Livestock and Rural Household Food Security: The Case of Small Farmers of the Punjab, Pakistan

Muhammad Khalid Bashir[ab*], Steven Schilizzi[a], and Ram Pandit[a]

[a]School of Agricultural and Resource Economics, The University of Western Australia, Crawley, WA 6009, Australia
[b]University of Agriculture, Faisalabad, Pakistan

*E-mail address: khalid450@uaf.edu.pk

June 2012
Working Paper 1207
School of Agricultural and Resource Economics
http://www.are.uwa.edu.au

THE UNIVERSITY OF WESTERN AUSTRALIA
Achieve International Excellence

Citation: Bashir, M.K., Schilizzi, S. and Pandit, R. (2012) *Livestock and rural household food security: The Case of small farmers of the Punjab, Pakistan*, Working Paper 1207, School of Agricultural and Resource Economics, University of Western Australia, Crawley, Australia.

Livestock and Rural Household Food Security: The Case of Small Farmers of the Punjab, Pakistan

Abstract:

This paper examines the role of livestock for household food security of small farmers in the Punjab province of Pakistan. Household level data were collected from 576 small farmers of 12 districts of the province using stratified sampling technique. According to the results, about 19% of the sample households were measured to be food insecure. It was found that both large (cows and buffalos) and small (goats and sheep) livestock assets significantly improve food security. An increase of one animal in both assets increases the chances of a household to become food secure by 10.1 and 148.6%, respectively. Other important factors found to improve food security were monthly income, total earners in a household and education level of graduation and above. Furthermore, increasing family size deteriorates household food security. Rural household food security can be improved by focussing on livestock sector especially the small animals.

Keywords: Livestock, food security determinants, small farmers, Punjab, Pakistan

JEL Classification: I30, Q18 and R20.

1 Introduction

Despite the fact that Pakistan is a food self sufficient country (Gera, 2004 and Bashir *et al.* 2012), the proportion of undernourished population is 26% that is very high (FAO, 2010). The services and industrial sectors of Pakistan's economy have seen a steadily higher growth rates, but the economy of Pakistan still depends on its agricultural sector. It is contributing about 22% towards the national GDP and employing about 45% of the total workforce (GOP, 2011). It is one of the world's largest agricultural commodities producing sector[1] (FAO, 2011). It not only serves as a main supplier of raw materials to the industrial sector but provides shelter to more than 45% of country's labour force. Additionally, more than 63% of the total population lives in rural areas that are directly or indirectly dependent on agriculture for their livelihood. The majority of the farmers (more than 85%) owns less than 5 hectares of land (GOP, 2011).These are the households who are the most vulnerable ones to become food insecure (Yasin, 2000).

It is a well know fact that livestock sector plays an important role in improving agricultural productivity. Its contribution in poverty alleviation is enormous and significantly contributes to the total supply of nutrients in food intake (Hassan *et al.* 2007). In Pakistan, livestock contributes about 55% to country's agricultural value addition which is greater than the combined contribution of all crops (42%). During 2010-11, it contributed more than 11% to the GDP (GOP, 2011). The production of both meat and milk has grown at a steady growth rate since 2001-02 (Annex-I).

This study aims to examine the role of livestock in improving food security of the small farmers of the Punjab. Key research questions are:

---

[1] See Annex-I

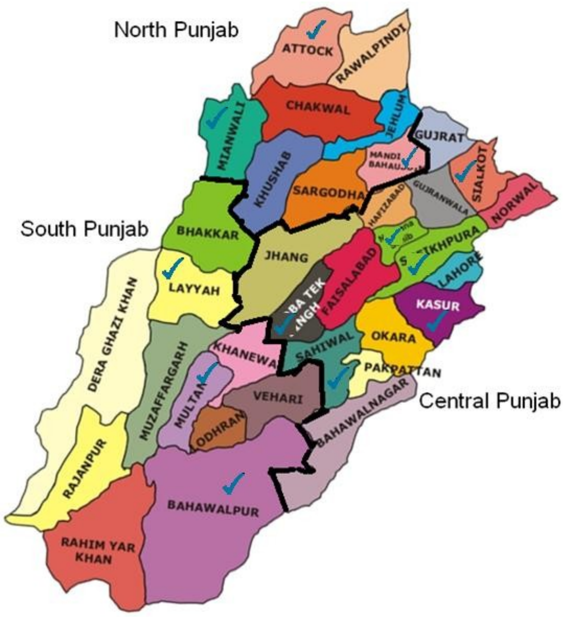
1. What levels of food security are experienced by small farmers?
2. How livestock assets affect their food security?
3. Which other socio-economic factors correlate with and best explain the levels of their food security?

The rest of the paper is organized as follows: section 2 discusses the methodology; section 3 presents the results and their discussion; and section 4 concludes the paper.

2 Methodology

Primary data were collected from 12 districts of the Punjab province. There are 36 districts in the province that were divided into three sub-regions (strata) on the basis of their geography: South, Central and North Punjab. The sub-regions were not symmetrical in terms of the number of districts i.e. there were 11, 17 and 8 districts in South, Central and North Punjab, respectively. It was decided to include one third of the districts in the sample to better represent the province. For this purpose a proportionate sampling procedure was adopted and 3, 6 and 3 districts from each region were selected (Figure 1). The districts were selected on the basis of homogeneity in population, number of villages and irrigated and non-irrigated land characteristics.

Figure 1. Selection of districts



Districts marked √ are the selected districts

One percent of the total villages (6 villages) were randomly selected from each district. There were 200 households, on average, in a village and more than 80% of them are small land holders or landless households (GOP, 2010). From each selected village, 5% of the small farming households (8) who own up to 5 acres of land were randomly selected. The total sample size came out to be 576 farming households (12*6*8 = 576).

A comprehensive questionnaire survey was designed to obtain the information on various aspects of household food security. The information was recorded on three major aspects of household characteristics: general and demographic information, the consumption of different food items on weekly basis, and information on socio-economic factors.

Data analysis

A two stage approach was adopted to ensure the meaningfulness and accuracy of the empirical analysis. In stage one, food security status of the farming households was measured by calculating their per capita calorie intakes[2] using 7 days recall method for food consumption information. Calories thus calculated were adjusted for adult equivalents to ensure equal distribution of age and gender in a household (see Annex-III for adult equivalent units). A household with per capita calorie intake equivalent to or above 2,450 Kcal/capita/day was considered as food secure household following the Government guidelines (GOP, 2003). Mathematically, the food security status of a household can be written as:

$$FS_i = \sum C_i^{ad} - 2{,}450 \geq 0 \qquad (1)$$

Where;

FS_i is the food security status of the ith farming household (1 for food secure and 0 for food insecure),

C_i^{ad} is the adjusted calorie intakes of ith farming household, and

2,450 is the threshold level for rural household defined by Government of Pakistan (GOP, 2003)

The food security measure based on dietary intake method has often been criticised on the following grounds: one, it skips the element of nutrient adequacy (Wolfe *et al.*, 2000); second, it misses the vulnerability aspects of food security and income substitution effects on food for taste vs. food for subsistence; and third, there is no consensus among researchers over dietary threshold levels (Jensen and Miller, 2010). Despite lack of consensus among researchers on threshold level of dietary intake, we followed Government of Pakistan's threshold definition for food security (GOP, 2003) to minimise error created due to ambiguity on threshold levels. However, the sample households in our study belong to the lowest income group, which is vulnerable to food insecurity (Yasin, 2000). For such households it is more important to fill their stomachs than to choose a tastier food.

In stage two, binary logistic regression was applied to the data to test the role of livestock along with other socio-economic factors on rural household food security. The dependent variable 'food security' is a binary variable in the form of '0' i.e. food insecure and '1' i.e. food secure. As argued by Hailu and Nigatu (2007), binary logistic regression is a better choice because *it directly estimates the probability of an event occurring for more than one independent variable*. The food security status measured by equation 1 is subject to change with varying socio-economic factors, therefore, a linear function is assumed and can be written as:

$$FS_i = \sum_{i=1}^{n} \beta_i \mathbf{X_i} + e_i \qquad (2)$$

Where, β_i represent the coefficients of the model, X_i represents the vector of socio-economic factors, and e_i is the error term. As the dependent variable is a discrete variable, the equation

[2] See Annex-II for information on calories in 100 g of different food items

2 can be re-written in terms of the probability of a household becoming food secure as: $\eta_i = \eta(FS_i = 1 | X_i = x_i)$, where, η_i is the probability of i[th] household becoming food secure and x_i is the vector of socio-economic factors. The general form of logit can be written for equation 2 as:

$$\log it(\eta_i) = \beta_0 + \beta_i x_i \qquad (3)$$

Following equation (3), the logit model for food security including all explanatory variables can be written as:

$$\eta_i(FS_i) = \beta_0 + \beta_1 LSA_{Li} + \beta_2 LLA_{Si} + \beta_3 MI_i + \beta_4 AHH_i + \beta_5 HS_i + \beta_6 TEH_i + \beta_7 HT_i + \beta_8 Edu_{Pi} + \beta_9 Edu_{Mi} + \beta_{10} Edu_{Ii} + \beta_{11} Edu_{Gi} \qquad (4)$$

Where;

$\eta_i(FS_i)$ is the probability of the i[th] household to become food secure (food secure =1 or insecure = 0)

β_0 is the constant term

β_{1-11} are the coefficients of the predictor variables

LSA_{Li} is the number of large livestock animals (buffalos and cows) owned by the i[th] household

LSA_{Si} is the number of small livestock animals (goats and sheep) owned by the i[th] household

MI_i is the monthly income of the i[th] households from all sources, in Pakistan Rupees (Rs)

AHH_i is the age of the head of the i[th] household, in years

HS_i is the family size of the i[th] household number of total household members

TEH_i is the total number of earners in the i[th] household

HT_i is the household type of the i[th] household i.e. nuclear family (Husband, wife and children: '0') or joint family (more than one nuclear family under a common household head: '1')

Edu_{Pi} is the educational level of the i[th] household's head, a dummy variable defined as 'primary' i.e. completed five schooling years = grade 5

Edu_{Mi} is the educational level of the i[th] household's head, a dummy variable defined as 'middle' i.e. completed eight schooling years = grade 8

Edu_{Ii} is the educational level of the i[th] household's head, a dummy variable defined as 'up to intermediate' i.e. completed ten or twelve schooling years = grade 10 and/or 12

Edu_{Gi} is the educational level of the i[th] household's head, a dummy variable defined as 'graduation (2 years of college) or above'

3 Results and Discussion

The incidence of household food insecurity and descriptive analysis

Table 1 shows the results for food security situation of the Punjab province. Based on the results, about 19% of the sample households were measured to be food insecure (Table 1). Using the same threshold level, earlier study by Bashir *et al.* (2010) in an adjacent district to our study area (Faisalabad district) found that about 15% of the similar farming households were measured to be food insecure in 2009-2010. Comparing the findings of this study with the earlier one, it may imply that the situation of rural household food security has worsened in the study region within a year. It can also be explained in terms of the variation in food security by location and time (Riely *et al.*, 1999). Nevertheless, the food insecurity of the sample households is comparatively less than the overall undernourishment (26%) in Pakistan (FAO, 2010).

Table 1. Food security status

Food Security Status	Frequency	Percent
Food insecure	108	18.75
Food secure	468	81.25
Total	576	100.00

Data source: Field survey, 2010-11

Table 2 presents the result of descriptive statistics for the continuous variables. It shows that among the sample households the minimum calorie intake was as low as 612 Kcal/capita/day and highest intake was nearly 5000 Kcal/capita (adult equivalent)/day with an average intake of about 3200 Kcal/capita (adult equivalent)/day. The number of livestock owned by a family ranges from 0 to 26 for large animals and 0 to 8 for small animals with average livestock holding of 6 large and 4 small animals pre family. Monthly household income was about Rs. 19500 ($214.29) that varied from slightly over Rs. 2000 ($21.98) to over Rs 55000 ($604.40) per family among the sample households. The average age of household heads' was about 46 years (ranges between 22 and 76 years), while the mean family size was 7 members per household with a range of 1 to 25 members in a family.

Table 2. Descriptive statistics

Variables	Minimum	Maximum	Mean	SD
Per capita calorie intake	612	4989	3193	808.6
Livestock (buffalos and cows)	0	26	6	4.2
Livestock (goats and sheep)	0	8	4	1.5
Monthly income	2193	56217	19485	9729.1
Age of household head	22	76	46	10.2
Household size	1	25	7	2.9
Total earners in a household	1	5	1	0.7

SD = standard deviations | Data source: Field survey, 2010-11

Determinants of household food security for small farmers

The results of the binary logistic regression are presented in Table 3. In binary logistic regression, the estimates of the probabilities are computed and explained in terms of the odds-ratios (OR)[3]. The results show that out of eleven variables, six are statistically significant (Livestock (buffalos and cows), livestock (goats and sheep), monthly income, household size, total earning members, and education graduation and above). In terms of predictive efficiency, the model predicted with more than 85% accuracy (Table 3). The goodness of fit of a logistic model against actual outcomes was tested using descriptive measures: Cox & Snell R^2 and Nagelkerke R^2, and inferential goodness of fit test: Hosmer and Lemeshow (H-L) (Peng *et al.*, 2002). The descriptive measures of goodness of fit are the variations of OLS R^2 and are also known as the pseudo R^2s. The results of both of them cannot be tested in an inferential framework (Menard, 2000). The values of Cox & Snell and Nagelkerke R^2 are 0.246 and 0.398, respectively. The pseudo R^2 are not a good measure of goodness of fit as they are based on various comparisons of the predictive values from the fitted model (Hosmer and Lemeshow, 2000). The Hosmer and Lemeshow (H-L) test was insignificant (p>0.92), suggesting that the null hypothesis of a good model fit to the data was accepted.

Table 3. Results of Binary Regression

Variables	B	SE	OR
Livestock (milking animals large) LSA_{Li}	0.097 **	0.039	1.101
Livestock (goats and sheep) LSA_{Si}	0.911 ***	0.125	2.486
Monthly income MI_i	0.00001 **	0.000	1.00001
Age of Household head AHH_i	-0.018	0.012	0.982
Household Size HS_i	-0.300 ***	0.060	0.740
Total earning hands TEH_i	0.844 ***	0.288	2.326
Household Type HT_i	-0.199	0.319	0.819
Education level (primary) Edu_{Pi}	0.091	0.336	1.096
Education level (middle) Edu_{Mi}	0.618	0.457	1.855
Education level (up to intermediate) Edu_{Ii}	0.599	0.382	1.821
Education level (graduation and above) Edu_{Gi}	1.515 **	0.610	4.550
Constant	1.319 **	0.564	N/A
Model Prediction success	85.6 %		
Log-likelihood ratio test statistics	393.072		
Cox & Snell R^2	0.246		
Nagelkerke R^2	0.398		
H-L model significance test results (df = 8)	3.096 (p-value = 0.928)		

*** significant at < 1 %; ** significant at < 5 % | Data source: Field survey, 2010-11
No correlation was detected amongst monthly income and education categories
A meagre correlation was detected among monthly income and large livestock, hence can be ignored
None of the standard errors are above 2 which is an indication of the absence of co-linearity.

[3] This is *the ratio of the odds of an event occurring in one group to the odds of it occurring in another group* (Grimes and Schulz, 2008).

Only the results of the statistically significant variables are presented briefly.

Livestock husbandry is a common livelihood strategy of rural farming households in Pakistan. The regression results indicate that having both large and small livestock positively impact rural household food security. The odds ratios derived from regression coefficients for large ($exp^{0.097}$ = 1.101) and small animal ($exp^{0.911}$ = 2.286) suggest that increase of one animal of each type increases the odds of a household being food secure by about 1.101 and 2.286 times. In other words, an increase in one animal of each type increases the chances of a household to become food secure by 10.1%[4] (for large) and 128.6% (for small). The results further indicate that, between large and small animals, having one more small animal in the household has a substantial impact on food security compared to the impact associated with an additional large animal. Most recently, Bashir *et al.*, (2012) found that an increase in small livestock increases the chances of a household to become food secure by 31% in the rural Punjab, Pakitsan. Using categorical variable to represent livestock holding in Faisalabad, an adjacent district of current study area, Bashir *et al.* (2010) found similar impact of large animal holding on food security. They found that the households who were in the category of having 'two animals' were 37.03 times more food secure compared to the households who were in the category of 'zero animal'. The impact is substantially greater than our results (1.101 and 2.286 times for large and small animals, respectively) that may be due to the categorical nature of the explanatory variable used by the earlier study. Similarly, Haile *et al.* (2005), using the same analytical technique for Ethiopia, found that an increase of 1 livestock (ox) increased the probability of a household to become food secure by 1.05 times (5%).

As expected the impact of monthly household income on food security is positive but the impact magnitude is relatively small (i.e. coefficient estimate 0.00001). Because of the smaller coefficient value we calculated the OR for the effect of a Rs 1000 ($ 11) increase in monthly income using $exp^{0.00001*1000}$ = 1.01. The odds ratio (1.01) for monthly income implies that an increase of Rs 1000 ($11) in monthly income increases the chances of a household being food secure by 1.01 times (1%). The magnitude of monthly income impact on food security is very small which can be expected for selected household category because farmers grow their own food. Earlier, it was found that an increase of Rs 1000 increases the chances of household food security by 5% in rural Punjab, Pakistan (Bashir *et al.*, 2012). In a related study, Bashir *et al.* (2010) also found a positive impact of income on food security. They found that the households belonging to the income group of Rs 5001–10000 ($55 – 110), had 15 times more chances of achieving food security compared to the households who belonged to the income group of Rs 0-5000 ($0 – 55). Similarly, Sindhu *et al.* (2008) using the same analytical technique for India, found that the chances of food security increases by 30% with an increase of 1000 Indian Rupees ($20) in monthly incomes. In a different context, Onianwa and Wheelock (2006) found that chances of a household to become food secure increases by 5% with an increase of households' annual income by $1000 for a family without children in the USA. These income effects on food security are relatively high compared to our finding perhaps due to the socio-economic differences of the study areas.

Household size has a negative sign implying an increase in family size by one member decreases the chances of food security by 0.740 times (26%), a finding similar what Bashir *et*

[4] Percentage = (Odds ratio – 1)*100

al. (2012) found in an earlier study. They found that an increase of one household member decreases the chances of household food security by 31%. Similarly, Bashir et al., (2010) found using a categorical variable that households with large families of up to 9 members in the household were about half food insecure compared to the household with smaller family size of 4 to 6 members. In India, however, Sindhu *et al.* (2008) found that an increase in one family member increases the chances of a household becoming food insecure by 49%.

Increase in one income earner in the household increases the chances of household food security by 2.326 times (132%). Similar relationship was found by Bashir *et al.* (2010) for an adjacent district of our study area. They found that households with three earning members were 20 times more likely to become food secure as opposed to households with one earning member. The difference in the impact is due to the difference in the nature of explanatory variable used. Earlier study included number of earners as a categorical variable while we considered it as a continuous variable.

Education level of graduation had a positive impact on household food security. It increases the chances of food security by 4.55 times (355%), because those household heads that have graduate level education are in a better position to improve their farm production. Education level helps them to understand the latest production technologies and the use of available information through extension services regarding new crop varieties. Earlier, Bashir *et al.*, (2012) found that households whose heads have up to intermediate level of education have 133% more chance to become food secure. Similar effect of education was found by Bashir *et al.* (2010) for graduation level that increased the odds of a household to become food secure by 21 times. Again the coefficient magnitude is very high compared to our study due to the use of a categorical explanatory variable. Other studies have also pointed out the positive effect of higher education on decreasing chances of household food insecurity (i.e. improving chances of food security) by 0.408 times (59%) in Nigeria (Amaza *et al.*, 2006) and 0.712 times (29%) in the USA (Kaiser *et al.*, 2003). The difference of the magnitudes in earlier studies and the current study may be due to the socio-geographical situations of the study areas.

4 Conclusion

From the above discussion it may be concluded that food insecurity is on the rise in rural areas of Pakistan i.e. about 19% food insecure households compared to earlier estimates of 15% (Bashir *et al.*, 2010). Both types of livestock animals: large and small improve the household food security of rural families significantly ($P < 0.05$ and 0.01, respectively). Additionally, monthly income, number of earners and graduate level of education positively impact household food security while the household size had a negative impact which is understandable.

On the basis of the above findings, it may be suggested that by giving special emphasis to education for every member of the household, livestock production especially of small animals and family planning programmes, the household food security of small farmers can be improved.

References

AIOU, 2001. Food composition table for Pakistan. Allama Iqbal Open University, Islamabad, Pakistan.

Amaza, P.S., J.C. Umeh, J. Helsen and A.O. Adejobi. 2006. Determinants and measurement of food insecurity in Nigeria: some empirical policy guide. Presented at international association of agricultural economists annual meeting, August 12-18, Queensland, Australia, online available at http://ageconsearch.umn.edu/bitstream/25357/1/pp060591.pdf accessed on 04/01/2012.

Babatunde, R.O., O.A. Omotesho and O.S. Sholotan. 2007. Socio-economic characteristics and food security status of farming households in Kwara State, North-Central Nigeria. Pak J Nut, 6: 49-58.

Bashir, M.K., M.K. Naeem and S.A.K. Niazi. 2010. Rural and peri-urban food security: a case of district Faisalabad of Pakistan. WASJ, 9: 403-411.

Bashir M.K., S. Steven and R. Pandit. 2012. The determinants of rural household food security in the Punjab, Pakistan: an econometric analysis. Working paper 1203, School of Agricultural and Resource Economics, University of Western Australia, Crawley, Australia online available at http://ageconsearch.umn.edu/bitstream/122526/2/working%20paper%201203.pdf.

FAO, 2010. The state of food insecurity in the world: addressing food insecurity in protracted crises. Food and Agriculture Organization of the United Nations, Rome.

FAO, 2011. Country rank in the world, by commodity. Food and Agriculture Organization of United Nations, Statistics Division, online available at: http://faostat.fao.org/site/339/default.aspx accessed on 03/01/2012.

Feleke, S., R.L. Kilmer and C. Gladwin. 2005. Determinants of food security in Southern Ethiopia. Agri Econ, 33: 351–363.

Gera, N. 2004. Food security under structural adjustment in Pakistan. Asian Survey, 44: 353-368.

GOP, 1998. Population census of Pakistan. Population Census Organization, Statistics Division, Government of Pakistan.

GOP, 2003. Economic survey of Pakistan 2002-03. Finance Division, Ministry of Finance, Government of Pakistan.

GOP, 2010. Economic survey of Pakistan 2009-10. Finance Division, Ministry of Finance, Government of Pakistan.

GOP, 2011. Economic survey of Pakistan 2010-11. Finance Division, Ministry of Finance, Government of Pakistan.

Haile, H.K., Z.G. Alemu and G. Kudhlande, 2005. Causes of household food insecurity in Koredegaga Peasant Association, Oromiya Zone, Ethiopia. Working paper, Department of Agricultural Economics, Faculty of Natural and Agricultural Sciences at the University of the Free State.

Hailu, A. and R. Nigatu. 2007. Correlates of household food security in densely populated areas of Southern Ethiopia: does the household structure matter? Stud. Home Comm. Sci., 1: 85-91.

Hassan, M.Z.Y., T. Ali and M. Ahmed. 2007. Gender contribution in livestock management: a case study of rural Punjab, Pakistan. African Crop Science Conf Proceedings, 8: 1473-1477.

Hosmer, D.W. and S. Lemeshow. 2000. Applied logistic regression. John Wiley and Sons, New York, USA.

Jensen, R.T. and N.H. Miller. 2010. A revealed preference approach to measuring hunger and under-nutrition. Working Paper No. 16555, NBER Working Paper Series, online available at http://www.nber.org/papers/w16555.pdf accessed on 04/01/2012.

Kaiser, L.L., H.M. Quiñonez, M. Townsend, Y. Nicholson, M.L. Fujii, A.C. Martin and C.L. Lamp. 2003. Food insecurity and food supplies in Latino households with young children. J Nut Edu and Beh, 35: 148-153.

Menard, S. 2000. Coefficients of determination for multiple logistic regression analysis. The Americani Statistician, 54: 17-24.

Mengistu, E., N. Regassa and A. Yusufe. 2009. The levels, determinants and coping mechanisms of food insecure households in southern Ethiopia: case study of Sidama, Wolaita and Guraghe Zones. DCG Report No. 55, the Drylands Coordination Group.

NSSO, 1995. Measurement of poverty in Sri Lanka. National Sample Survey Organization of India. Online available at: www.unescap.org/stat/meet/povstat/pov7_ska.pdf accessed on 04/01/2012.

Omotesho, O.A., M.O. Adewumi and K.S. Fadimula. 2007. Food security and poverty of the rural households in Kwarwa State, Nigeria. AAAE Conf Proceedings: 571-575.

Onianwa, O.O. and G.C. Wheelock. 2006. An analysis of the determinants of food insecurity with severe hunger in selected southern states. Southern Rural Sociology, 21: 80-96.

Peng, C.Y., T.S. So., F.K. Stage and E.P. (St) John. 2002. The use and interpretation of logistic regression in higher education journals: 1988–1999. Research in Higher Education, 43: 259–293.

Riely, F., N. Mock, L. Bailey and E. Kenefick. 1999. Food security indicators and framework for use in the monitoring and evaluation of food aid programmes. Food Aid Management (FAM), Washington D.C.

Sindhu, .R.S, I. Kaur and K. Vatta. 2008. Food and nutritional insecurity and its determinants in food surplus areas: the case study of Punjab state. Agricultural Economics Research Review, 21: 91-98.

Wolfe, W.S. and E. A. Frongillo (Jr). 2000. Building household food security measurement tools from the ground up. Background Paper, Food and Nutrition Technical Assistance Project, Washington, DC., USA.

Yasin, M.A., 2000. An investigation into food security situation in rain-fed areas of district Rawalpindi. M.Sc. (Hons.) Thesis (Unpublished), Department of Agricultural Economics. University of Agriculture Faisalabad, Pakistan.

Annex-I

Production of Meat and Milk (000 tonnes)

Years	Meat Production	Milk Production
2001-02	2,072	27,031

2002-03	2,132	27,811
2003-04	2,185	28,624
2004-05	2,238	29,438
2005-06	2,515	31,970
2006-07	2,618	32,996
2007-08	2,728	34,064
2008-09	2,843	35,160
2009-10	2,965	36,299
2010-11	3,094	37,475

Data Source: GOP, 2011

Annex-II

Food Composition Table for Pakistan (Revised 2001) Amount in 100g of edible portion

No	Name of Food	kcal	No	Name of Food	kcal
A)	Cereal and Cereal Products		F)	Fruits	
1	Corn Whole grain flour	276	35	Apple	57
2	Rice Polished Fried	268	36	Banana Ripe	96
3	Vermicelli	345	37	Dates Dried	293
4	Wheat Whole grain flour	357	38	Dates Fresh	131
5	Wheat flour Granular	370	39	Guava Whole	73
6	Wheat Bread	369	40	Lemon	30
7	Wheat Bread	259	41	Lichi	62
8	Wheat Bread	364	42	Mango Ripe	64
9	Wheat Bread	293	43	Melon Water	23
10	Wheat Bread	263	44	Mandarin	44
11	Wheat Flour	440	45	Orange Sweet	43
B)	Legumes		46	Peach	47
12	Broad Bean Cooked	175	47	Pomegranate	66
13	Chickpea Cooked	187	48	Zizyphus	79
14	Lentil Cooked	178	G)	Dairy Products	
15	Mung Bean Cooked	120	49	Butter Milk	31
16	Mash Cooked	158	50	Curd	52
C)	Vegetables		51	Cream	361
17	Bath Sponge	18	52	Milk Buffalo Fluid Whole	105
18	Bottle Gourd	15	53	Milk Cow Fluid Whole	66
19	Bringal	26	54	Milk Goat Fluid Whole	70
20	Cauliflower	27	55	Yogurt	71
21	Cocumber	16	56	Ice-cream	148
22	Lady Finger	35	H)	Meat & Products	
23	Spinach	27	57	Beef	244
24	Tinda	23	58	Buffalo Meat	123
D)	Roots & Tubers		59	Chicken Meat	187
25	Carrots	37	60	Goat Meat	164
26	Onion	44	61	Sheep Meat	175
27	Potato	83	I)	Eggs	
28	Reddish	23	62	Chiken Egg White	400
29	Turnip	26	63	Duck Egg White (Raw)	895
E)	Spices & Condiments		J)	Fats & Oils	
30	Cumin Seed	336	64	Butter	721
31	Liquorice Root	212	65	Ghee	874
32	Clove	304	66	Ghee (Buffalo)	900
33	Turmeric	365	67	Lard (Raw)	899
34	Pepper Black	268	68	Dalda (Hydrogenated Oil)	892
69	Corn Oil	900	75	Jaleebe	395
70	Soybean	887	76	Koa (Whole Buffalo Milk)	401
K)	Sugar, Sweets & Beverages		77	Halwa Sohen	481
71	Sugar	380	78	Carbonated Beverages Pepsi, Coke, etc.	39
72	Gur	310	79	Lemon Juice	43
73	Honey	310	80	Mango Juice	74
74	Barfi	384			

Source: AIOU, 2001

Annex-III

Adult Equivalent Units

Age groups (years)	Male	Female
< 1	0.43	0.43
1-3	0.54	0.54
4-6	0.72	0.72
7-9	0.87	0.87
10-12	1.03	0.93
13-15	0.97	0.80
16-19	1.02	0.75
20-39	1.00	0.71
40-49	0.95	0.68
50-59	0.90	0.64
60-69	0.80	0.51
70+	0.70	0.50

Source: NSSO, 1995