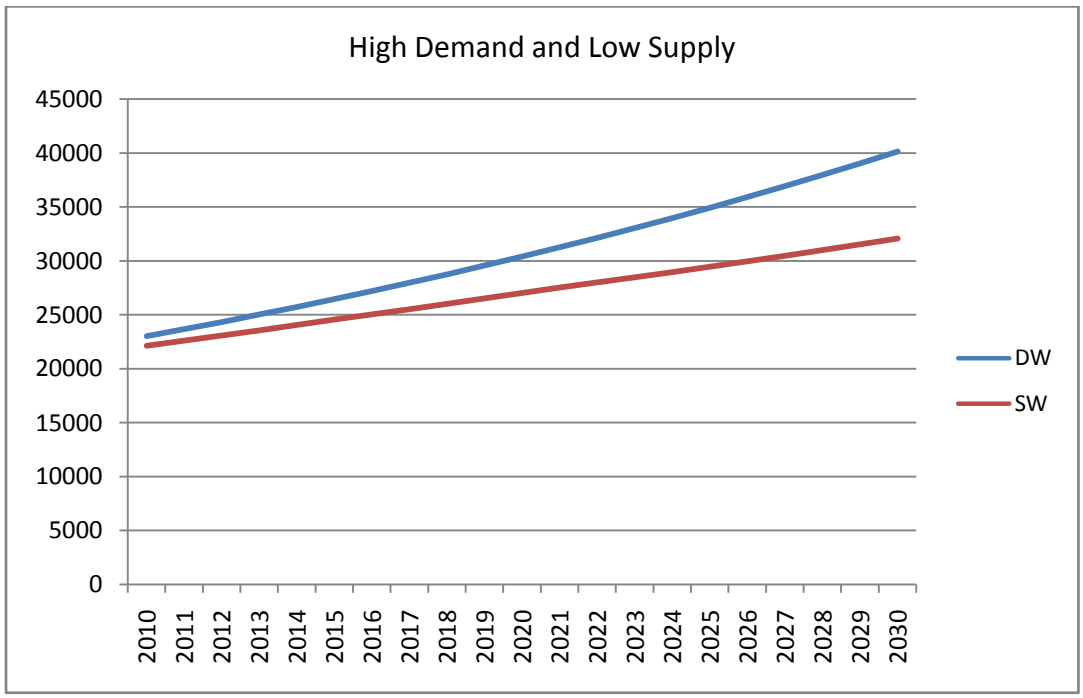
We have calculated annual compound growth rates of area, production and yield respectively. There is an increase in total food grain area of 2.18% in the 60s, and then it grew at the rate of around 1.25% for other decades but 1990s when there was growth in total area around 0.34%. So long as area growth increase is concerned, we don't have many options left. Only way for area expansion is to build new water reservoirs and introduce latest water irrigation technique for efficient utilization of water. Area growth rate for wheat, rice and maize crops in 60s and 70s was quite encouraging but decline for coarse grains. Even in the recent past we observe a significant decline in area growth for coarse grain crop. We have to be careful in designing our food self sufficiency policy as area is limited and it is being substituted among different crops.

On yield growth rates we have significant increase in the decades of 60s and 70s i.e. in a period of green revolution but later on performance on this parameter has not been very consistent. We

have projected demand and supply for the years 2011- 2030. These projections serve as a useful guide for the policy makers to design food policy both in the short run and in the long run. There are number of scenarios considered and assumptions made. Firstly we consider three different scenarios for economic growth rate i.e. 3%, 5% and 7% for the next 20 years along with 3 scenarios for population growth (fast decline, moderate decline and slow decline in population growth rate). Our estimate for wheat consumption per capita are also slightly on lower side i.e. we have assumed that per capita consumption is 115 Kg which is normally assumed to be in the range of 126-128 Kg. There are four scenarios for supply of wheat i.e., area and yield/hectare has the same growth trend as that of the last decade; area grows at current rate while yield increase; area decline and yield grows at current rate; and finally that there is no significant increase in area growth but yield increase is significant. Out of 9 scenarios for demand projection (3 for each economic growth and population growth) and four supply scenarios, we discussed three scenarios i.e., worst demand and best supply, best demand and supply scenario, and optimal (most likely) scenario. Calculations in detail are available with author and can be provided if required.





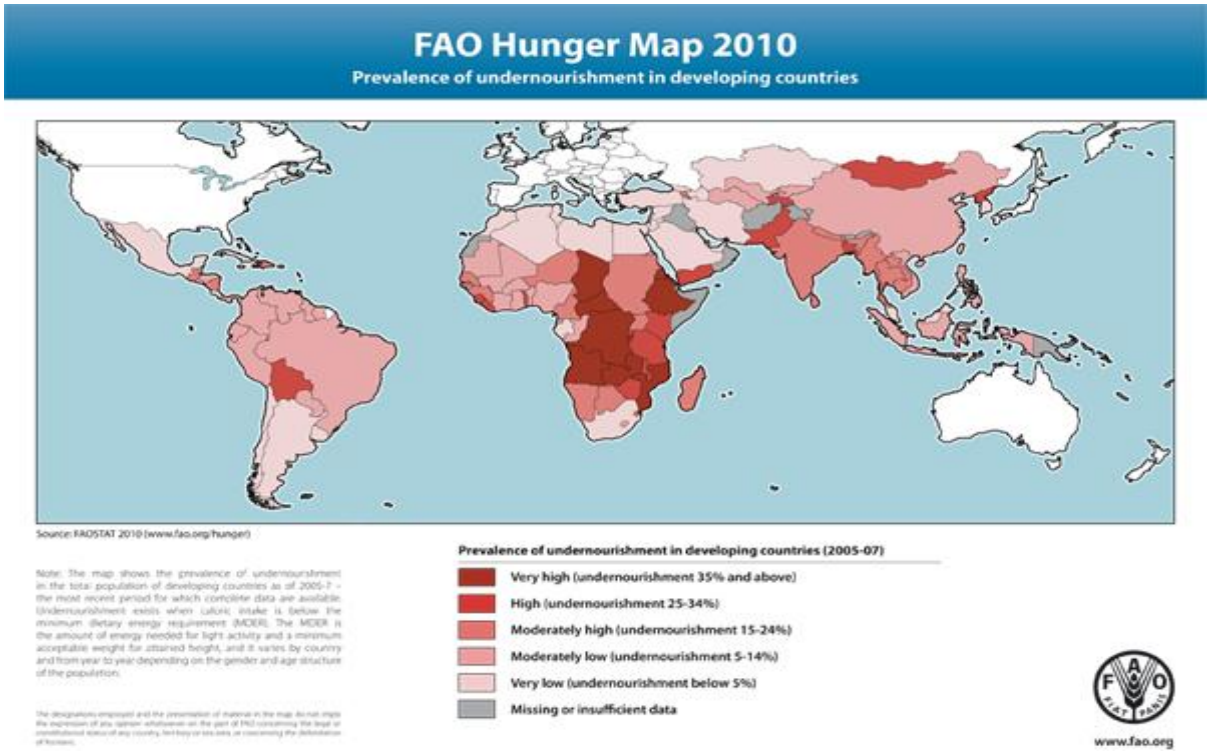


Our estimate suggests that Pakistan's self sufficiency in wheat shows that so long as wheat availability is concerned it has not very serious problem. However, any natural calamity like floods, drought, or bad management of stock, smuggling can make food availability highly uncertain and will adversely affect our food availability. Any decision to export wheat without having proper assessment of total wheat output or smuggling may create lot of unrest at any time. Moreover, keeping large stock is important to keep price volatility low in wheat market.

Nevertheless, there is need to determine whether this large stock should be in public sector or private sector

4. Accessibility of Food people of Pakistan Using 2007-08 HIES Data

According to FAO Hunger Map, Pakistan has 25-34% population whose minimum dietary energy requirements are not met and thus rank Pakistan among high hunger countries. Only sub-Saharan Africa and couple of other countries have undernourishment higher than Pakistan. Child malnourishment is even more severe not only in Pakistan but also in South Asia. 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.



Pakistan which is facing many challenges and severity of the challenges increased many fold due to world economic recession. In other words we can say that world is facing a triple F crises such as financial, food and fuel (FFF), but unfortunately Pakistan is suffering with additional two F crises 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 causing malnutrition levels rise despite the recovery of crops after devastating floods. In 2011

Wolfgang Herbinger describe, Pakistan may have the country full with food but people are too poor to buy it. This implies that self sufficiency in food or food sovereignty at the national level is a necessary but not a condition for food security at the household level. Similarly, Nobel Laureate Amartya Sen explained starvation as 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.

According to 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. Measuring food security is a very challenging task due to its complex and multidimensional aspect. The issue remains important as millions of people go hungry on daily basis. This part of the paper analyzes food security indicators relating to food access and food utilization following international guidelines.

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, is 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 needed.

Lack of access to food implies hunger among poor, and malnourishment kills more people than natural disasters or calamities. According to Pin Strep (2009), National food security was confused with self-sufficiency 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.

Table 2: Percentage of population's per capita daily food energy consumption (k calories)

	Pakistan	Punjab	Sindh	KPK	Baluchistan
3000+ - High	**30.00**	**41.50**	**17.20**	**30.30**	**23.50**
2500-3000 - Medium	**15.60**	**13.00**	**14.60**	**23.10**	**15.30**
2050-2500 - Low	**30.50**	**24.30**	**33.80**	**35.40**	**30.20**
<2050 - very Low	**23.90**	**21.20**	**34.40**	**11.20**	**31.00**

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 Sindh and Baluchistan but in terms of absolute number Punjab has the highest number of food insecure people. This is important as in terms of hunger every individual matters rather the percentage of hungry population.

If we take the criteria of international standard of 2250 calories per day the population of the provinces become more deteriorate further and raise the issue of food insecurity severely.

Table 3: Percentage of population consuming less than 2250 k calories

	Pakistan	Punjab	Sindh	KPK	Baluchistan
<2250 - very Low	35	31	48	23	45

Table 4: Percentage of population consuming less than 2250 k calories

	Urban Pakistan	Rural Pakistan	Male Pakistan	Female Pakistan
<2250 - very Low	**40**	**34**	**35**	**31**

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 firstly, 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. Secondly, high food insecurity in urban area may be highly dynamic nature of consumption basket. Over last one to two decades we have observed that urban population has to spend a

reasonably high portion of their budget on children education as school fees, 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.

If the food budget share of the house hold expenditure 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 5: Percentage of Expenditure on Food for (Expenditure Deciles)

Expenditure Deciles	1	2	3	4	5	6	7	8	9	10
Budget Share on food Pakistan	53.64	53.59	52.8	51.84	51.46	50.37	48.32	46.89	43.12	33.29
Budget Share on food Urban	48.38	47.45	47.06	46.43	45.42	43.52	42.93	39.04	36.41	26.93
Budget Share on food Rural	54.54	55.38	55.17	54.8	54.36	53.71	53.45	51.4	50.42	43.81

Food is an issue which we cannot put till tomorrow because no one can wait for tomorrow. So LET FOOD FIRST should be the slogan till we achieve zero hunger level as has been the case in Brazil. There is need to think on designing optimal strategy to resolve the problem of food insecurity. While designing this policy people should be at the centre of focus not the production. An efficient food strategy 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. So we propose here the policy instruments which if implemented in letter and spirit can help significantly in reducing if not completely eradicating food security.

5. Conducive External Environment to ensure Food Security in Pakistan

The traditional approach for solving the prevalence of malnourishment in Pakistan does not lie only in increasing the agriculture productivity through high teach mechanization of farming, availability of agriculture finance, research & development. There is a need of a comprehensive strategy to handle the problem of food insecurity broadly starting from overall growth of GDP, economic development and high employment rate and narrow down to very specific measure like improvement in connectivity between the fields and markets, development of cities for generating consolidated demand, provide environment for healthy competition in the market like branding, patents & trademark and certifications, etc, as well as change in diet choices and food waste by revitalized investment in the knowledge systems to support these changes.

We are not proposing to give up R&D, introduce high yield variety (HYV) seeds, improved farming technology, credit facilities to farmers etc., and direct investment in agriculture sector because all these factors are important for long term improvement in the agriculture productivity. Of course.increase in grain production has saved millions of lives over the past four decades. Nevertheless, any approach based on direct interventions in the agriculture sector alone without making macro-economic environment favorable will definitely fail and will only add to the miseries of the small and medium size farmers due to demand constraints, price volatility and their limited capacity to increase food production.

The Agriculture sector of Pakistan which accounts for over 21% of GDP and absorbs more than 45% of country's labor force has very strong linkages with other sectors of the economy. Besides ensuring food availability and generating direct employment it also serves as primary supplier of raw material to downstream industry. Moreover, many large industries like fertilizer, pesticides, tractors and agriculture machinery are directly linked with the growth of this sector. Growth in the sector, particularly in the crop subsector, has been either falling or stagnant over the past three decades. We have rising yield gap resulting into lower productivity over all. Table given below shows the performance of Pakistan's crop sector.

Table 6: Pakistan's ranking in yield of major crops and their Gap with the best yield of the world

	Pakistan's ranking world wide			
Crops	**Production**	**Yield**	**Area**	**Yield Gap[2]**
Cotton[3]	**4**	**12**	**-**	**14980**
Rice	**11**	**15**	**10**	**60118**
Wheat	**8**	**13**	**7**	**51523**
Sugarcane	**5**	**19**	**4**	**832646**
Orange	**12**	**18**	**7**	**271850**

Source: http://faostat.fao.org/site/339/default.aspx other than cotton crop

This low yield is often cited as the most important reason for direct investment in agriculture sector but this can not only be justified on the grounds of lack of technology or lack of quality inputs. There are several other factors which include lack of economic incentives to increase yield.

After analyzing the food security in Pakistan in section 4, we recommend broadly some areas important for devising food strategy in coherence with the National Growth Strategy (NGS) to ensure food security and enhance agriculture productivity. The foremost is to improve and enhance connectivity and improve direct linkages between farms and markets. Develop mega cities due to their role as drivers of demand for food. Introduce competition and innovations in agri-marketing, agri-business, encouraging private sector to invest in the sector. Develop inter-sector coherent and coordinated policy framework.

New growth strategy focuses on changing the external environment for various sectors of the economy in order to have long run sustainable growth. Agriculture sector being one of the most important sectors of our economy also needs changes in external environment in order to have an increase in agriculture productivity and ensuring food security. It has been established that any policy or program which put its focus solely on agriculture sector has delivered results but only in the short run. Yield of various crops increased when farmers were given incentives in form of interest free loans, subsidized fertilizers and energy. Farmers doubled, tripled their yield when they were part of a pilot program but they were back to square one, once these schemes stopped. Saskawa one acre project in Africa is an ideal example in this regard. Subsidy culture in

[2] Yield Gap is the difference between the best in the world with Pakistan's yield. Cotton data are for 2007-08 and other data are 2009 taken from Food and Agriculture Organization

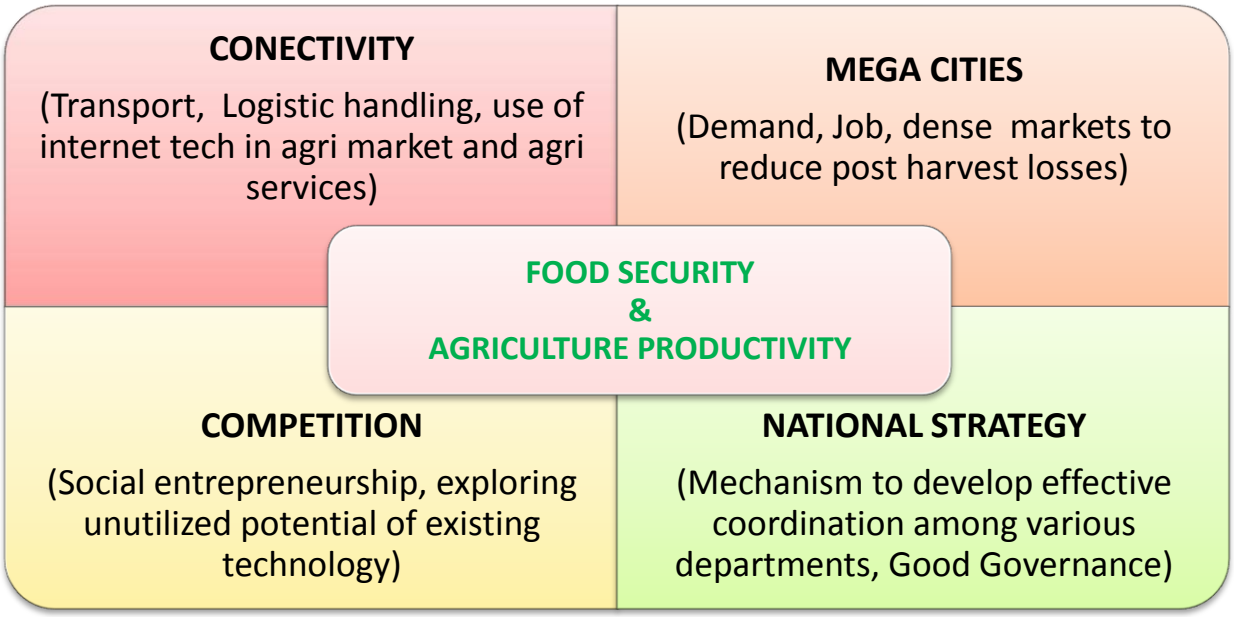
[3] For Cotton data: Source: Foreign Agriculture Service/USDA, Office of Global Analysis

agriculture sector has mainly halted the development process of entrepreneurship in agriculture production and agriculture business. Moreover, it discouraged private sector to penetrate in the sector due to monopoly of government in different agricultural related businesses.

To have a sustainable and high growth whether in agriculture or in any other sector, any approach is isolation will definitely fail. The contemporary economic system is complex and growth in any sector is linked with other sectors. We need a multi-facet approach in solving the problem of food security and enhancing agriculture productivity. In this multi-facet approach there is need to introduce competition in agri-markets, good governance, fast connectivity, entrepreneurship and innovations in agri sector to increase our agricultural productivity on sustainable basis and hence making possible that food being available to a rapidly increasing population.

There is lot of literature available explaining policy frame work for the food security but unfortunately most of literature emphasis on one or the other aspect of the policy? A comprehensive multidimensional strategy is needed to promote not only the food production but also the consumption. Amartya Sen in his book "Development as Freedom" mentioned that on average the prevalence of undernourishment in India via-a-vis Africa is much higher; this is so despite the fact that it is India, rather than sub-Saharan Africa that is self-sufficient in food. Indian self-sufficiency is based on the fulfillment of market demand, which can be in normal years, easily met by domestically produced supply. Pakistan is also not much different than India, market demand and supply are meeting but there is prevalence of undernourishment in the society.

In order to develop the strategy for food security in Pakistan the external environment should be made more conducive through better connectivity of markets and fields and better mechanism for procurement of crops, development of mega cities which generate employment opportunities as well as generate demand, direct linkage of sellers and producers, develop fair market competitions through establishment of institutions for certification of products, patents & trademarks.



Connectivity has major role to play in increasing agriculture productivity. Farm to market fast connectivity will reduce transportation cost and will help in reducing post-harvest losses. Statistics compiled by Pakistan's Ministry of Food, Agriculture and Livestock, indicate that improper postharvest handling results in the loss of approximately one third of the yields of fruits and vegetables produced in Pakistan. Fruits, being perishable fetch lowest prices during seasons. Postharvest handling, grading, packing, transportation and storage techniques/facilities are inadequate. Efficient transportation mechanism will make timely availability of food in the market. It will also introduce competition in the agriculture market since farmers have easy access to the market and only due commission will be charged by the intermediaries.

Pakistan ranks lower than many of its neighboring countries in logistics. Logistics play useful role in physical movement of agri produce from farm to the market. In case of efficient transportation system there will be healthy competition among agri-business people, fast connectivity and successful delivery of produce from farm to the market. As a result a small amount of agriculture produce enters in the marketing system and value addition channel besides huge post-harvest losses.

Better connectivity by efficient road, rail and aviation network will also help in boosting export of agriculture goods. Since most of the items exported in raw farm are perishable so they lost their competitiveness when reaches their export destination. Strong interconnectivity of the

port cities with other cities will make it possible for the exporters to make their shipment well in time. Superior quality connectivity will reduce transportation cost, enhance the volume of trade, saving cold storage cost, post-harvest losses and in turn earning high profits for the farmers. There is strong need to facilitate the private sector to invest in such projects that increase the connectivity though effective transportation means and like carrier companies, private sector railways or private air lines so that countries integration process become fast and goods can reach everywhere with minimum cost and time.

Cities have crucial role in generating and enhancing demand for agriculture products. Creative cities with having modern shopping malls and densely situated retail shops, cold storage and warehouses, a market for fresh agriculture foods in nearby neighborhood will greatly help in reducing post-harvest losses. Prosperous and dense cities coupled with better connectivity will increase demand for agriculture produce and will help in reducing the transportation cost for the agricultural goods. Moreover, due to rapid urbanization, there is need to smooth supply chain as more and more people are moving from rural to urban area. It is highly desirable to invest in infrastructure development i.e. better quality network.

Similarly due to mechanization of agriculture there is a major shift in patterns of employment, the unemployment in rural areas are increasing and with the development of big cities these unskilled labor can easily be utilized in cities and these better paid unskilled labor in big cities ultimately effect the agriculture sector positively by generating demand. The NGS forecasted that Pakistan needs more than 7% economic growth in order to absorb the flow of workers into the labor force. Rural population is growing faster than employment in primary sector, so there is need to generate employment in non-agriculture sector. This will require institutional environment mainly in urban area that is conducive to multiple sources of employment and income generation.

Competition, there is need for institutional innovations and introduction of new marketing techniques with the support of relevant institutional framework. Government has to play role in development of input and output agricultural market and regulations for introducing fair competition in the agri-marketing sector. Branding of our agriculture products is one of the requisite because it is the process of creating distinctive and durable perceptions in the minds of consumers. A brand is a persistent, unique business identity intertwined with associations of

personality, quality, origin, liking and more. Our agriculture, live stock and fish producers need to certify their products and brands internationally, so that with these international certifications we can maximize the potential of existing markets as well as break into new markets. Similarly regulations should be introduced in order to fairly manage the agriculture input markets. There has been very tough competition among the seed and pesticide providers but as such they go unchecked when there is problem of adulteration. Similarly there is monopoly in the fertilizer market which needs to be checked by providing incentives to build medium level fertilizers plants.

There is also need to find pathways for sustainable food system to ensure health and nutrition. It is possible to increase agriculture production and at the same time increasing health and nutrition. There are instances when production increased but nutrition and health gone down. India and Pakistan are an example in this regard. Both countries are almost self-sufficient in their food production but they observe high level of food insecurity, female malnourishment and high stunting among children. Recently, IFPRI put a great focus on leveraging agriculture to ensure nutrition and health. This is possible if we introduce diversity in our crop culture, improve our food system and supplement our food with micronutrients.

Role of Small and Medium Enterprises (SME) in prosperity of the non-farm poor is non ignorable. There is strong need to promote SME for non-farm activities in agriculture sector because of their capacity to generate employment through agro-based industry. Though agriculture is now declared as private business but it lacks healthy competition as it is still a family business. There is need to bring more and more innovations in the agriculture farming and livestock sector through social entrepreneurship.

National Strategy, Federal and provincial ministries of health, agriculture, finance and nutrition do not share any common agenda about food security. It is a challenging task that requires the convergence of different mechanisms, processes, and institutional tools for developing strategy for food security in Pakistan. Moreover, over time more autonomy is given to provinces, there is sturdy need to maintaining balance between the autonomy of subsystems and their integration, especially complex in the field of food and nutrition services (FNS). There are many political institutional hindrances; FNS is a strategic goal so consensus on this should

emerge without any resistance among various departments and regional stakeholders. Ahmad and Farooq (2010) stated this similar approach by saying that the federal and provincial ministries have to redefine their boundaries. The policy makers need to think and establish system perspective linking agriculture and non–agriculture sectors.

Since long the main focus of our policies are to enhance productivity through efficient use of scarce water, increase cultivation area, build water reservoirs, invest in R&D in agriculture etc. However, no emphasis is given towards accessibility of food at household level, nutritional security and hidden hunger.

6. Conclusion

The food insecurity is a national issue because it is necessary for the development of the country, as "Food insecurity anywhere, threatens peace everywhere". Food insecurity may cause unrest or even political instability. Persistent food insecurity may cause conflicts, civil wars and can threaten the overall peace of country. Therefore, there is need to develop coordinated inter-sector approach to increase food production and security. In general, Pakistan is facing institutional fragmentation and independent goals of every sector. This led to change of distribution of resources both horizontally (across sectors) and vertically (across government levels). Moreover, there is high chance of inefficient allocation, and overlapping of actions and customers rather strengthening the construction of deal with complex problems such as food and nutrition security.

Food security will help in reducing poverty and this will in turn help in reducing total fertility rate hence leading to reduction in population growth rate. Only high income can lead to help in reducing population

Solution to food security: Not only increasing productivity rather both increase in agriculture productivity and ensuring food security does not lie in the farms but it lies outside the farms. It is possible that a country has increase in its agriculture production but it suffers from food insecurity. Therefore we believe that multi-prong strategy to tackle the issue of food security in Pakistan is to develop better connectivity, develop mega cities, set framework for fair market mechanism for input and output of agriculture sector and coordination among the major

stakeholders. All these contribute not only in enhancing productivity but also solve the problem of food insecurity by augment the purchasing power of the masses.

There are some pre-requisites for ensuring food grain availability in Pakistan. Firstly, investment in agriculture has to increase by more than 50% over current level through a combination of higher public investment and better incentives for farmers and the private sector to invest in their sources. Secondly, R&D in agriculture in order to achieve yield and productivity gains should be the top priority in order to feed rapidly increasing population of Pakistan. Thirdly, there is need to develop domestic agro-based commerce activity. There should be access to different provinces of food grains by ensuring there will be no smuggling across the border. This free movement of food grains will discourage speculators and as a result there will be less volatility in food prices. Last but not least there is serious need to improve rural infrastructure if we want our cities should have food security and can become hub of knowledge and innovations.

Economic growth and poverty reduction policies as such do not automatically ensure success, the source of growth matters too. Food related economic activity should be considered as something very important. It is perceived that food crisis in the world is mainly because urban population has not paid enough attention to the issue from where do they get this food. One main reason why hunger and malnutrition may persist in spite of overall economic growth and 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.

References

1. Ahmed, A.M & R.Siddiqui 1994**.** "Supply Response in Pakistan with "Endogenous" Technology," The Pakistan Development Review, Pakistan Institute of Development Economics, vol. 33(4), pages 871-888.
2. Ahmed, A.M. and R. Siddiqui, 1995. Food security in Pakistan: Can it be achieved? *The Pakistan Development Review* 34(4,II):723-731.

3. Asghar, Z. (2011). Measuring Food Security for Pakistan Using 2007-08 HIES Data. Munich Personal RePEc Archieve, Quaid-i-Azam University, Islamabad

4. Braun, T., Bober, E., and Arnold, H. H. (1992). Inhibition of muscle differentiation by the adenovirus E1a protein: repression of the transcriptional activating function of the HLH protein Myf-5. Genes Dev *6*, 888-902.

5. Burney, Nadeem A., and M. Akmal , 1991. Food Demand in Pakistan: An Application of the Extended Linear Expenditure System. Journal of Agricultural Economics 42:2, 185–95.
6. Chand, R. 2007. Demand for Foodgrains. *Economic and Political Weekly*, December 29: 10-13.
7. Cirera, X.; Masset, E. 2010. Income distribution trends and future food demand. *Philosophical Transactions of the Royal Society B* 365: 2821–2834. http://dx.doi.org/10.1098/rstb.2010.0164
8. Goyal S.K and Singh J.P. 2002**.** Demand Versus Supply of Foodgrains in India: Implications to Food Security. Paper presented at the 13 th International Farm Management Congress, Wageningen, The Netherlands.
9. Herbinger, W. (2011). "The World Food Programme's Response to the Challenge of Linking Relief and Development." IDS Bulletin **25**(4): 96-100.
10. J.-L. Dubois, 2003, "Food Security, Vulnerability and Social Sustainability", *Cahiers de l'IFAS* n°3, Johannesburg, pp. 15-21
11. Mander H.(2008) 'Living with Hunger: Deprivation among the Aged, Single Women, and People with Disability'. Economic and Political Weekly 43(17):87–98.
12. Munir Ahmad & Umar Farooq, 2010. "The State of Food Security in Pakistan: Future Challenges and Coping Strategies," The Pakistan Development Review, Pakistan Institute of Development Economics, vol. 49(4).
13. (SDPI), D. A. Q. S. and S. H. (WFP) (2009). Food Insecurity in Pakistan SDC-Swiss Agency for Development and Cooperation, SDPI-Sustainable Development Policy Institute, WFP-World Food Programme Pakistan GOP, P. C. (May, 2011). "Pakistan: Framework for Economic Growth." Report

14. Pinstrup-Andersen, P. and D. D. Watson (2011). Food policy for developing countries : the role ofgovernment in global, national, and local food systems. Ithaca, N.Y., Cornell University Press.
15. Sen, A. (1999). Development as freedom. New York, Knopf.
16. Sen, P. (2005). "Of Calories and Things: Reflections on Nutritional Norms, Poverty Lines and Consumption Behaviour in India." Economic and Political Weekly **40**(43): 4611-4618.
17. Sher, F and Ahmad,E. 2003 "Forecasting Wheat Production in Pakistan" The Lahore Journal of Economics 13:1 (Summer 2008): pp. 57-85
18. Stone, J. R N. 1954. Linear Expenditure System and Demand Analysis: An Application to the Pattern of British Demand, *Economic Journal,* 64,511-527.
19. Surabhi Mittal 2006. Structural Shift in Demand for Food: India's prospects in 2020.
20. ICRIER Working Paper.
21. Surabhi Mittal 2008**.** Demand-Supply Trends and Projections of Food in India, Working
22. Paper No. 209, March ICRIER, New Delhi
23. F. A. O(2011). "FAO Hunger Map 2010."

Appendix

Demand and Supply Projections 2011-2030

Year	High D	Moderate D	Low D	High Sup	Moderat S
2010	23021.02	23021	20969.7	22329.585	22176.343
2011	23669.29	23669.3	21603	23003.938	22689.282
2012	24335.82	24335.8	22255.4	23698.657	23214.085
2013	25021.11	25021.1	22927.5	24414.357	23751.026
2014	25725.71	25725.7	23619.9	25151.67	24300.388
2015	26450.14	26450.1	24333.3	25911.251	24862.456
2016	27194.98	27008.9	24726.1	26693.771	25437.524
2017	27960.79	27742.2	25422.9	27499.923	26025.894

2018	28748.16	28495.5	26139.3	28330.42	26627.873
2019	29557.71	29269.2	26875.9	29185.999	27243.776
2020	30390.06	30063.9	27633.2	30067.416	27873.924
2021	31245.84	30518.5	28078.8	30975.452	28518.648
2022	32125.73	31316.4	28841.7	31910.911	29178.285
2023	33030.39	32135.1	29625.4	32874.62	29853.178
2024	33960.52	32975.3	30430.3	33867.434	30543.682
2025	34916.85	33837.4	31257.1	34890.23	31250.158
2026	35900.11	34146.7	31049.7	35943.915	31972.974
2027	36911.06	35005	31830.6	37029.421	32712.509
2028	37950.47	35884.9	32631.1	38147.71	33469.149
2029	39019.16	36786.9	33451.8	39299.771	34243.29
2030	40117.94	37711.6	34293.1	40486.624	35035.338