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Determinants of household food insecurity: evidence from dry Indian villages

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Abstract

The objective of the present research is to identify major determinants of food insecurity in drought affected villages of Bundelkhand region of Uttar Pradesh. The study is based on field survey conducted in 420 households in 14 sample villages located in Hamirpur district of Uttar Pradesh. The study finds widespread food insecurity of varying intensity prevailing in the district. The major determinants of food insecurity in the villages are found to be high incidence of poverty, landlessness and dependence on casual labour coupled with high rate of unemployment, illiteracy, collapse of public distribution system and poor sanitation etc.

Keywords: *Food insecurity, determinants, BPL, PDS, scheduled caste.*

Introduction

Most governments across the world have recognized food security as a fundamental right of the citizens. However, insecurity of access to food persists as a major challenge to many nations at national, regional, local, household and individual level. Food insecurity refers to inaccessibility of nutritionally sufficient and culturally accepted food by each member of the household for healthy life. Food insecurity is multidimensional rendering accurate measurement of it problematic. The complexities associated with measurement leads to difficulty in identifying the needy which pose serious challenges to the policy makers of most nations facing large scale food insecurity. Most food security experts agree on four pillars (dimensions) of food security: availability, accessibility, utilisation and stability. A food system is said to be vulnerable when one or more of the four components of food security are uncertain and insecure (Andersen, 2009; FAO, 2006; FAO, 2008).

The recent data on world's food insecure population reveals the disturbing fact (FAO, 2017) that one out of every ten persons in the world is unable to secure its food despite considerable efforts made by national governments to assist poor households in accessing their food needs. Food insecurity has become a worldwide concern due to the increasing number of undernourished reaching to 815 million (approximately 11 percent of the world's population) in the year 2016-17 (FAO, 2017).

It is a fact that the burden of food insecurity falls disproportionately on the developing countries particularly the Asian and African countries where more than 92 percent of the world's undernourished people live. The FAO estimates (2017) reveals that around 520 million people in Asia and 243 million people in Africa did not have sufficient food to consume. South Asia alone accounts for 35

percent of all the food insecure population (FAO, 2017) in the world. India is one of the most food insecure countries of south Asia. Around 94.6 million (15.2%) people of the country goes hungry every day. This despite the fact that the country has achieved self-sufficiency in food grain production and large buffer stock is available to feed every mouth (Nord et al., 2005; FAO, 2017).

Food insecurity exists at various scales ranging from global, national, regional, local, and household to the individual level; determinants of food insecurity therefore differ at each such level (Doppler, 2002).

It would be simplistic to say that food insecurity is directly linked with poverty and poor income which conceal the real magnitude of food insecurity. Poverty prevalence rate is the same as food insecurity or hunger prevalence rate, since the relationship between poverty and food insecurity is not a consistent one. Accurate measurement and monitoring of food security situation can help improve public policy as well as service provision for better assistance and effectiveness of the existing programmes. Identification of crucial determinants of food insecurity is indispensable for assessment and planning to enhance the level of food security.

The purpose of the research is to identify the factors that influence food security in Bundelkhand region of Uttar Pradesh. For this purpose, Hamirpur district of Bundelkhand region of Uttar Pradesh has been selected. The district has faced severe meteorological drought in the recent past (2004-06, 2008-10, and 2014-16). Agriculture which is the main source of income of the people is largely affected by these spells of drought accentuating food insecurity in the district.

Objectives

The specific objectives of the present paper are:

a. To assess the extent of food insecurity in Bundelkhand region of Uttar Pradesh
b. To find out the major determinants of food insecurity in the region

Database and methodology

The data has been collected by a field survey conducted in the year 2011 with the help of a structured collective schedule. Keeping in view the purpose of the study, two villages from each of the seven blocks have been chosen randomly, located within 5 kms and between 5 and 20 kms from the block headquarter with the assumption that villages located closer to an urban centre get more livelihood options and that sources of livelihood decrease with increasing distance from the block headquarters. Approximately ten percent of the households have been sampled from each village with the help of systematic random sampling method. The first unit of the sample was selected randomly while remaining was selected at regular interval. The sampling interval was calculated by dividing the total households of a village by the desired sample size (i.e. 10%). In all, 420 households were included in the sample from the 14 villages (Table 1). Statistical techniques such as simple percentage, z score and Karl Pearson's correlation techniques have been profitably used to get the desired result.

In order to determine the food insecurity status of the selected villages, 20 indicators have been used classified under the four food security dimensions i.e., availability, accessibility, utilisation and stability as proposed by Food and Agricultural Organization of the UN (Table 2).

Table 1: Hamirpur District: selected villages

Blocks	Selected Villages	Sample Households
Kurara	Badanpur	23
	Raghwa	17
Sumerpur	Kundaura	44
	Para Ojhi Danda	18
Sarila	Jalalpur	31
	Karyari	42
Gohand	Bargar	15
	Itayal	18
Rath	Girbar	38
	Umanniya	15
Muskara	Sioni	28
	Husaina	43
Maudaha	Makrawn	38
	Narayetch	50
	Total	420

Source: Field Survey, 2011

Study area

Hamirpur district has been chosen for the present study for its persisting underdevelopment and severe meteorological drought. The region has faced a prolonged meteorological drought in the recent past i.e., 2008-2010 (Perspectives, 2010) adversely affecting the economic conditions of the people of Hamirpur district. The UN world food programme (2010) on food security situation of rural Uttar Pradesh reveals that Hamirpur district comes under the priority zone of food security intervention with other districts of Bundelkhand including Banda, Mahoba, Chitrakoot, Jhansi and Lalitpur (WPF, 2010).

The district is situated in the south-eastern part of UP. It extends between the north latitudes of 25º00' and 26º8' and east longitudes of 79º15' and 80º20'. It consists of four *tehsils* (sub-district) and seven development blocks (Figure 1). It has a population of 0.55 percent (11, 04,285 population) of the total population of Uttar Pradesh. With 21.8 percent of the scheduled caste population, Hamirpur district has a high share of the under privileged. Around 68.77 percent of the population is literate coexisting with great male female disparity (79.76% among males and 55.95% among females) in literacy (District Census Hand Book, 2011).

Result and discussion

Food availability, accessibility, utilisation and stability

An assessment of food insecurity clearly reveals wide variations in all the four dimensions of food security in the selected villages. In order to arrive at a composite picture of food insecurity, the mean value

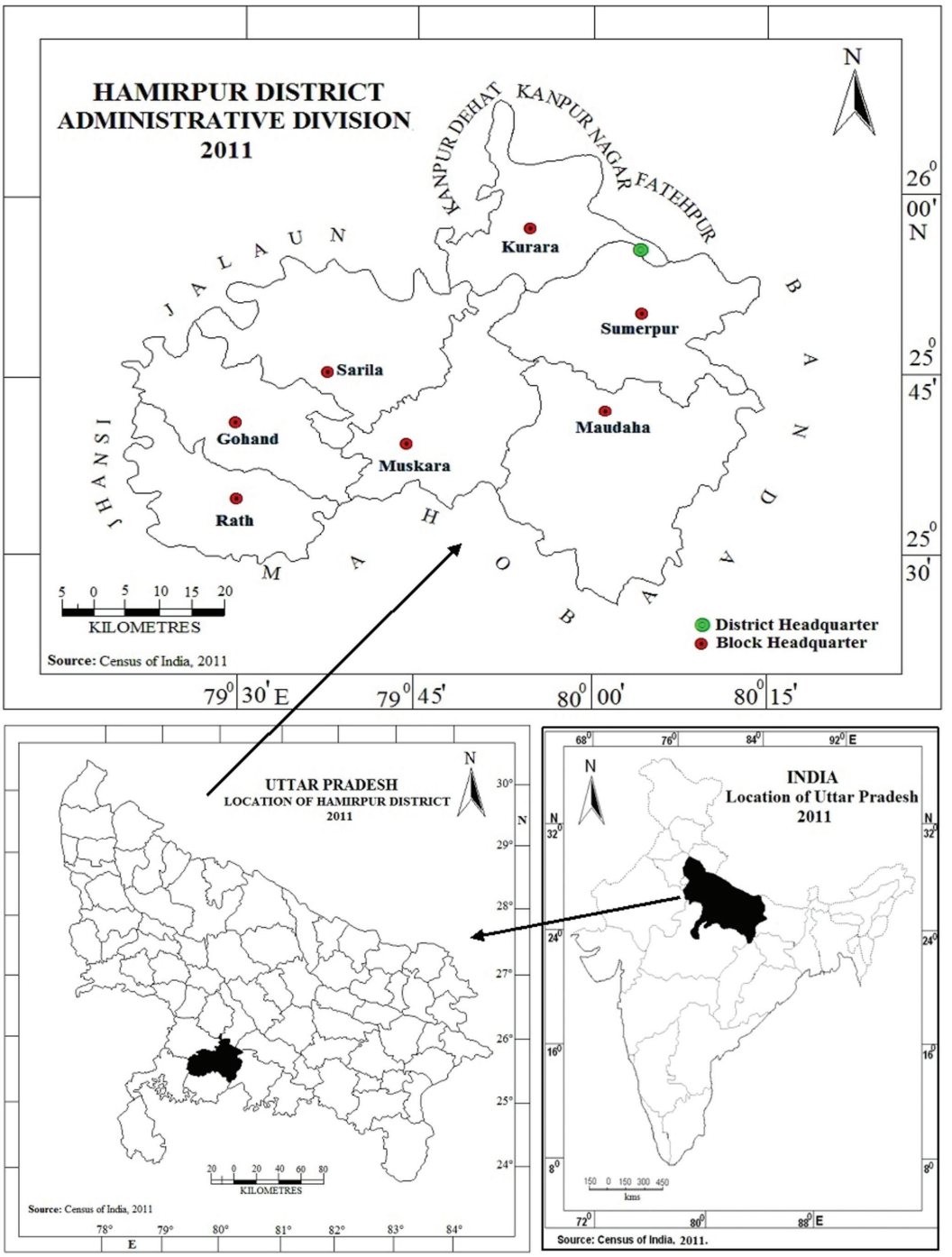

Fig. 1: Location of Hamirpur District

Table 2: Variables of food insecurity

Variables	Indicators
Food Availability	% of HHs getting below 1890 Kcal/cu/day to the total HHs
	% of HHs getting below 2400 Kcal/cu/day to the total HHs
	Number of Livestock per household
	Population livestock ratio
Food Accessibility	% of households having Income < Rs 3500
	% of BPL houses to the total Households
	% of Illiterate to total population
	% of SC Population to the total population
	% of Non-Workers to the total population
	% of landless households to the total households
	% of households without livestock
	No. of persons per family
Food Utilisation	% of Illiterate female to the total female
	% of households not getting safe drinking water
	% of households without toilet facility
	% of mud *(Kutcha)* houses to the total houses
Food Stability	% of households not getting PDS facility to the total households
	% of households reported food shortage
	% of households having food anxiety
	% of households reported food insufficiency

Source: Field Survey, 2011; Naushad et al, 2016

of twenty variables have been obtained and presented in table 3.

The extent of food insecurity can be estimated from the z scores that vary from a high of 0.84 in Para Ojhi Danda village of Sumerpur block to a low of -.82 in Umanniya village of Rath block. A perusal of table 3 reveals that the villages such as Karyari, Raghwa, Badanpur and Para Ojhi Danda were highly food insecure (0.29 and above) recording poor performance in almost all the indicators. Most of the villages (except Badanpur village) having high food insecurity also has huge concentration of SC population. The SC population, being economically weaker section of the society, are prone to food insecurity. Badanpur village which has huge (nearly 95%) concentration of OBC (Other Backward Classes) population, also marginalised section of the society in terms of economic security too suffer from acute food insecurity. Villages which recorded moderate (i.e., between -0.29 to -0.27 of composite z-score) food insecurity are Kundaura, Makrawn, Husaina, Sioni and Jalalpur. Lastly, five villages namely Narayetch, Bargar, Itayal, Umanniya and Girbar recorded low

Table 3: Z-Score of Availability, Accessibility, Utilisation and Stability of Food

Villages	Availability	Accessibility	Utilisation	Stability	Insecurity
High Insecurity					
Para Ojhi Danda	0.94	1.06	0.52	0.84	0.84
Badanpur	0.50	0.61	1.30	0.88	0.82
Karyari	0.28	0.32	0.43	0.66	0.42
Raghwa	0.12	0.16	1.05	0.18	0.38
Moderate Insecurity					
Makrawn	0.06	0.26	0.51	-0.13	0.18
Kundaura	0.30	0.23	-0.35	0.41	0.15
Sioni	0.44	-0.38	-0.14	-0.01	-0.02
Husaina	-0.02	0.00	-0.05	-0.40	-0.12
Jalalpur	-1.06	-0.29	-0.13	0.94	-0.14
Low Insecurity					
Bargar	-0.08	-0.84	-0.16	-0.20	-0.32
Girbar	-0.74	0.04	-0.16	-0.63	-0.37
Narayetch	0.17	0.51	-1.08	-1.22	-0.41
Itayal	-0.47	-0.82	-0.78	-0.32	-0.60
Umanniya	-0.45	-0.84	-0.97	-1.01	-0.82

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(i.e., -0.27 and below) level of food insecurity in the study area.

The variables of food availability, food utilisation and food stability being high and moderate in most of the selected villages, have no marked impact on the severity of food insecurity. Food accessibility in most of the selected villages being low to moderate, have profound impact on the overall level of food insecurity in the selected villages of the district.

Determinants

Numerous factors are at work that affects food insecurity at individual, community or at the level of the country. In the present study factors, both general and specific, have been identified which influence the level and severity of food insecurity in the selected villages. The general factors include inaccessibility to PDS facility, sanitation problem and landlessness etc. while the specific determinants were level of income and availability of work.

Poverty and low level of income

Poverty as a concomitant of low income is the most important determining factor for higher food insecurity as it defines the purchasing power. The government of India measures the poverty line based on caloric consumption. In 2009-10, the average per capita monthly expenditure for rural area was Rs 672.8 and RS 859.6 for urban areas.

This expenditure was considered sufficient to get 2400 calories per head per day for rural areas and 2100 per head per day calories for urban areas (Saxena, 2002). It is evident from table 4 that with a per capita monthly income below Rs 672 (as per 2009-10 norms of planning commission of India), 71.43 percent of the sample households are extremely poor. The proportion of the BPL households is as high as 90 percent in Para Ojhi Danda village of Sumerpur block. Over 65 percent of the households in this village belong to the most socially and economically marginalized scheduled caste segment. BPL households in Badanpur village and Karyari village constitute over 85 percent of all households in these two villages. In fact most other villages contain 60-80 percent households which are extremely poor.

Unemployment and casual labour

Available literatures on food security reveal close relation between rate of employment and level of food insecurity (Etana el al, 2017; Mutisya et al, 2016; Dodd et al, 2014). Differential wages associated with employment directly affect nutritional status and well-being. The table 4 shows that only 34.03 percent of the population finds gainful employment while rest of the sampled population of the district is unemployed (65.97%) indicating high dependency rate. The main reason of high percentage of unemployed population (compared to national average) is the prolonged meteorological drought. The main source of income of the district is agriculture but the drought has directly affected this principal source of work reducing them to the status of the unemployed or as marginal workers. The villages having more than 70 percent population as unemployed are Kundaura, Para Ojhi Danda, Makrawn and Narayetch (Table 4). This is largely due to unavailability of regular work during prolonged drought. Casual labourers account for 10.61 percent of the working population ranging from 16.67 percent in Narayetch to 6.06 percent in Girbar village. It is evident from the Table 4 that the majority of the working population is engaged in cultivation in their own land or as casual labourers-both of which yield very little by way of income generation in a region chronically dry and drought prone.

Landlessness

At the village level, around 30 percent of the total sample rural households were landless while the remaining had agricultural land. As per the socio-economic and caste census of India (2011), the share of landless households in India and Uttar Pradesh is 56.41 percent and 44.78 percent respectively (Socio-economic and caste census, 2011), which is much higher than the district average landless households. The share of households having land below 1 acre is 17.86 percent. Approximately, 15 percent households have land holdings ranging between 1-2 acres and 11.90 percent have holdings between 2-3 acres. Households having agricultural land above 5 acres are 13.33 percent. More than half of the sample households have holdings below 5 acres. At the village level, the highest proportion of landless households is found in Karyari (70 percent). That is why this village comes under Ambedkar Development Scheme by the state government. On the other hand, landless households have been identified in Jalalpur and Bargar village. The villages where three-fourths of the sample households have landholding size of less than 5 acres are Badanpur (60%), Jalalpur (80%), Bargar (60%), Itayal (66.7%), Girbar

Table 4: Determinants of food insecurity

Villages	BPL	Unemployed	Casual Labour	Landless	Illiteracy	SC	No PDS	Sanitation
Badanpur	86.67	69.73	13.51	36.67	60.00	0.00	56.67	96.67
Raghwa	70.00	68.33	7.78	30.00	57.22	40.00	40.00	93.33
Kundaura	76.67	72.55	9.31	33.33	50.98	46.67	40.00	76.67
Para Ojhi Danda	90.00	71.79	16.24	43.33	53.85	56.67	53.33	93.33
Jalalpur	53.33	66.47	6.94	13.33	53.76	26.67	46.67	80.00
Karyari	86.67	57.65	12.35	70.00	52.94	26.67	53.33	80.00
Bargar	43.33	64.52	10.22	13.33	43.55	30.00	40.00	86.67
Itayal	63.33	53.89	7.19	20.00	46.71	23.33	40.00	83.33
Girbar	66.67	69.70	6.06	20.00	44.24	26.67	43.33	86.67
Umanniya	63.33	55.42	9.64	16.67	45.18	10.00	36.67	60.00
Sioni	76.67	59.41	9.41	33.33	48.24	6.67	40.00	70.00
Husaina	66.67	64.42	8.17	30.00	56.73	43.33	36.67	90.00
Makrawn	76.67	71.51	13.37	30.00	50.58	20.00	36.67	86.67
Narayetch	80.00	74.14	16.67	33.33	53.45	26.67	43.33	53.33
Total	71.43	65.97	10.61	30.24	51.45	27.38	43.33	81.19

Source: Field Survey, 2011

BPL: Percentage of households below the poverty line. **Unemployed**: Percentage of unemployed population to the total population of the villages. **Casual Labourer**: Percentage of casual labourers to the total population. **Landlessness**: Percentage of landless households to the total households. **Illiteracy**: Percentage of illiterate to the total population. **SC**: Percentage of SC households to the total households. **No PDS**: Percentage of households without access to PDS to the total households **Sanitation**: Percentage of households without toilet facility to the total households

(63.3%), Umanniya (70.3%) and Husaina (66.7%).

Illiteracy

Illiteracy and low level of education are usually associated with food insecurity and hunger. It is generally believed that higher literacy among the males in general and women in particular can contribute in improving food security situation. Better literacy also impacts agricultural productivity. In the present context, it is seen that more than half (51.45 percent) of the population in the villages continue to be illiterate. The people educated up to primary level are 14.25 percent but it decreases consistently with increase in the level of education. For example, it is 13.04 percent at middle level, 8.73 percent at secondary level and 2.23 percent at higher secondary level. The overall illiteracy rate varies from 60.00 percent in Badanpur village to 43.55 percent in Bargar village. The burden of illiteracy is much higher among the women as evident from a high male female disparity. The literacy rate among male population (69.45 percent) is higher than that of the female population (47.84 percent) with a gap of 21.61 percent between the two sexes.

Proportion of Scheduled Caste

The under privileged SCs are an important social group who are socially and economically backward in the country. Therefore, they have been specially selected for the affirmative action by the government of India. Incidence of poverty in them is generally high and they constitute a significant proportion of the food insecure in India. The SC population accounts for more than 27 percent of the total sample households in the sample villages followed by the OBC and the general castes. The concentration of SCs has been found highest in Para Ojhi Danda (56.67%) and lowest in Sioni (6.67%). There is a strong association between higher concentration of the SCs and the level of food insecurity in the villages studied.

Public distribution system

Institution support plays a vital role in providing the much needed to support the food insecure. The successive Governments in India have made elaborate arrangements to provide food to the needy through Public Distribution system (PDS). However, the poor implementation of the PDS through ration shops is also one of the reasons of hunger and food insecurity in the selected villages. The data reveals that more than one third (43.33%) of the sample households in the study area do not get food commodities through the TPDS (Targeted Public Distribution System) schemes indicating large scale exclusions which is in the range of 56.67 percent to 36.67 percent in the selected villages. Among different card holders, the card holders of people above the poverty line ironically accounted for maximum with 27.38 percent whereas the more deserving people living below poverty line constituted 18.33 percent of all ration card holders. The card holders eligible for Antodaya Programme (a poverty alleviation food supply programme aimed at the poorest among the poor) were only 10.95 percent. It is important that out of total BPL households (71.43 percent) only 29.28 percent get ration under BPL schemes. This raises important questions on the ability of the government schemes in reducing food insecurity among the most needy. It also indicates a situation of widespread corruption that might have denied access of food provided to the poor from government schemes. Table 5 finds strong positive association

Table 5: Determinants of food insecurity

	X1	X2	X3	X4	X5	X6	X7	X8	X9
X1	1								
X2	0.914**	1							
X3	0.321	0.296	1						
X4	0.661*	0.648*	0.416	1					
X5	0.772**	0.808**	0.03	0.518	1				
X6	0.428	0.527	0.399	0.332	0.453	1			
X7	0.085	0.032	0.381	0.029	0.14	0.159	1		
X8	0.338	0.544*	0.186	0.456	0.569*	0.471	-0.041	1	
X9	0.025	0.04	0.191	-0.158	0.086	0.347	0.279	0.314	1

**Significant at 0.01, *Significant at the 0.05

X1 Food Insecurity, X2 BPL, X3 Unemployed, X4 Casual Labour, X5 Landlessness, X6 Illiteracy, X7 Scheduled Caste, X8 No Access to PDS, X9 Sanitation Problem

between the BPL households as well as the landless categories with non-access to PDS. The landless poor households appear to be doubly disadvantaged. This situation has hampered food and nutrition security at household level. Over fifty percent of the population is without PDS facilities in Badanpur, Karyari and Para Ojhi Danda.

Sanitation

The unhygienic living condition due to poor sanitation (without toilet facility at home) has a profound impact on the level of food insecurity in the study area. It is a key element of the third dimension (food utilisation or absorption) of food security (FAO, 2011). Significantly, more than three fourths (81.19%) of the sample households do not have toilet facility within their house premises. This ratio is as high as 96.67 percent in Badanpur village, followed by Raghwa (93.33%), Para Ojhi Danda (93.33%) and Husaina (90 percent). The village of Narayetch and Umanniya have better sanitation in comparison. Villages with large concentration Muslims (30 to 40%) show better access to toilet facility as outside defecation is a taboo in this community.

Determinants

Table 5 reveals that food insecurity is significantly correlated with BPL (0.914) and landless (0.772) households at 99 percent level of confidence, while food insecurity has also significant correlation with casual labour (0.661) at 95 percent level of confidence. The table further reveals that BPL households has significant correlation with casual labour (0.648) and households with no access to PDS facilities (0.544) at 95 percent level

of confidence. At the same time, BPL households have significant correlation with landless households (0.808) at 99 percent level of confidence.

The landless households have also significant correlation with households with no PDS facility (0.569) at 95 percent level of confidence.

Conclusion and recommendation

Majority (67.38%) of the sample households were food insecure either highly (four villages) or moderately (5 villages). Only five villages had households that suffered from low food insecurity. Poverty, engendered by higher incidence of unemployment and landlessness has been identified as the most prominent factors responsible for high food insecurity in the region as approximately 71.43 percent were below poverty line. Illiteracy and failure of the PDS system are the other contributing factors in food insecurity.

The livelihood is agriculture and related activities in the district that is badly affected by erratic rainfall and meteorological drought. Provision of artificial means of irrigation as a long term measure can alter the food security situation. The food aid and poverty alleviation programmes need to be continuously monitored for improving the food security situation. Concerted efforts to reduce unemployment and waiving of the agricultural loans are the least that the government can initiate to help the people suffering from acute food insecurity. Besides, existing nutritional programmes and health facilities must be strengthened to provide better services and access.

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