

## Food Insecurity and Coping Strategies by Micro Growers in Punjab, Pakistan

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### Article History Received

January 25, 2015

### Published Online

April 15, 2015

### Keywords:

Access,  
Coping strategies,  
Food insecurity,  
Food policy,  
Households,  
Small farmers,  
Vulnerability

**Abstract:** This study investigates the coping strategies adopted by small farming households in Punjab province of Pakistan and also finds the relationship among coping strategies and socioeconomic factors of households. Primary data was collected from Punjab province and simple descriptive and spearman's correlation was used to elaborate the results. The results shows that in the study area, coping strategies like borrowing from friends, stick to simple food, reduce expenditures on health, reduce expenditures on education, adult skips a meal and selling assets are used to overcome the food insecurity situation. The correlation between coping strategies used and socioeconomic factors revealed that age of the household head, household size and earning members in the households decides the adoption of coping strategy to cope with food security. In the end, a better work environment should be provided to enhance household earnings, off farm employment opportunities to cope with food insecurity situation.

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**Cite this article as:** Ahmed, U. I., L. Ying and M. K. Bashir. 2015. **Food insecurity and coping strategies of micro growers in Punjab, Pakistan.** *Journal of Environmental & Agricultural Sciences*. 3:31-34.

### 1. Introduction

At national level, Pakistan is a food sufficient and food secure country but at household level, food insecurity accounts for about 23 percent in rural areas (Bashir et al., 2012). The malnutrition and underweight in children are about 43 percent and 42 percent respectively (GOP, 2014). National Nutrition Survey of Pakistan reported that food insecurity is present in all provinces and major factors that causing food insecurity are poverty, energy crises, increased food prices, terrorism, low economic growth and political instability (NNSP, 2011). In recent years, food supply is improved significantly at aggregate level but the situation of malnutrition is still a challenge in Pakistan (Ahmad et al., 2010).

Wheat is a major source of food supply in Pakistan and there is a wide gap exists between Pakistan and many other countries of the world in terms of per acre yield of wheat (Akhtar et al., 2015). Recent climatic changes greatly effecting productivity and resilience in adaptation to climate change and coping strategies to food insecurity and livelihood improves the crop production and living standard (Tanner et al., 2014). It is debated that food intake per person has been higher than the average

recommended level in the country (Khan, 2003). However, over the last decade, one third of the all pregnant women were malnourished and about 25 percent new born babies had under weighted. This causes about 30 percent infant and child deaths in the country (Planning Commission and UNICEF, 2004).

Women farmers plays a major contribution in food security. Women exclusion from agriculture along with poverty are the major threats to food security. There are five indicators that have impact on poverty, food security and women empowerment to agriculture. These five change levers are capacity, access, productivity, household influence and enabling environment. So, these indicators plays important role to achieve more secure and resilient livelihood and also improves the food and nutrition security, coping and adapting abilities (CARE, 2015)

Food security is a broader issue in a sense that having an adequate level of basic goods to meet necessary demand and alleviate instabilities in production and prices at all times. Food security means access to enough food by all people at all times for an active life, and in opposite food insecurity exists. Coping strategies to food insecurity are devised as measure to handle the food insecurity

situation. Radimer et al. (1990) introduced the term coping strategies for the first time in literature and later Maxwell and Frankenberger (1992) discussed the issue.

The survival methods used by household when confronted with unexpected living failure is called coping strategies (Ellis, 2000). Different households adopts different coping strategies that are varies within or between the households at the different poverty levels (Maxwell et al., 2003). Household level coping strategies to deal with food insecurity mentioned by many researchers were includes temporary dietetic variations, restricting or decreased consumption, changing family consumption, varying food distribution within household's members, increased credit requirements, sales of assets, variation in crop and livestock production and increased dependence on wild food (Frankenberg, 1992; Davies, 1993; Grobler, 2014). Off farm employment is also a strategy to cope with food insecurity but in many industries like ginning industry in Pakistan, workers faced a lot of difficulties in terms of health, food and salary. Many hazards were identified like noise, dust, cold and heat stress, bad light and chemicals. These hazards leads to many diseases in workers (Sajjad et al., 2015). Diversification in income generating activities plays a significant role to improve food security and living standards (Ellis, 1998)

There is growing demand for susceptibility and response assessment to identify the vulnerability of food insecure households. Analyzing coping strategies to food insecurity and hunger could leads to better understanding to various factors effecting food security like family size, off farm income, land holding, expenditures on education and health. Changes in coping strategies cause increasing food insecurity and these changes can be detected by three indicators: leading indicators, concurrent indicators and trailing indicators (Frankenberger and Goldstein, 1990) discussed the coping strategy indicators like Previous literature about coping strategies of small farming households argued that these responses differ over time and between households in terms of purposes, chances, adoptions and limitations (Siri, et al., 2005). Therefore, this short study examined the strategies used to cope with food insecurity by small farmers in Punjab province, Pakistan.

## 2. Methodology

Data were collected through detailed personal interview from 576 small farming households in Punjab province. Sampling was done by stratified,

proportionate and random sampling techniques from selection of districts to selection of households. A well designed questionnaire was used to collect information about food security and coping strategies.

The objective of the household in selecting a coping strategy is to fulfil its members' daily ration picking among alternate methods. The idea is that household head chooses a vector ( $J, K, L, M, N$ , etc.) of coping strategies to maximize his utility subject to ensure availability to his or her members due to a vulnerability to food insecurity. To acquire enough food for the members of the family, a rational household head always picks a most proffered set of alternative options of coping behaviors.

For the analysis, methodology used, was adopted by Zakari (2014), which described as follows. Let's assuming a head of the household who strives to satisfy the need of his her members and have to choose among a set of options or coping strategies. If a household  $i$  prefers to select  $J$  if the perceived benefits from  $J$  is greater than the utility from  $K$ , then we can write:

$$U_{ij}(\beta_j X_j + \varepsilon_i) > U_{ik}(\beta_k X_k + \varepsilon_i), k \neq j \quad (1)$$

Where  $U_{ij}$  and  $U_{ik}$  are the perceived utility by the head of the household  $i$  in selecting the coping strategy  $J$  and  $K$  respectively;  $X_i$  is a vector of explanatory variables (e.g. education, age, household size etc.) that influence the choice of the options;  $\beta_j$  and  $\beta_k$  are parameters to be estimated; and  $\varepsilon_j$  and  $\varepsilon_k$  are the error terms.

We can relate the fact that a household prefers or selects a coping strategy for its utility maximization for providing enough food for its members and not choosing the other options to a discrete choice. The outcome  $Y$  is then a dichotomous dependent variable taking the value of 1 when the household head adopts an option and 0 otherwise.

The probability that household  $i$  will adopt a coping strategy  $j$  among the set of options could be defined as follows;

$$\begin{aligned} P = \left( Y = \frac{1}{X} \right) &= P \left( U_{ij} > \frac{U_{ik}}{X} \right) = P \left( \beta'_j X_i + \varepsilon_j - \beta'_k X_i - \varepsilon_k > \frac{0}{X} \right) \\ &= P \left( [\beta'_j - \beta'_k] X_i + \varepsilon_j - \varepsilon_k > \frac{0}{X} \right) = P \left( \beta^* X_i + \varepsilon^* > \frac{0}{X} \right) = F(\beta^* X_i) \end{aligned} \quad (2)$$

Where  $\varepsilon^*$  is the random disturbance term,  $\beta^*$  is a vector of unknown parameters that can be interpreted as the net influence of the vector of explanatory

variables influencing coping strategies, and  $F(\beta^*X_i)$  is the cumulative distribution of  $\varepsilon^*$  evaluated at  $\beta^*X_i$ .

The probability of household  $i$  choosing coping option  $Y_i$  and the set of explanatory variables  $X_i$  is specified as follows;

$$P_{ij} = \text{prob}(Y = 1) = \frac{e^{x' \beta}}{1 + \sum_{j=1}^j e^{x_i \beta}}, j = 1 \dots j \quad (3)$$

Where  $\beta$  is a vector of parameters that satisfy the condition  $\ln(P_{ij} = P_{ik}) = X'(\beta_j - \beta_k)$  (Greene, 2003; Molua, 2012)

From equations 1, 2, and 3, the Marginal effects of the explanatory variables are given as:

$$ME_{ijk} = \frac{\partial \text{Pr}(y_i = j)}{\partial x_{ik}} = \frac{\partial F_j(X_i, \theta)}{\partial x_{ik}} \quad (4)$$

Coefficients are interpreted as marginal effects relating to utility differences.

If a positive coefficient in equation 4 means explanatory variable  $J$  has positive effect on utility difference. If the utility difference increases, then a household head is more likely to choose alternative  $J$  relative to the benchmark choice. Negative coefficient makes a household head less likely to choose option  $J$ .

The descriptive statistics are reported in the form of percentage, frequency and mean. We then use Spearman's correlation techniques to establish a relationship between socioeconomic characteristics of respondents and different coping strategies of the households.

### 3. Results and Discussion

To mitigate the effects of not having food to meet the daily dietary requirements of the household's members, coping strategies are employed. Table 1 shows the different coping strategies adopted the households to meet their food needs. As indicated by the table, stick to simple food is ranked number one among the coping strategies of respondents against food shocks which is about 68 percent. Ziaei et al.

(2013) also reported that consumption of less preferred food is widely used coping strategy in study area. About 53 percent households prefer to borrow from friends to meet their dietary needs. This result is very much similar to Zakari (2014) as they found that about borrowing strategy used by about 45 percent. Other strategies like adults skips a meal a day, selling assets, reduce expenditures on health and reduce expenditures on education was less preferred respectively. About 20 percent adult households skips meal or reduce the consumption as similar value reported by Regassa (2011), which is about 18 percent of the total sample size.

**Table 1: Coping Strategies adopted by the households to meet their food needs**

Coping Strategies	Response	
	Frequency	Percentage
Borrowing from Friends	306	53.1
Stick to Simple Food	390	67.7
Reduce Expenditures on Health	85	14.8
Reduce Expenditures on Education	74	12.8
Adults Skips a Meal a Day	117	20.3
Selling Assets	88	15.3

Spearman's correlation coefficients for coping strategy and socioeconomics variables of the households were calculated to explain the strength and direction of their linear association. Data in table 2 shows that age of the household head has a positive and significant correlation with coping strategy stick to simple food and negative but significant relationship with selling assets. Education level and total land holding don't have correlation with any of the coping strategies. Household size has negative correlation with selling assets. Earning members of the households have positive and significant correlation with coping mechanism borrowing from friends. So these coping strategies are somehow correlated with socioeconomic characteristics of the households.

**Table 2: Spearman's Correlation coefficients for coping strategies and socioeconomic aspects of respondents**

Coping Strategies	HHAge	HHEdu	HSize	TEH	TLH
Borrowing from friends	-0.022	-0.052	0.068	0.094*	0.043
Stick to Simple Food	0.119**	-0.035	0.060	0.051	0.072
Reduce Expenditures on Health	0.036	0.010	-0.059	-0.047	-0.037
Reduce Expenditures on Education	0.028	0.044	0.030	0.000	0.011
Adults Skips a Meal a Day	-0.006	-0.034	0.054	0.030	0.039
Selling Assets	-0.105*	-0.081	-0.083*	-0.051	-0.013

HHAge=Household head's Age; HHEdu=Education of Household head; HSize=Household size; TEH=Total earning hands in household; TLH=Total land holding

\* and \*\* shows significance at less than 5% and 1% significant level respectively.

#### 4. Conclusion

In the study area, coping strategies like borrowing from friends, stick to simple food, reduced health and education expenses, adults skips a meal and selling assets are used to overcome the food insecurity situation. The correlation between coping strategies used and socioeconomic factors revealed that age size and earnings of financially supporting members in the households decides the adoption of strategy to cope with food insecurity. In the end, a better work environment should be provided to enhance household earnings, off farm employment opportunities to cope with food insecurity situation.

#### Acknowledgements

This study was supported by the project (NCET-12-0868) of New Century Excellent Talents and the project (2013PY017) of the Fundamental Research Funds for the Central Universities of China.

#### Competing Interests

The Authors declare that they have no competing interests regarding contents of this paper.

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