HOUSEHOLD LEVEL FOOD SECURITY IN KANDI REGION OF PUNJAB AND HARYANA STATES

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Abstract

Food security exists when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. Food security at global or national level may not address the micro level situation. Therefore, the objectives of the present paper are to examine the household level food security in the Kandi region of Punjab and Haryana states and also to identify the factors affecting the status of household level food security. For this purpose, data related to households' demographic and socio-economic characteristics and food production, expenditure etc. were collected through field survey. A household food security index has been computed through eight indicators i.e. food consumption, dietary energy, monthly household income, food consumption share, poverty status, safe drinking water sources, toilet availability and livelihood based coping strategies. Ordinal regression has been used to analyse the effect of households' characteristics on the household food security status. The results show that the households having small family size, high monthly income, larger size of land holdings are relatively more food secure. On the other hand, households belonging to scheduled caste population, having high dependency ratio and low monthly income are more prone to food insecurity. Only 30 per cent households are food secure, most of which belong to villages falling in western parts of Kandi belt and to general castes. The less food secure households are found in northern and central parts of the study area.

Introduction

Food security in any area cannot be understood only in terms of national or regional level situation. Despite having food security at national and regional levels, inequalities and disparities in food intake at household and individual levels may exist (Maxwell, 2001). Survey of literature suggests that there has been a shift of the perspective of food security from global and national level to household and individual levels (Maxwell, 1996).

At the household level, food security refers to the ability of the household to secure adequate food for meeting the dietary needs of all members for leading active and healthy life. A household is food secure when it has both physical and economic access to the food needed for a healthy life for all its members (adequate in terms of quantity, quality, safety and cultural acceptability). Year-round access to adequate and safe food is needed for considering a household food secure (IFAD, FAO and WFP, 2000). Household food security is therefore, dependent on the physical

availability of food, the ability of household to access the available food and the ability of individuals (particularly those susceptible to food deficits such as women, infants and children) to secure entitlement to it (Bouis and Hunt, 1999). Access refers to the ability to obtain the necessary food, either through own production or purchasing from the market. Various definitions of household food security have covered the three major aspects i.e. availability, access and utilization. Hence, the scope of the term food security has been broadened beyond the notions of food supply, as it includes the elements of access (Sen, 1981), utilization and sustainability (Chambers, 1989; Watts and Bohle, 1993). Though availability and accessibility to livelihood assets are major determinants of food security, yet the factors related to human resource development (including education, health care and clean water; population growth, urbanization and displacement of people) highly influence household level food security (Dercon, 2004; Dercon and Hoddinott, 2003). Therefore, in the present research paper an attempt has been made to analyse the household level food security in the Kandi belt of Punjab and Haryana states.

Objectives of the Study

The objectives of the present research are:
- to examine the household level food security in the Kandi region of Punjab and Haryana states; and
- to identify the determinants affecting the status of household level food security.

Study Area

Sub-mountainous region along the Himalayas in Punjab and Haryana is known as Kandi belt. Generally, the areas falling at an elevation of more than 300 m above mean sea level comprise the Kandi belt in both the states. The belt lies between 30° 21′ 48″ to 36° 16′ 15″ North latitudes and 70°45′ 00″ to 76°56′ 54″ East longitudes (Fig. 1). It extends over a length of 370 km in north to south-east direction from Dhar Kalan block of Gurdaspur district of Punjab to Chhachhrauli block of Yamuna Nagar district of Haryana. The width of the belt varies from 10 to 30 km. Bordering Himachal Pradesh in the east, the Kandi belt covers an area of 6300 km^2 in Punjab (nearly 12.5 per cent of the state's geographical area and 1900 km^2 in Haryana comprising about 4 per cent of Haryana's geographical area) respectively. This belt falls in five districts of Punjab (Sahibzada Ajit Singh (SAS) Nagar, Rupnagar, Shaheed Bhagat Singh (SBS) Nagar, Hoshiarpur and Gurdaspur (including Pathankot) and three districts of Haryana (Ambala, Panchkula and Yamuna Nagar) which cover 30 blocks (3304 villages and 62 towns) of these two states.

The population of the study region is 48, 35, 343 persons. Nearly 30 per cent of the total population belongs to scheduled castes. Nearly 35 per cent population of Kandi belt resides in urban areas. The literacy rate of the region is 73 per cent against almost 76 per cent of Punjab and Haryana states together. The density of population in the Kandi belt is 589 persons per square kilometre. The main source of livelihood in the area is subsistence mixed farming i.e. crop cultivation supplemented by livestock rearing. Majority of the land holdings are small (1-2 ha) or marginal. High yielding varieties of seeds and chemical fertilizers are rarely used by farmers, as the area is not suitable for commercial grain cultivation due to lack of irrigation facilities, undulating character of the terrain, and coarse textured soils. Cropping intensity is low (148) as compared to Punjab (191) and Haryana (182) as in many parts of the area, single crop is grown.
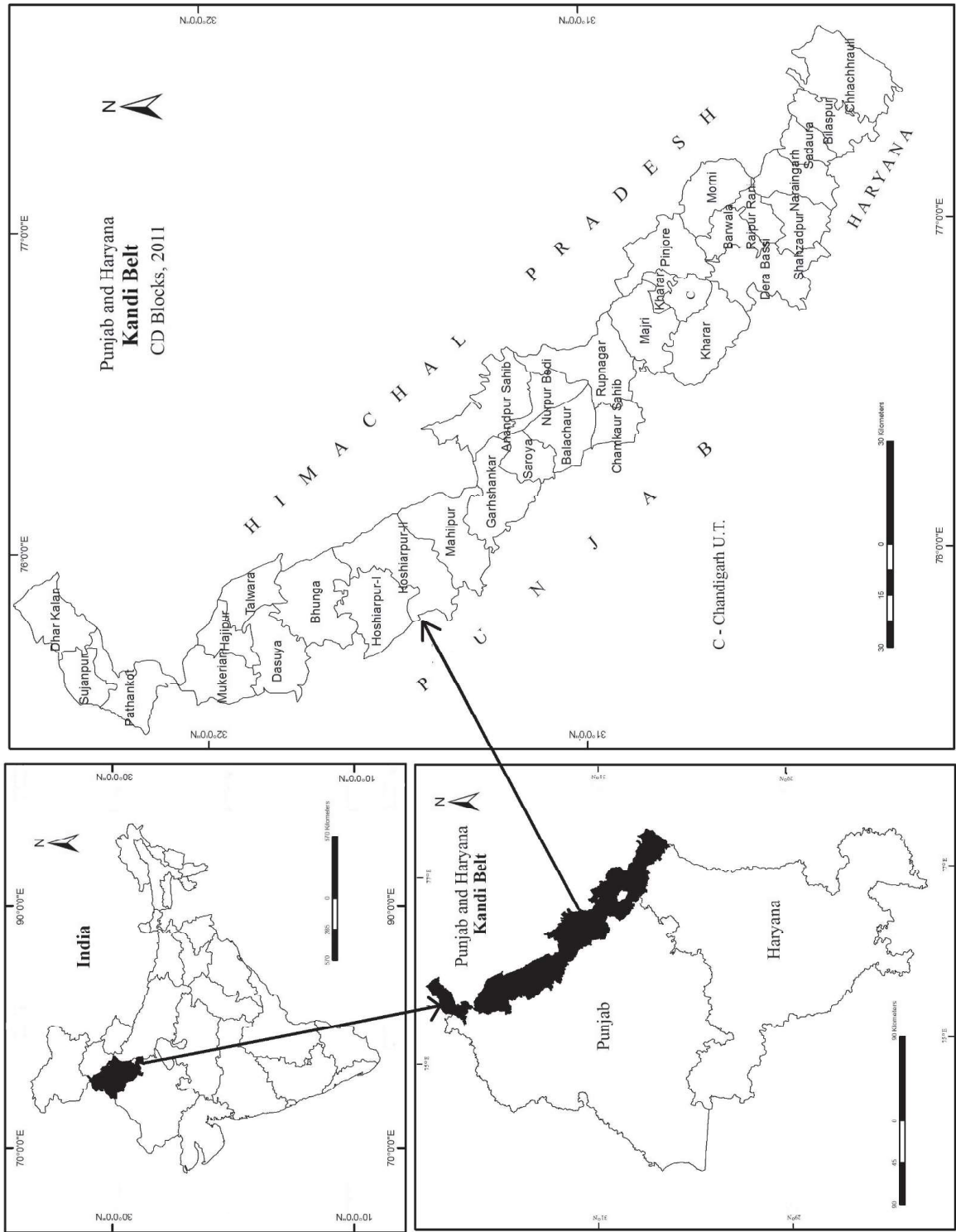
Fig. 1

Data Sources and Methodology

The study is based on field survey conducted in 2016. Taking into account the objectives of the study, various dimensions of food security were covered in the survey. Schedule method was used for data collection. It included information on various demographic and socio-economic characteristics of households such as household size and composition, household assets, ownership of land and livestock, food consumption and expenditure, off-farm employment and other sources of livelihood such as remittances and subsidies, access to safe drinking water and toilet facilities.

The Kandi belt has 3304 villages and 472 urban wards of 62 towns (total 3776 units). For the primary survey one per cent (38) villages/wards were selected by using stratified random sampling (Fig. 2). At the first stage, the three food security regions have been delineated on the basis of nine indicators (per
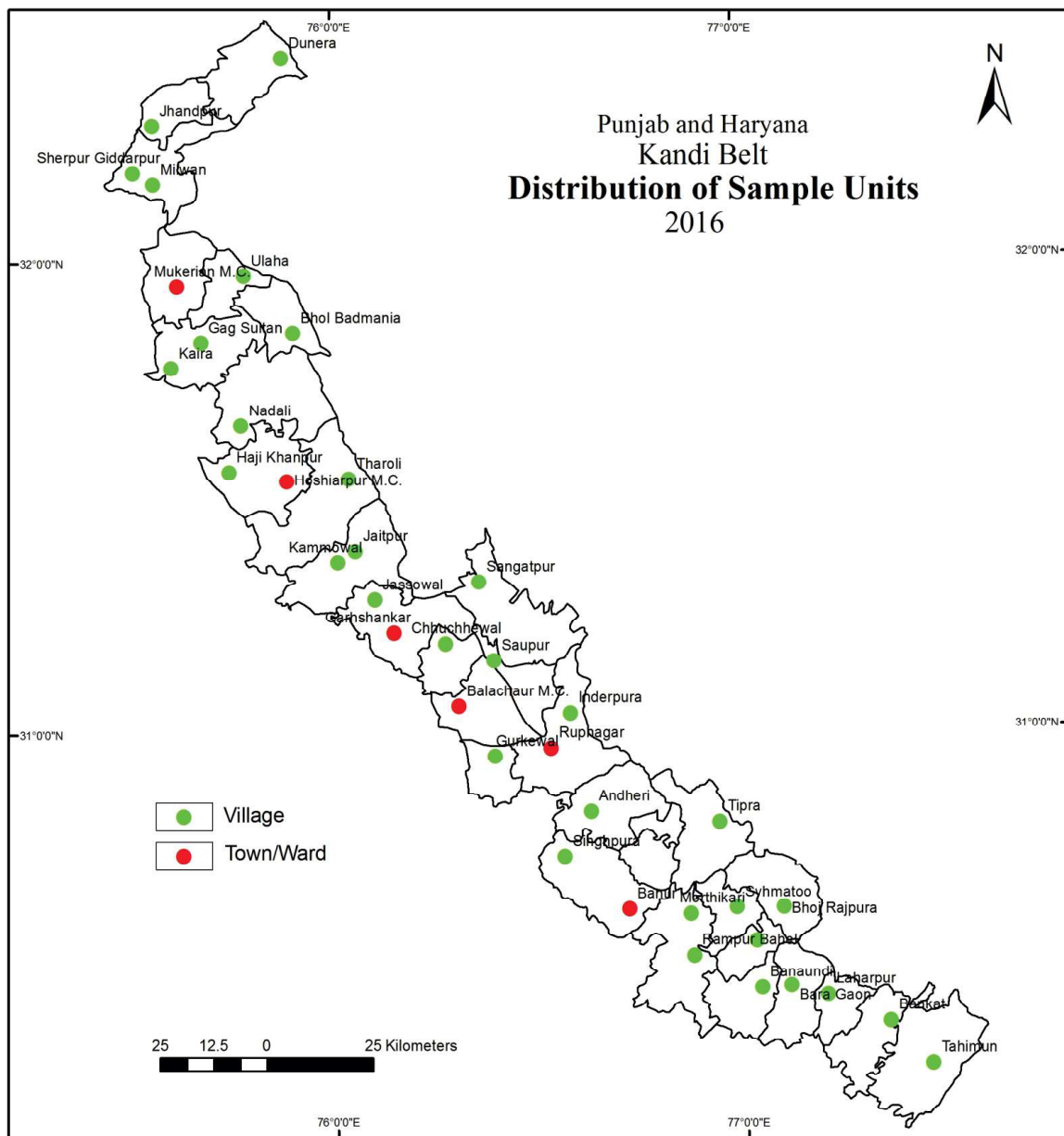

Fig. 2

capita cereal availability, cereal yield, proportion of forest area, literacy rate, employment rate, urbanization level, proportion of scheduled caste population, households having access to safe drinking water and households having toilet facility within the premises). For normalizing the data of these indicators, Range Equalization Method has been adopted. After combining the index values of these indicators, an overall composite index of food security has been computed for each development block of the study area. Depending on the variations in its value, three regions of food security have been demarcated (Fig. 3). From each region, one unit i.e. 8 villages/wards from first region, 20 villages from second region and 10 villages from third region were selected using random number tables. Care was taken to select one village from each block. Since there are total 30 blocks, to
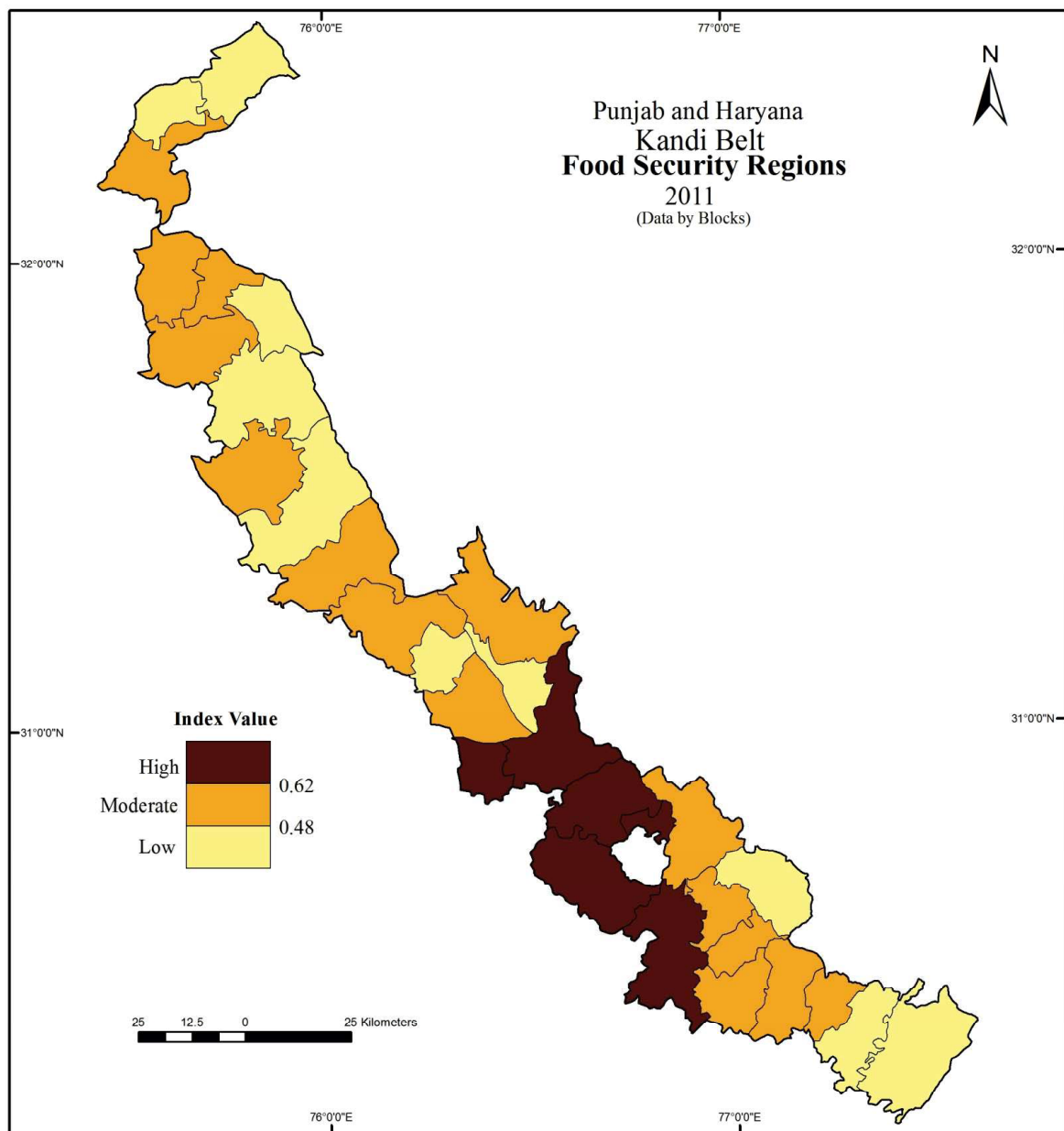
Source: Calculated from Nine Food Security Indicators

Fig. 3

select the remaining 8 units, blocks were arranged in the descending order of total number of villages in each block and in this manner 5 villages were selected from high food secure region and rest 3 from the blocks falling in medium category. Then from each sampled village/ward a maximum of 5 per cent and at least 5 households (making a total of 468) were selected for the detailed survey taking into account the socio-economic characteristics of households.

To ascertain the households' food security status, a food security index was calculated for each household using the World Food Programme's method (WFP, 2015). However, a slight modification was made by considering three categories of food security instead of four (4-point scale) in the WFP's method. Using selected indicators for each dimension of food security (Fig. 4), the food security index for each household was computed. The detailed description of procedure adopted for measurement of each dimension of household food security is stated as under:

(i) Measurement of Food Availability

Household level food availability is widely measured through diet diversity score and calorie intake (World Bank, 2014; WFP, 2015). Therefore, in the present study, these two indicators (i) Food consumption score (FCS) and (ii) per capita availability of dietary energy (DE) were used for determining the availability status of food at the household level.

- **Food Consumption Score** is the standard World Food Programme (WFP) indicator used in assessing household food consumption. For calculating FCS, all food items included in survey data were grouped into eight specific food groups. The consumption frequencies of each food item (last 7 days) for each group were recorded. The consumption frequency of each food group was multiplied by its weight and a new weighted food group was created for each household. After that, the weighted food group scores were summed up to get the score for the household. On the basis of food consumption score, the households were grouped on a three point scale as (i) High (above 40); (ii) Moderate (26-40); and (iii) Low (0-25) and were given scores of 1, 2 and 3, respectively. Higher value of food consumption score indicates higher food diversity in households.

- For calculating per **capita availability of dietary energy** (DE), edible quantities of each food item were
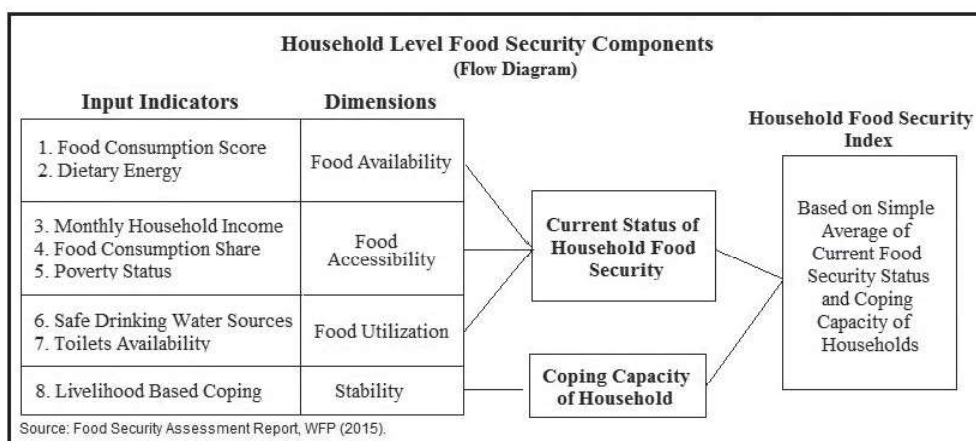

Fig. 4

converted into calories as per NSSO (2014). The total calories available for a household were divided by the consumer units. In consumer unit, the family size was adjusted to adult equivalent using the consumption factor for age-sex categories. According to NSSO (2014), the minimum weighted average food requirement per adult equivalent (AE) per day is 2200 kcal. Hence, on the basis of the per capita calorie availability, surveyed households were divided into three categories (i) food secure households (above 2200 kcal) (ii) moderately food secure households (1800-2200 kcal) and (iii) less food secure households (below 1800) and scores of 1, 2, and 3 were given respectively.

These two indicators were converted to a 3-point scale at the household level. After taking a simple mean of these available indicators, the overall food availability index was calculated for each household as under:

$$HFAI = \frac{1}{2}(FCS + DE)$$

where, HFAI= Household Food Availability Index, FCI= Food Security Scores and DE= Dietary Energy.

Higher value of this averaged index for a particular household indicates its lower status of food availability.

(ii) Measurement of Food Accessibility

Food accessibility has been taken as an economic indicator which means the purchasing power or income level of the household. It is very difficult to estimate the actual household income and food access. However, in this study, (i) Household income (HI), (ii) Food expenditure share (FES) and (iii) Poverty status (PS) are taken as indicators to measure food accessibility.

● **Household Income (HI)**: Average monthly household income was considered for its calculation. All households were categorised into five income groups and scored from 1 to 5. Score 1 was given to highest income group and 5 to lowest income group. The five income groups are: (i) Above Rs. 40,000, (ii) Rs. 30,001-Rs. 40,000, (iii) Rs. 20,001-Rs. 30,000, (iv) Rs. 10,001-Rs. 20,000 and (v) Rs. 10,000 and less.

● **Food Expenditure Share (FES)**: Share of total expenditure on food is also an indicator which highlights the accessibility dimension of a household. Higher the share of expenditure on food, lower will be the food security status of that particular household. Therefore, households having higher share of food expenditure are more vulnerable to food insecurity (NSSO, World Bank, 2014, FAO). Vulnerable households are less able to meet current non-food needs, and are likely to have less capacity to cope with future shocks. Using NSSO standards, the sampled households were divided into three categories such as low share of food expenditure (40 per cent and less), moderate share of food expenditure (between 41-65 per cent) and high share of food expenditure (above 65 per cent).

● **Poverty Status (PS)**: To determine a households' poverty status, the sources of food grains were considered as an indicator. Sampled households were categorised into three groups depending upon the source of food items i.e. own production, market purchase and Public Distribution System (PDS). Households dependent on PDS were considered poor and given score 3, while households dependent on market

purchase were given score 2 and households dependent on own production were given score 1.

The food accessibility index for each household was calculated by averaging the scores of these three indicators as under:

$$HFACI = \frac{1}{3}(HI + FES + PS)$$

where, HFACI= Household Food Accessibility Index, HI = Household Income, FES= Food Expenditure Share and PS= Poverty Status

Lower the score, higher will be food accessibility of the households and vice versa.

(iii) Measurement of Food Utilization

Along with availability and accessibility, the utilization of food is also an important dimension of food security. It determines the health status of people. For determining the households' food utilization status, two indicators; (i) Drinking water sources (DWS) and (ii) Availability of toilet within premises (AT) were considered.

● **Drinking Water Sources**: On the basis of source of drinking water, the households are divided as; (i) households having safe drinking water source within the premises and (ii) households having safe drinking water source outside the premises with scores 1 and 2 respectively.

● **Access to Toilets**: Households were also considered food secure on the basis of the availability of toilets; households with toilet facilities within the premises, were given score 1 while households without toilets facilities were given score 2.

The average score of above mentioned two indicators to determine the food utilization status of sampled households is calculated as under:

$$HFUI = \frac{1}{2}(DWS + AT)$$

where, HFUI= Household Food Utilization Index, DWS= Drinking Water Sources, AT= Availability of Toilet within premises.

(iv) Measurement of Food Stability

The aforementioned three dimensions determine only the current status of food security of all households. But food security situation of households also varies with time. Current food security status may appear satisfactory, but if a household has depleted its assets for providing food to its members, it will face difficulties in meeting future consumption needs. Therefore, to portray a clear picture of household level food security, the food stability dimension has also been included in the present study. The extent to which a household has depleted its assets is used as an indicator of food stability (Van der Kam, 2000; IPC Global Partners, 2012). During the survey, data were collected about the stress strategies such as:

● the households which were stress free were given score 1;

● the households which used stress strategies like selling household assets/goods, spent savings, sold animals, borrowed money and shifted children to less expensive school were giver score 2;

● the households that used crisis strategies (sold means of transport, withdrew children from school) were given score 3; and

● the households which used emergency strategies i.e. sold house or land to meet their food needs during past 2 years were giver score 4. Thus, the households were categorised on a 4-point scale according to stress strategy adopted by them, suggesting higher the value of score lower is the level of food stability.

(v) Household Food Security Index

The overall food security status of the sampled households was determined by

calculating the average score of above discussed four dimensions such as:

$$HFSI = \frac{1}{4}(HFAI + HFACI + HFUI + HFSbI)$$

where, HFSI=Household Food Security Index, HFAI= Household Food Availability Index, HFACI= Household Food Accessibility Index, HFUI= Household Food Utilization Index and HFSbI= Household Food Stability Index.

Further, the Statistical Package for the Social Sciences (SPSS) Version 17.0 has been used for identifying the determinants of household food security. In the present study, the dependent variable i.e. Household Food Security Index is ordinal where score 1 represents the high food security status and as the value of the score increases the level of food security decreases. The independent variables are household size, age of household head, monthly household income, literacy rate,

occupation, land ownership and household assets are nominal, categorical and ordinal. The frequencies mean, standard deviation and other descriptive statistics of the selected variables were computed. An ordinal regression model was also used to determine that the independent variables have a statistically significant effect on the dependent variables.

Results and Discussion

On the basis of the HFSI, the surveyed households have been divided into three categories (Table 1). Higher the index value lower is the level of household food security. The variations in household food security index are shown in Fig. 5.

(i) High Food Secure Households

Nearly 30 per cent (143) surveyed households are food secure by recording food security index ranging between 1-1.4. Higher
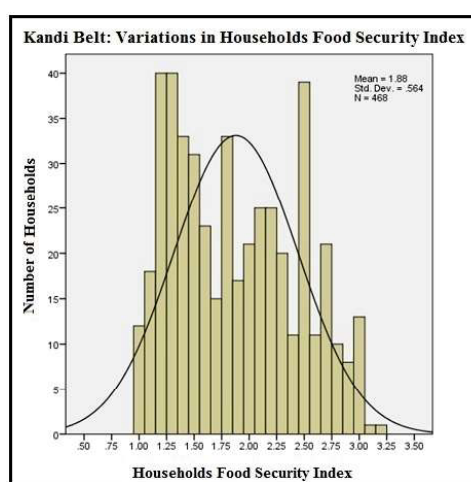
Fig. 5

Table 1
Kandi Belt: Household Level Food Security

| Category	Index Value	No. of Households	Per cent to Total
High	1.0-1.4	143	30.6
Moderate	1.5-2.0	140	29.9
Low	Above 2	185	39.5
Total		468	100.0

Source: Field Survey, 2016.

proportion of these households is found in Banaundi (Shahzadpur), Bhoj Rajpura (Morni), Bara Gaon (Naraingarh), Gag Sultana (Dasuya), Jassowal (Garhshankar), Laharpur (Sadaura), Shamtoo (Barwala), Singhpura (Kharar) and Tahimun (Chhachhrauli) villages. Most of these villages are located in western parts of Kandi belt adjoining plain areas of the two states (Fig. 2). Interestingly, a large majority (70 per cent) of such food secure households belong to general castes.

Nearly two-third households of this category have much higher value of food consumption score (above 50), indicating greater diversity in food intake. This observation is supported by WFP (2008) study which states that those who frequently consume a wide variety of foods (from different food groups) are more food secure than the ones who consume only cereals everyday with some vegetables and rarely ever eat meat. Fig. 6 clearly suggests that almost each food type is consumed by such households with a notably high frequency of staples, sugar and oil, followed by milk, vegetables fruits and pulses during the week.

In addition to high food diversity, the average dietary energy intake of these households (2700 kcal/capita/day) is above the study region average (2080 kcal/capita/day). It varies from 2100 kcal to 4000 kcal across all households falling in this category. Access to food is comparatively high in households having small to moderate family size (average size 4 members). Almost all of these families (95 per cent) are headed by male members. Literacy rate of these households varies between 75 to 100 per cent. High literacy rate has resulted in better employment opportunities leading to food security. Almost half of these households have at least one member in government jobs. Around 28 per cent families are engaged in farming activities and 16 per cent are involved in private sector jobs. Average monthly income is around Rs. 40,000. The dependency ratio is also below 35 per cent and nearly 20 per cent households do not have dependent population. Thus, share of working age population is high among these households.

The study suggests that none of the economically sound households have ever used any livelihood coping strategy in the last few years. These households are highly placed in all

Kandi Belt: Variations in Food Consumption of High Food Secure Households
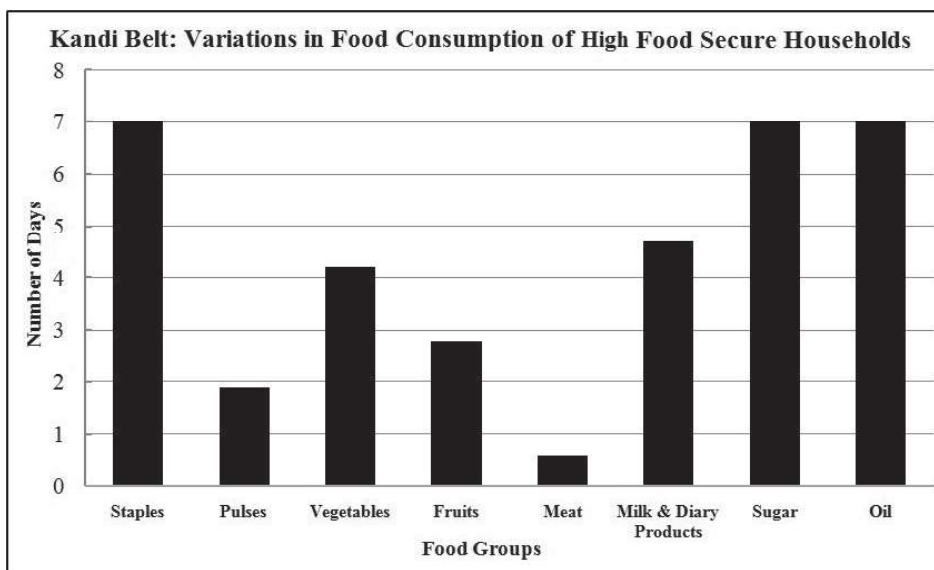
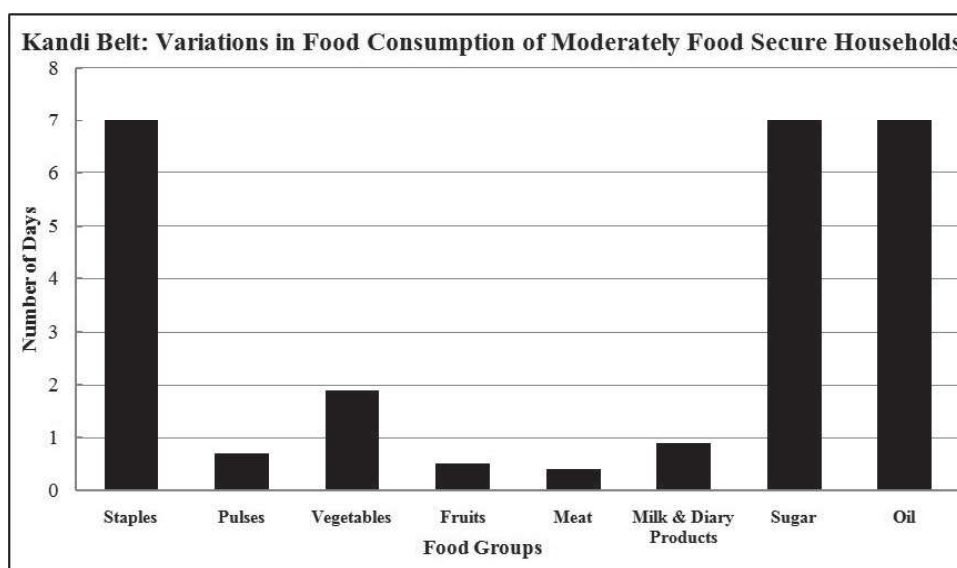Source: Field Survey, 2016   Fig. 6

the dimensions of food security (availability, accessibility, utilization and stability) and hence have much stronger food security status in the region.

(ii) Moderate Food Secure Households

The households recording index ranging between 1.5 and 2.0 have been classified as moderately food secure. Although these households are located in almost all the sampled villages but the largest proportion lies in Rupnagar MC, Mukerian MC and Banur MC and villages like Tipra, Inderpura, Jaitpur and Laharpur spreading over central and southern parts of Kandi belt. Some of these households have performed well in various food security indicators but a good number of them have also used livelihood coping strategies for meeting their food needs during the previous year. Due to this, these households fall in the moderate category of food security. The food consumption diversity is comparatively less as consumption score ranges between 30 to 50. These households eat vegetables, milk and dairy products, meat and pulses for only 1 to 2 days a week (Fig. 7). Within this category, the households falling in urban wards are having higher food diversity as compared to households of rural areas.

Dietary energy intake of such households varies between 1800 kcal to 3500 kcal. Average household size is 4.5 members and average household income is Rs. 18000 per month. Average dependency ratio is 50 per cent. As regards the occupational structure, only 26 per cent households have reported government job as a source of income, while 14 per cent are engaged in farming activities. A considerable proportion (40 per cent) is self-employed. Average literacy rate of the households is 80 per cent. But some households (only 10 per cent) have literacy rate below 60 per cent. Nearly 60 per cent households do not have cultivable land as most of these are located in urban wards. Average food expenditure for this category is 40 per cent of total expenditure. Some economically strong households have less than 25 per cent expenditure on food. The status of food utilization indicators is better in urban households, because their access to drinking water and toilet facilities is better in comparison to rural households. Nearly 5 per cent households have used the stress livelihood strategy in which they had sold their animals and also used their savings for meeting food

Kandi Belt: Variations in Food Consumption of Moderately Food Secure Households

Source: Field Survey, 2016   Fig. 7

related emergencies. Therefore, in all the selected indicators of food security, these households have lagged behind the most food secure households in the Kandi belt.
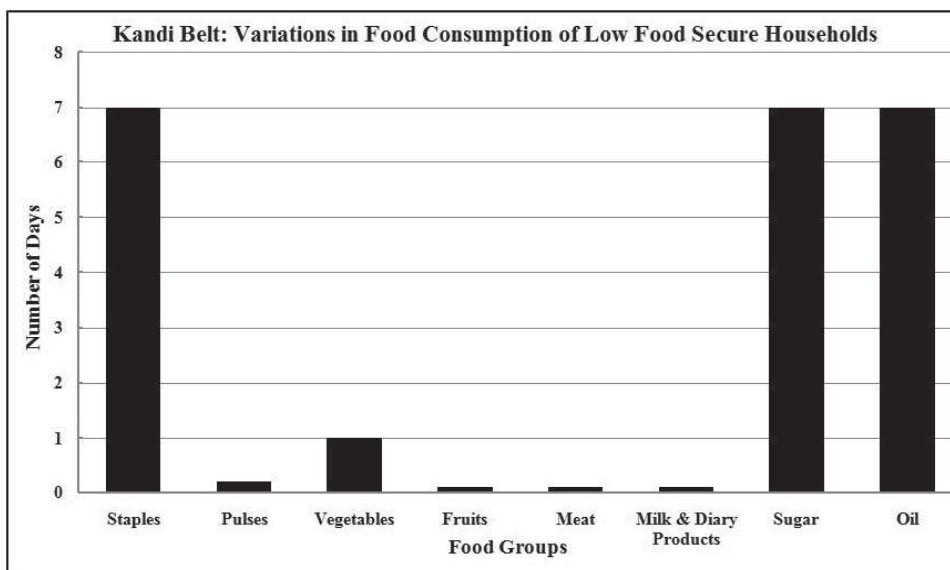
(iii) Low Food Secure Households

The largest share of surveyed households, nearly 40 per cent are having relatively low level of food security. Across these households, the food security index is more than 2. Such households are found in villages like Dunera, Milwan, Ulaha, Bhol Badmania, Kammowal, Gurkewal and Saupar and also in Balachaur MC, covering northern and central parts of the Kandi belt. A small proportion of these households are also found in the Sherpur Giddarpur, Singhpura, Bhoj Rajpura, Gag Sultana villages and in wards of Rupnagar MC, Hoshiarpur MC and Banur MC. Nearly 50 per cent households of this category belong to scheduled castes. Average family size is of 5 members, but nearly one third households have family size more than 5 members. The higher the household size, the more likely a household is to become less food secure (WFP, 2008). These households have poor food consumption score and largely consume cereals, sugar and oil every day (Fig 8).

Consumption of vegetables is once in a week. Other food items are rarely, if ever, eaten. The main source of getting items such as grains by this group is usually the PDS. Average dietary energy intake is the lowest at 1500 kcal and in 40 per cent households this intake is below 1200 kcal. This indicates their very poor levels of food security. It is attributed to low income levels (only Rs. 7000 per month) of the households. Around 75 per cent households belong to daily wage labour class. A large majority do not own any land. A major share of their earnings is spent on food. The dependency ratio among these households is also high and in some cases it is even more than 100 per cent. All these factors account for their low food security status.

This study highlights that the households having small family size, higher monthly income and larger size of land holdings are mostly food secure. Low food secure households are those which make over half of their expenditures on food due to low monthly income. These households belong largely to lower castes. Such households tend to have a higher rate of unemployment as

Source: Field Survey, 2016   Fig. 8

compared to the food secure households.

Determinants of Household Food Security

Household level food security is dependent on various socio-economic characteristics of households. In order to find out relationship between household food security and various demographic and socio-economic characteristics of households (household size, age of household head, monthly household income, literacy rate, occupation, land ownership and households assets), the ordinal regression model has been applied. The objective behind using ordinal regression model is to identify significant explanatory variables that may have influenced the food security situation of the household in the study area. This regression model also highlights the direction of relationship between the independent variables and dependent variable based on the sign (+ and -) of regression coefficients (Elamir and Sadeq, 2010; Hales and Chakavorty, 2006).

In order to construct ordinal regression model, complementary log-log link function has been selected. It is relevant to add that this model was found to have good fit for the present data. The model's Goodness-of-fit statistics are given in Table 2. Table 2 highlights Pearson's chi-square statistic and another chi-square statistic based on the deviance. In this study, the null hypothesis has been accepted, meaning thereby that the actual data and the model predictions are similar and have a good fitted model.

Coefficient of determination (R^2) was computed to check the association of variables by using Cox and Snell method (Elamir and Sadeq, 2010). Its value was found to be 0.887 pointing a strong association of selected independent variables with dependent variable. Table 3 shows the level of fitness of predicted categories of household food security with the actual categories of households taken in the study.

The estimates and the summarized effect of each independent variable are given in Table 4. The estimate column shows that out of independent variables only four have (p value below 0.05) statistically significant effect on the household food security in the study region.

Table 2
Kandi Belt: Ordinal Regression with Goodness-of-Fit

Method	Chi-Square	df	Sig. (p-value)
Pearson	278.106	882	1.000
Deviance	262.671	882	1.000

Source: Field Survey, 2016.

Table 3
Kandi Belt: Actual and Predicted Response Values for different HFSI Categories

HFSI Category	Actual	Predicted	Fitness of Model (Per cent)
Low	200	177	95.7
Moderate	121	106	75.7
High	147	136	95.1

Source: Field Survey, 2016.

Table 4
Kandi Belt: Explanatory Variables Associated with HFSI based on Ordinal Regression Model

Independent Variables	Estimate	p-value
Size of Household	-0.305	0.000
Dependency Ratio	0.000	0.814
Age of Household Head	-0.026	0.037
Households Literacy Rate	0.005	0.219
Land Ownership	0.181	0.012
Monthly Income	0.000	0.000
Total Assets	0.024	0.359
Household Head Education		
Illiterate	0.293	0.561
Primary	0.126	0.800
High	-0.063	0.891
Secondary	-0.023	0.962
Graduate & Above	0^a	.
Household Head Occupation		
Business	1.708	0.872
Government Job	-1.741	0.727
Cultivator	1.056	0.254
Private Job	-0.078	0.871
Casual Labour	-0.256	0.439
Not Working	0^a	
Household Main Occupation		
Business	-0.441	0.967
Government Job	2.522	0.613
Cultivator	-0.780	0.428
Private Job	0.124	-0.797
Casual Labour	0^a	.

0^a This parameter is set to zero because it is redundant.
Source: Field Survey, 2016.

Among these four variables, two namely household size and age of household head are negatively associated with the food security status of household suggesting larger the household size and higher the age of household head lower is the food security status and vice-versa, whereas household monthly income and land ownership are positively associated with the level of household food security. The association of variables like household occupation, literacy rate, dependency ratio, household assets and household head education with the household food security index is not statistically significant as p values recorded by these are above 0.05 (Table 4).

The foregoing analysis suggests that in the regression model, only four independent variables, namely monthly income, land ownership, household size and age of household head are significantly associated with the household food security status in the Kandi belt.

Conclusion and Suggestions

From the above, it can be concluded that only 30 per cent households which have higher

diet diversity, dietary energy intake, high income level and less expenditure on food items are food secure. The access to safe drinking water and availability of toilets within premises is also high among these households. On the other hand, about 40 per cent households distributed in almost all the sampled units of study area are found to be less food secure. These households have high dependency ratio, poor literacy and employment and spend large share of their income on food. The diversity in their diets is minimal. However, most of the households falling in urban areas have recorded moderate level of food security.

The regression results indicate that out of identified independent variables, four have shown statistically significant effect on the level of household food security. Of these, the household size and age of household head are negatively associated with the food security. It suggests that larger the size of households and higher the age of household's head, lower is the food security status of households. The other two variables of monthly income and land holding size are positively related with the level of food security in the study area.

Keeping in view the above discussed food security results, there is a strong need to make additional efforts for improving the food security status of poor households, by way of increasing the food diversity through inclusion of more food items (despite rice and wheat) for distribution under the Public Distribution System and by supporting the dependent population through various schemes. More employment generation programs including small size cottage industries should be introduced in these areas. These programmes should target landless, poor households and provide them opportunities for increasing the farm and non-farm employment. There is an imperative need to improve the infrastructure related to drinking water and toilet facilities so

that utilization aspect of food security is addressed especially for economically weaker sections. There is a need to make the people aware about the nutritional values of the food they are eating which may help them to think about taking balanced food.

References

Bouis, H. and Hunt, J. 1999. Linking food and nutrition security: past lessons and future opportunities. *Asian Development Review*, 17 (2): 168-213.

Chambers, R. 1989. Editorial introduction: vulnerability, coping and policy. *IDS Bulletin*, 20 (2): 1-7.

Dercon, S. 2004. Growth and shocks: evidence from rural Ethiopia. *Journal of Development Economics*, 74 (2): 309-329.

Dercon, S. and Hoddinott, J. 2003. Health, shocks and poverty persistence, WIDER Discussion Papers. *World Institute for Development Economics (UNUWIDER)*. 8: 1-13.

Elamir, E. and Sadeq, H. 2010. Ordinal regression to analyse employees' attitudes towards the application of total quality management, *Journal of Applied Quantitative Methods*. 5 (4): 647-658.

Hales, D.N. and Chakravorty, S.S 2006. Implementation of Deming's style of quality management: an action research study. *International Journal of Production Economics*. 103: 31-148.

IFAD, FAO & WFP. 2000. Development System-Wide Guidance on Household Food Security and Nutrition. *Administrative Committee on Coordination (ACC) Occasional Policy Papers*. Rome: IFAD, FAO, and WFP: 37-41.

IPC Global Partners, 2012. *Integrated Food Security Phase Classification Technical Manual Version 2.0. Evidence and Standards for Better Food Security*

Decisions. Food and Agriculture Organization, Rome: pp 11-17.

Maxwell, S. 1996. Food security: a post-modern perspective. *Food policy*, 21(2):155-170.

Maxwell, S. 2001. The evolution of thinking about food security. In Devereux, M. and Maxwell, S., (Eds.), *Food security in Sub-Saharan Africa* London: Institute of Development Studies, ITDG Publishers: 13-31

National Sample Survey Office (NSSO). (2014). *Nutrition intake in India*, 2011-12. Report No. 560, NSS 68th Round. New Delhi: 21-26.

Sen, A. 1981. *Poverty and famines: an essay on entitlement and deprivation*. Oxford university press: 1-8.

Van der Kam S, 2000. Revised MSF nutrition guidelines. *Field Exchange Emergency Nutrition Network*. 10 (21): 1-4.

Watts, M. J., and Bohle, H. G. 1993. Hunger, famine and the space of vulnerability. *Geo Journal*, 30 (2): 117-125.

World Bank. 2014. *Analysing food security using household survey data: Streamline analysis with AdePT software*. Washington DC: World Bank: 15-68.

World Food Programme. 2008. *Comprehensive Food Security & Vulnerability Analysis Guidelines, first edition*. World Food Programme, Rome: 21-35.

World Food Programme. 2015. *Technical Guidance for WFP's Consolidated Approach to Reporting Indicators of Food Security*. World Food Programme, Rome: 1-39.

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