

Investigating the Impact of Major Variables Influencing Food Security in Lahore, Pakistan

Manan Aslam[#] and Shafqat Rasool^{*}

[#] Faculty Member at University of Management and Technology (UMT), Lahore, Pakistan
E-mail: manan.aslam@umt.edu.pk

^{*} Faculty Member at Government Educator Institute, Faisalabad, Pakistan
E-mail: shafqat_1797@yahoo.com

Abstract— The current research examines the determinants of three aspects of food security in Pakistan that are food availability, accessibility and absorption. For this purpose a models is applied on household level data. The consumption of food related items relates positively with food security. Some other factors like infant mortality and sick person relates negatively with food security. For this purpose primary data approach was used. A representative sample of 90 respondents from high populated city (Lahore) of Pakistan The data about explanatory variables collected through questionnaire. This data was further analyzed using OLS technique. According to findings of the study value of R² was 96% and F value was 23. Econometric analysis revealed that strong policy implications required increasing economic access to food. Production of food commodities should accelerate to ensure food availability. Further analysis demands that proper health facilities and education sector also should make appropriate policies to access the poor households which cannot afford it economically and this health and education related policies will lead to become food secure at domestic level.

Keywords— Food security, food availability, food accessibility, food absorption, infant mortality

I. INTRODUCTION

Pakistan is an agricultural state so agriculture gains are of much importance than any other sector. It is the second largest sector and Importance of this sector is significant because it feeds people, provides raw material for industry and is contributed over 21 percent of GDP and ultimately the largest employer, absorbing 45.1 percent of the country's total labor force and major source of trade earnings (Government of Pakistan, 2012).

Food security exists when all the people, at all times, have safe and secure food which is accessible economically and physically to fulfill the need of healthy life but if these conditions could not prevailed then it means food insecurity. Food security is directly linked with economic growth and they strengthen each other during the process of development (Timmer, 2004). A food sovereign state is which cannot produce the desired food quantity and has no economic access to buy food from the international market to fulfilling its needs (Chilton, 2009; Andersen, 2009). A significant component of national security is food security which has been ignoring continuously (Fullmer, 2007). Food security is an alarming condition for an agricultural state

where wheat is the main staple food and Rice is the second largest staple food crop in Pakistan.

The term food security significantly considered at each level like global, regional, national, community, household and finally individual. Food secure person is having food available at all times, economically accessible as well, nutritionally safe and finally match with given culture. This level of food security demands the availability of food, adequate access to food and appropriate absorption of the food. So food security can be generally based on three components, food availability, food accessibility and absorption of food (Aslam and Rasool, 2013). Food availability is achieved when adequate amounts of food are available to all individuals. Availability of enough resources to acquire food for fulfilling nutritional requirements is called accessibility to food. Food absorption has many dimensions including sufficient energy providing food with essential nutrients and clean water with adequate sanitation system. Food absorption also depends upon the awareness of the household about food storage, basic principles of nutrition, proper child care and illness management. Economic prosperity serves as a backbone for the overall progress of a nation because one thing is common in all developed nations that they are economically sound (Aslam,

2013). Logic behind this is that when people of a country are unconstrained from the worries of earning a livelihood to withstand their lives then they will ultimately divert their attention to more useful and productive things as they will focus on education, healthcare and technologies to make the life easy and much more. Poor economic condition is the root cause of so many problems that exist in a society. Unfortunately, Pakistan's economic conditions are pathetic. People are struggling for basic commodities of life and they have been totally indifferent of the progress of the country (Bickel et al., 2000; Cook, et al., 2004). Along with other crises, Pakistan is also suffering from food crisis which is unfortunate and shocking. People have to stand in lines for hours for getting a bag of flour and sugar is getting out of their reach. It is quite unacceptable for an agriculture country to face the shortages in food commodities like wheat, rice, sugar, vegetables etc (Zaldivar et al., 2004; Hamelin et al., 2008).

Fifty six (56) million people living in urban areas of Pakistan, 21 million are food insecure on basis of calorie consumption. Condition is particularly severe in Baluchistan where 20 districts with urban population fall in the zone of food insecurity. In Sindh 6 and in NWFP 5 districts are food insecure (Government of Pakistan, 2011). Punjab province is comparatively better than others (Bashir et al., 2012). If considering rural areas of Pakistan on an average 80 districts are food insecure and out of them 38 are extremely foods insecure. From these foods insecure 22 located in Baluchistan, 10 in Punjab and 11 in Sindh and remaining are of other two provinces (SDPI, 2003). At the household level one third of all the households in Pakistan are living below the food poverty line. (PHCR, 2002). Attaining food security at national level does not essentially assured food security at provincial, district and household level. Discrepancy exists among provinces, districts and households as if a household is food secure it does not confirm that each member of the household is food protected due to behavioral discrimination in food distribution within households. The geographical, environmental and medical relating factors of food security are very much considerable for assuring food safety but importance of social factors is also significant for policy formulation.

In Pakistan decentralization process is now settled enough to implement the policies. The district governments can mediate to enhance the food security in the districts. Food security is divided into three components, food availability, accessibility and absorption. This study has focused on these three components. It is expected that results would enhance the currently available information on determinants of food security.

Pakistan suffers from food crisis which is quite unfortunate and shocking because Pakistan is agricultural country. In spite of adequate production malnutrition is constantly prevailing in the country which is a threat to food security. The extra-ordinary rises in food prices affect the purchasing power of the people which resist the economic access to food. The three major dimensions of food security including food availability, food accessibility and food absorption, further effected by certain factors which effect Food Security in Pakistan as well as responsible for increasing food poverty in this region. These different

factors collectively contribute to food security. This study designed to access the determinants of food security under three dimensions of food security at household level.

II. AN OVERVIEW OF LITERATURE

Food security is multidimensional phenomenon covering climate, disaster, civil unrest, and social norms along with food production, access and absorption. So, the determinants of food security are different at different levels of application, i.e. global, national, regional, household and individual level. From the literature review, the conceptual background for determinants of food security may be built. A number of studies have analyzed the food security at national level in Pakistan.

Mehmmud and Sheikh (1991) examined the different causes of lower dietary level and poverty in Pakistan. The factors which they recognized were lower purchasing power of money, inflation, larger household size, low education including other large number of dependents in the household which had direct impact on food poverty. Ahmed and Siddique (1995) observed the food security situation in Pakistan and concluded that continuously growing population, unequal income distribution and emerging trend of urbanization had influenced the demand for food and the rose in irrigation cost, heavy debt load, the deficiency of technology and mismanagement in food distributional system had contributed to a slower growth of food production and availability. Schlichling and Esfahani (2004) focused on Northern Areas of Pakistan to study the relationship between food security and income using household level data. The estimates of nutrients demand indicated that there were disagreement existed between income and demand for nutrients.

Hazarika and Khasnobis (2005) examined the children's food security in Pakistan with reference to women's intra-household bargaining. They applied OLS model on data taken from Pakistan Integrated Household Survey. The proxy variables for women status which had been taken as explanatory variables were mother's education, mother's work for wages, mother's age at first marriage, and age difference between mother and child's father. The study described that food security of children was linked positively with women status at the household level. Deaton and Dreze (2009) explored the household food security in rural households offside. The study concluded that there were certain factors which effect household food security. He identified those factors as household income, food prices and women relating variables like age and time allocation which further influence household food security. Bashir et al. (2012) concluded that banking industry had a pivotal role to increase agriculture production by providing dynamic credit to finance the agriculture business to enhance production. They further proposed that by using the range of agricultural technologies like modern irrigation techniques, integrated pest management and biotechnology farmers could produce higher yields of good quality food.

According to available literature very few of the studies had analyzed the determinants of components of food security, i.e. food availability, accessibility and absorption. The food availability is affected by production of agriculture commodities and import export balance of food. Access to

food affected by a variety of socio-economic factors ranging from education and per-capita income to economic management and land ownership. Food absorption is affected by health status, awareness and health facilities according to the given literature.

III. METHODOLOGY AND DATA

Three components of food security which are food availability, food consumption and food absorption have taken in analysis. The data of explanatory variables have also been taken from households. Simple random sampling technique used to cover Lahore district of Punjab, Pakistan and the determinants of these three components have analyzed from the data at household level taking sample size 90. For each sample, per-capita per-day food availability, accessibility and absorption is analyzed for different set of explanatory variables. To estimate the determinants contributing to these three components, a model is shaped, in which each component of food security is a function of socio-economic variables. Ordinary Least Square regression is used to estimate the coefficients. The function is as:

$$FSC = f(HSZ, HEC, DRA, CAS, SDW, EPS, EDP, IFM, CSFr, CSM, CSG, CSF1, CSE)$$

$$FSC = \beta_0 + \beta_1 HSEZ + \beta_2 HEC + \beta_3 DRA + \beta_4 CAS + \beta_5 SDW + \beta_6 EPS + \beta_7 EDP + \beta_8 IFM + \beta_9 CSFr + \beta_{10} CSM + \beta_{11} CSG + \beta_{12} CSF1 + \beta_{13} CSE$$

Description is given below;

FSC	Expenditures spent on food security considered as proxy variable of food security
HEC	Houses electrified using nominal scale 2=yes, 1=no
DRA	Persons suffering diarrhea
CAS	Child attending school
SDW	Safe drinking water using nominal scale 2=yes, 1=no
EPS	Employed persons
EDP	Educated persons
IFM	Infant mortality
CSF	Consumption of fruits/month in kg
CSM	Consumption of milk/month in kg
CSG	Consumption of grains/month in kg
CSFL	Consumption of flour/month in kg
CSE	Consumption of eggs/month in numbers

In the model expenditure on food items per month taken as proxy variable of food security and the dependent variables are the dimensions of three components of food security i.e food availability, food accessibility and food absorption. Dummy values used to get response about house electrified and access to safe drinking water.

Food availability determinants taken in the analysis are consumption of food items and accessibility determinants included electrified house, access to safe drinking water, employed persons, educated persons, child attending school and finally food absorption determined by persons suffering diseases and infant mortality and household size. Abid (2009) used the production of wheat, rice, maize, pulses, oilseeds, poultry meat and fish, electrification, adult literacy immunization, safe drinking water and number of hospitals as reliable variables which affect food security in many dimensions. The other variables which can affect the food accessibility could be per-capita income, price inflation of food items, consumer price index, labor force participation,

employment rate, informal sector labor force participation, length of roads, landless labor, different stages of marginal cultivator and household size (Haile et al., 2005). It is assumed that access to food would be better in the electrified houses. These households represent the improved standard of living in rural areas. The electrified houses increase the economic status of households which make the accessibility easier. The educated people per household may play an important role in economic access to food. Education increases the income of individuals and the awareness regarding health which ultimately enhances the absorption and access to food. The ratio of the children attending school represents the socio-economic status of the household. On the other hand ratio of these children in the household affects the budget of the households, which impacts the accessibility of the households to food. A number of factors affect the food absorption including Malnutrition are diarrhea, respiratory illness and other diseases caused by poor standard of living which accounts for lower health position.

IV. EMPIRICAL FINDINGS

The study has attempted to evaluate the role of various factors to explain the food security in Lahore district of Pakistan by using three components of food security as availability, accessibility and absorption. In the component of food accessibility, the electrification of the households and educated persons can positively contribute towards food

The finding of the study in hand has been described below; Table 1 shows the descriptive statistics of the selected sample of 90 households. According to results nearly 55 % households incurring expenditures on food items below than 5000 with household size ranging from 8-12 so these are considered as food insecure households and nearly 20 % households spent 6000-9000 with household size 6-14 considered as not fully food secure. 10 % households spend 10000-18000 with households size of 4-9 considered as fully food secure and remaining 15 % households spent > 20000 with various household size considered as fully food secure.

TABLE I
FOOD EXPENDITURES PER MONTH WITH HOUSEHOLD SIZE

%age	Expenditures on food/month	Household size	Conclusion
55%	< 5000 Rs	8-12	Hunger
20%	6000Rs-9000Rs	6-14	Food insecure
10%	10000-18000	4-9	Food secure
45%	>20000	various	Food secure
24	title		

Results regarding OLS showed distinct conclusions as depicted in table 2 according to results houses electrified, educated people per house hold, employed persons per households and consumption of food items taken in the model have positive effect on food security. With the increment in these variables people will move towards food security according to the assumption. As the educated persons of households will more aware of health considerations, food intakes and living standard which ultimately increase the food security. Safe drinking water is basic human requirement and it is vital for health. Water sources are polluted largely by industrial waste and

imperfect sewerage system. In Pakistan, 60 percent deaths are associated with use of polluted water (Akhtar and Zia, 2003). Access to safe drinking water is essential for good health, which ensures the high level of food absorption. Food security is found positively related with safe drinking water. It shows that access to safe drinking water may increase food absorption.

But if talk about those variables which shows negative relationship with dependent variable included size of household because as the persons living in a house increase their standard of living will effect, their expenditures will increase and share of food in expenditure will ultimately decrease which finally cause food insecurity. Sick persons due to poor hygienic condition suffering from diarrhea and malaria showed negative relation with food security as those households where safe drinking water is not available and malnutrition exist, in those houses these diseases prevailed. Infant mortality also considered as an effect of spending less expenditure on food and health which ultimately cause food insecurity.

TABLE III
DETERMINANTS OF FOOD SECURITY (REGRESSION ANALYSIS)

Variables	Coefficients	T-Value	P-Value
(Constant)	-12344.763	-1.100	.097
Electrified houses	596.073	.163	.053
Sick persons	-837.936	.481	.068
Educated persons	1996.844	1.806	.101
Employed persons	623.352	-.472	.047
Child going to school	-654.823	-.508	.133
Infant mortality	-692.409	.597	.064
Consumption (milk)	32.154	.523	.012
Consumption (fruits)	262.084	2.025	.070
Consumption (eggs)	54.454	1.589	.143
Consumption (grains)	391.246	.438	.039
Size of households	-466.371	1.033	.026
Safe drinking water	293.969	-.067	.048
Consumption of flour	188.292	.338	.242
R²=.969	F=24.396		

V. CONCLUSIONS

The study has attempted to evaluate the role of various factors to explain the food security in Lahore district of Pakistan by using three components of food security as availability, accessibility and absorption. In the component

of food accessibility, the electrification of the households and educated persons can positively contribute towards food accessibility. In the component of food absorption, the malnutrition in terms of diseases, educated persons and safe drinking water arisen as important areas to increase food security. Government already has an extensive and successful diseases immunization program so an improvement in this program in terms of attention and direction can contribute significantly to better food absorption and ultimately food security. Education is very much important in food security as it helps to understand that how to manage nutrition and disease more effectively and efficiently. Drinking water is commonly used as an indicator of health-care, which impacts on the food insecurity negatively. The use of safe drinking water in the households may be proposed to improve food absorption. The secondary data revealed that Pakistan is a food sufficient as well as food secure country at the national level. But primary data showed that at the household level 55 percent of the sample households were measured to be food insecure. Econometric analysis revealed that strong policy implications required increasing economic access to food. Production of food commodities should control to ensure food availability. Further analysis demands that proper health facilities and education sector also should make policies to access the poor households which cannot afford it economically and this health and education related policies will leads to become food secure at domestic level.

REFERENCES

- [1] Adil, S .A., M. W.A. Chattha, K. Baksh and S. Hassan. 2007. Profitability analysis of summer vegetables by farm size. *Pak. J. Agri. Sci.* 44:184-188.
- [2] Ahmad, A. and S. Siddiqui. 1995. Food Security in Pakistan: Can it be achieved. *The Pakistan Development Review*, 34(4):723-731.
- [3] Akhtar, T. and S. Zia. 2003. Quality of Drinking Water in Rural Peshawar. *Pakistan Journal of Research*, 42(3).
- [4] Andersen, P.P. 2009. Food security: Definition and measurement. *Food Security* 1:5-7.
- [5] Aslam, M. 2013. Food Security. *Business Recorder Articles & Letters*, March 6, 2013
- [6] Aslam, M. and S. Rasool. 2013. Agriculture & Food Security. *The Lahore Times, Editorial & Opinion*. October 10, 2013
- [7] Bashir, M. K., S. Schilizzi and R. Pandit. 2012. Are the determinants of food insecurity for landless households different from that of other rural households? *Pak. J. Agri. Sci.* 49:393-400.
- [8] Bickel, G., M. Nord, P.P. Cristofer, W. Hamilton and J. Cook. 2000. Measuring food security in the United States: Guide to measuring household food security (Rev.). United States Department of Agriculture (USDA), USA.
- [9] Chilton, M. 2009. A rights-based approach to food insecurity in the United States. *Amer. J. Public Health* 99:1203-1211.
- [10] Cook, J. T., D. A. Frank, C. Berkowitz, M. M. Black, P.H. Casey, D. B. Cutts, A .F. Meyers, N. Zaldivar, A. Skalicky, S. Levenson, T. Heeren and M. Nord. 2004. Food insecurity is associated with adverse health outcomes among human infants and toddlers. *J. Nutr.* 134:1432-1438.
- [11] Deaton, A. and J. Dreze. 2009. Food and nutrition in India: facts and interpretations. *Special Article. Economic & Political Weekly (EPW)*. XLIV:42-65.
- [12] Fullmer, M. 2007. Healthy people 2007. Available online with updates at: http://programs.weber.edu/hpstudents/meganfullmer/healthy_people_2010.pdf
- [13] Government of Pakistan. (GOP). 2011. Economic survey of Pakistan, 2010-11. Ministry of Food and Agriculture. Finance Division, Economic Advisor's Wing, Islamabad, Pakistan.
- [14] Government of Pakistan. (GOP). 2012. Economic Survey of Pakistan, 2011-12. Ministry of Food and Agriculture. Finance Division, Economic Advisor's Wing, Islamabad, Pakistan.

- [15] Haile, H. K., Z. G. Alemu and G. Kudhlande. 2005. Causes of Household Food Insecurity in Koredejaja Pleasant Association, Oromiza Zone, Ethiopia”, Working Paper, Department of Agricultural Economics, University of Free State.
- [16] Hazarika, G. and B. Khasnobis. 2005. Women’s Status and Children’s Food Security in Pakistan. Department of Business Administration, University of Texas.
- [17] Hussain, A. 2003. Pakistan national human development report 2003. Poverty, growth and governance. United Nations Development Program (UNDP), Islamabad, Pakistan.
- [18] Mahmood, S. and K. Shaikh. 1991. Food Poverty and its Causes in Pakistan. *The Pakistan Development Review*, 30(4):821-834.
- [19] Schichting, D. and F. Ahmadi-Esfahani. 2004. Household Food Security in the Northern Areas of Pakistan: An Empirical Analysis. Paper presented at the 5th Annual Research Conference 2004 on Sharping population and Development Research across South and West Asia, held in University of Karachi, 14-16 December.
- [20] SDPI. 2003. Food Insecurity in Rural Pakistan 2003. Social Development and Policy Institute(SDPI), Karachi and United Nations World Food Program, Pakistan.
- [21] Timmer, C. P. 2004. Food security and economic growth: an Asian perspective. Working Paper Number 51, Center for Global Development.