Food Security and Energy intake in South Kashmir (J&K-India)- A Tehsil Level Study of District Anantnag

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Abstract: The present study is an attempt to evaluate the food and energy (calories) deficit viz a. viz identification of vulnerable tehsils (unit of study) in the study area. Systematic random sampling technique was used in selection of twenty four sample villages across six tehsils. Using Standard score and food deficit formula, the study revealed that all the tehsils were deficient in food and energy intake with an average deficit of 41.2 percent and 37.8 percent respectively. The study envisaged inter-tehsil variations with Anantnag (73.6 percent), Pahalgam (50.9 percent) are high vulnerable as compared to Bijbehara (28.3 percent) and Dooru (32.2 percent) that are on lowest ebb. Similar results have been found in energy intake with large variations across different tehsils. Agriculture planning is badly needed to curb the grave problem and impose restrictions to land conversion a burning issue nowadays.

I. INTRODUCTION

Food security at the individual level of child, woman and man is the first requirement for a healthy and productive life. Jawaharlal Nehru had said in 1947, "everything else can wait, but not agriculture"[1] . Agricultural systems have never been explicitly designed to promote human health and mostly focus on increased profitability for farmers and agricultural industries[2] .The main concern is that food availability of smallholder farm households will be affected by the displacement of food crops by cash crops [3]. Cereals continue to play a dominant role in feeding people. Of the nearly two billion acres of crop land in the world, about 72 percent is used to produce grain. Grains provide 55 percent of all food energy produced and are typically divided into food grains for people (wheat, rice and rye) and feed grains for livestock and poultry (oats, barley, sorghum etc). Any imbalance in the area devoted to food grains would definitely affect the food security [4]. The supply demand gap in terms of staple food in various regions has been widened by the changing cropping land use. The dynamics of cropping land use has led to crop diversification[5]. Global Hunger Index conducted by the International Food Policy Research Institute shows that India holds the 67th rank among 122 developing countries. It has also stated that "serious hunger" is prevalent in all the States [6]. To ensure food security of a nation or a state, it is a pre-condition to have an adequate quantity of food available. In India the food problem arises from demand supply gap and the cropping land use change [7]. The state of Jammu and Kashmir faces a massive deficit of 40% in food grain, 70% in oilseeds and 30% in vegetables [8]. The supply demand gap in the state has widened on account of change in cropping land use pattern. It was stated that by assuming 622 grams of food grains consumption per capita per day to be standard norm, then two lakh tons of food grains would have to be imported to meet the growing demand of food in the state [9]. The general trend in cropping land use has been a shift from cereals to non-cereals implies low production of food crops. This process has a direct impact on the basic component of food security, i.e., deficiency in food supply.

II. STUDY AREA

Anantnag district is situated in the southern region of the Kashmir valley between geographical coordinates of 74°30' to 75°35' East longitude and 33°20' to 34°15' North latitude, at an altitude of 5,300 feet (16,00 meters)

above mean sea level, at a distance of 33 miles (53kms) from main city Srinagar. Anantnag is the Maraz division and is situated on the right bank of the Vyeth. The ancient name of the town was Anyech, and present name Anantnag is derived from the spring of Anat Nag, the spring of Anant, the serpent of Vishnu and emblem of eternity. The entire Southern sector of the district, which is contiguous with tehsils of Reasi, Banihal and Kishtwar of Jammu province, and Eastern sector which is contiguous with Tehsil Kargil of Ladakh division comprises of thick forests and mountains. The Northern and Western sides of this district are bounded by Pulwama district while Kulgam district falls in its west. Of all the districts of the state, Anantnag claims the largest number of streams (Nallas) like Sandran, Brengi, Arpath and Lidder. The most important among these is Lidder which takes off from Sheshnag Lake and irrigates maximum area of the district.
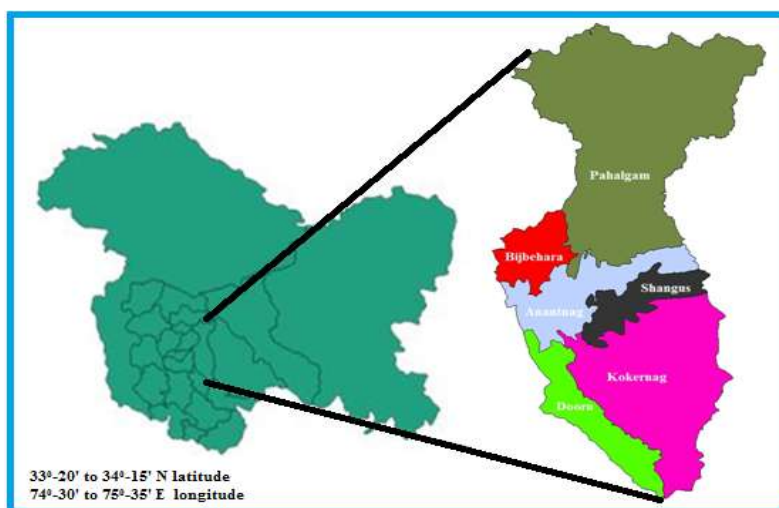

Figure-1 location map of the study area

The area of the district after carving out district Kulgam in the year 2007 stood at 2917 km2 which constitutes about 1.31% of the total area of Jammu And Kashmir State. Anantnag had population of 1,078,692 of which male and female were 559,767 and 518,925 respectively. The district consists of 605 Villages having 01 Municipal Council and 10 Municipal Committees. There are Six Tehsils Viz. Anantnag, Bijbehara, Dooru, Shangus, Kokarnag and Pahalgam which have further been sub divided into 16 Nayabats (Land Revenue Circles) and 96 Patwar halqas (Fig.1). These villages have also been divided into 07 Community Development Blocks Viz. Achabal, Breng, Dachnipora, Khoveripora, Qazigund, Shahabad and Shangus.

III. MATERIALS AND METHODS

The present study were analyzed by using different variables viz. i) area under Paddy, ii) area under maize, iii) population, iv) food consumption, v) agricultural productivity by taking tehsil as unit of analysis. The data were collected and generated from different sources and have diverse nature and characteristics as presented in Table 1.

Table-1 Type and source of data sets used

Data set	Types of Data	Source	Date of acquisition
Topographic maps		Survey of India	1971
Primary data	Dietary assessment	Sample survey	2015-16
	Agricultural Productivity	Financial Commissioners Office, Srinagar	2015
Secondary data	Population variables	Census of India, J&K Series, Srinagar/Jammu	2011
	RDA /Nutritive Value chart	National Institute of Nutrition (ICMR) Hyderabad.	2010

IV   SAMPLE SURVEY / FIELD SURVEY

Sample survey was conducted to collect data regarding consumption pattern of food crops by using methodology adopted by FAO [10],[11],[12],[13],[14],[15] (1957) and ICMR i.e. (i) The food balance sheet method and (ii) the house hold food consumption survey method. The field survey was conducted in twenty four sample villages across six tehsils of the study area. The collected data were tabulated and then converted into energy (*K.calories*). The qualitative and quantitative aspects of nutritional intake among the population have been analyzed. Departure of energy was calculated as:

Surplus/Deficit=Actual Intake - Standard Requirement

$$\textbf{Percentage}(\%) = \frac{\textbf{Surplus/Deficit}}{\textbf{Standard Requirement}} * \textbf{100}$$

Ancillary data comprising reports, official data and publications relevant to the present study were obtained from different sources. The data pertaining to the population dynamics have been obtained from census of India-J&K Series, 2011 and agricultural productivity data was obtained from Financial Commissioner's office Srinagar (2013). Map work was carried out in Arc View GIS environment. The flowchart of the methodology adopted is given in (Fig. 2). A brief description of the various steps of methodology is given below.
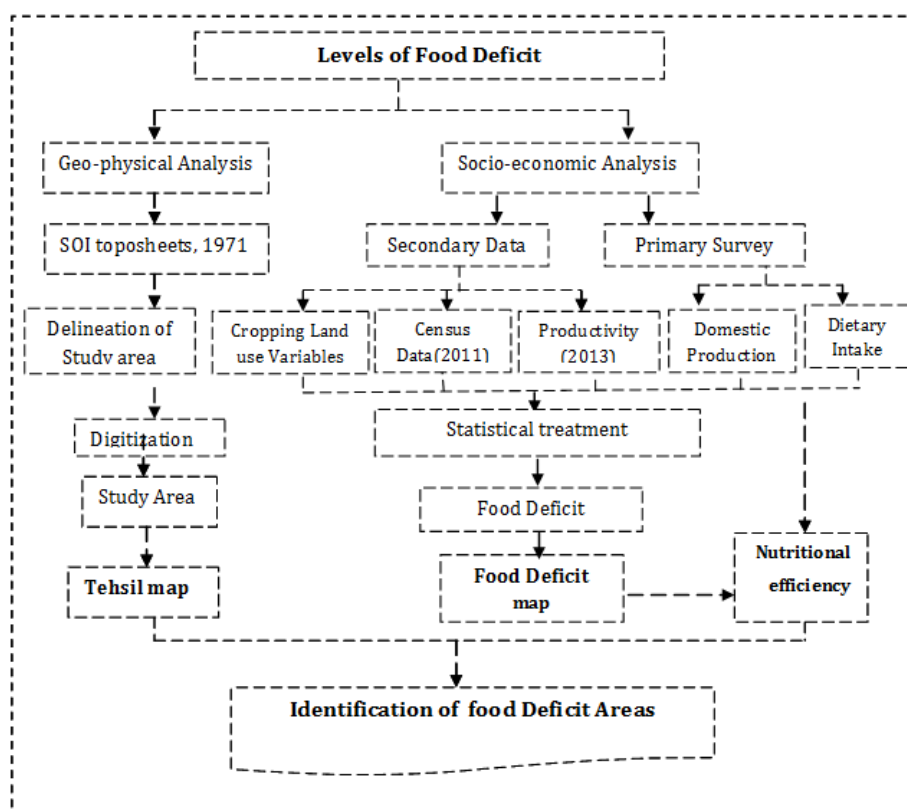

Figure-2

Food deficit trends in various Tehsils of district Anantnag has been calculated by using the following formula:
AC_y= P_y x DI
Where ACy= actual intake in a year 'Y' , Py = Population in the year, DI=Dietary intake
FD_y = AC_y - Dp_y
Where, FDy = Food deficit in a year 'y', ACy= actual intake in a year 'Y' and Dpy = Domestic Production in the   year.
For measuring food deficit of different tehsils in Anantnag district a Standardized Score (Z- Score) method have been applied.

V.   RESULTS AND DISCUSSIONS

Rice and maize are the dominant food crops grown in study area. Table 2, depicts variation both in terms of area and productivity across all spatial units (Tehsils). Rice cultivation is dominated in the lower altitudes while maize dominated in upper areas. The reasons being variation in geophysical constraints. The low altitudinal tehsil like Anantnag, Bijbehara and Dooru shows highest area under paddy crop as compared to high altitudinal tehsils which are dominated by maize cultivation. The highest area under paddy is found in Anantnag (8.9 hac.) followed by Bijbehara (4.6 hac.) and Dooru (4.6 hac.) and lowest area is found in Shangus (1.4 hac.) and Kokernag (2.6 hac.) tehsil. The Average rice production of the study area was 38.74 Qtl/hac. But it varries across different tehsils with highest productivity was found in Dooru (39.95) followed by Bijbehara (36.65) and the lowest was witnessed in Anantnag (27.69 Qtl/hac.) Similar results were found in maize production in which overall production was 1.93 lakh quintals while the highest production was found in tehsils of Bijbehara (21.3 Qtl/hac) and Pahalgam (17 Qtl/hac) and the lowest in Anantnag (7.0 Qtl/hac) and Shangus (9.1 Qtl/hac). The reasons being micro level variation in geophysical constraints and traditional and mono cropping practices prevailing in study area

Table-2 Tehsil wise Land use and Productivity pattern in Anantnag District

Tehsils	Rice			Maize		
	Area in (000 Hac.)	Average yield quintals/Hac.	Prod. In Lakh Qtl	Area in (000 Hac.)	Average yield Qtl /Hac.	Prod. In Lakh Qtl
Anantnag	8.9	27.69	2.4539	0.54	7.0	0.0376
Kokarnag	2.6	28.83	0.7502	4.356	17.2	0.7495
Shangus	1.4	33.51	0.4718	2.011	9.1	0.1832
Dooru	4.6	39.95	1.8184	2.572	16.4	0.4207
Pahalgam	3.1	30.21	0.9451	1.866	17.0	0.3164
Bijbehara	4.6	36.65	1.6835	0.534	21.3	0.2274
TOTAL	**25.1**	**38.74**	**8.1229**	**12.279**	**15.8**	**1.9348**

Source: *Financial Commissioner's Office Srinagar (2016).*

The analysis of Table 3, shows a dismal picture of food deficit across various spatial units (Tehsils) of the study area. The domestic production of Rice and Maize was 752085 quintals and 34761 quintals /year against yearly requirement of 1153025 quintals and 34761 quintals per year respectively, leading a food depict of 41.2 percent. The highest deficit prevails in the tehsils of Anantnag (73.6 percent) followed by Pahalgam (50.9 percent) and   Kokarnag (40.7 percent)   while as lowest food deficit was observed in the tehsils of Bijbehara (28.3 percent), Dooru (32.2 percent) and Shangus (32.6 percent). The reasons being this variation is the widened supply demand gap in the study area on account of change in cropping land use pattern.

Table-3 Tehsil wise Food Deficit in Anantnag District

Tehsil	Population	Actual intake/year (Qtl)		Domestic production		Deficit (Qtl)		Deficit (Percentage)		Total Food Deficit (%)
		Rice	Maize	Rice	Maize	Rice	Maize	Rice	Maize	
Dooru	199429	203816	90989	182080	42052	21736	-8937	10.7	53.8	**32.2**
Kokarnag	173712	155342	103349	72856	74052	82486	29297	53.1	28.3	**40.7**
Shangus	74103	78438	31916	46464	24132	31974	7784	40.8	24.4	**32.6**
Anantnag	364763	426043	23966	218164	378	207879	23588	48.8	98.4	**73.6**
Bijbehara	146801	182180	22416	169941	11252	12239	-11164	6.7	49.8	**28.3**
Pahalgam	119884	107206	74825	62580	29856	44626	44969	41.6	60.1	**50.9**
Total	**1078692**	**1153025**	**347461**	**752085**	**181722**	**400940**	**165739**	**34.8**	**47.7**	**41.2**

Source: Financial Commissioner's Office Srinagar (2016) and census (J&K),2011
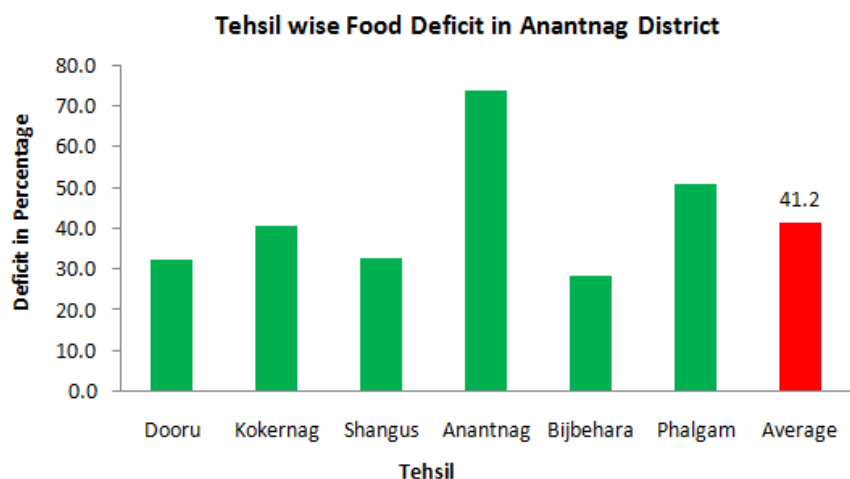
Figure-3

The following Table: 3, reveals the required energy intake, actual energy intake and deficit of energy. Deficit of energy was calculated by identifying the standard nutrition unit of energy intake equal to 3,40,000 Calories. The total deficit of energy (calories) in the study area was found to be 37.8 percent with highest in Tehsil Anantnag (51.4 percent) followed by Tehsil Kokarnag (43.2 percent), however the lowest energy deficit was witnessed in Bijbehara (11.4 percent), and Dooru (24.0 percent) tehsils respectively. The food and energy deficit reveals a positive correlation with $R^2=0.629$ between them. Thus, signifies the fact that large the available food resources highest is consumption and highest is the energy available and vice versa.

Table-4 Tehsil wise Departure of Energy in Anantnag District

Tehsil	Required Energy *(calories)*	Actual Energy intake *(calories)*	Deficit of Energy *(calories)*	Deficit of Energy *(%)*
Dooru	1002337	762048.8	240288	**24.0**
Kokarnag	879549.4	499487.2	380062	**43.2**
Shangus	375203.6	240026.4	135177	**36.0**
Anantnag	1530030.6	743042.8	786988	**51.4**
Bijbehara	695626.4	616056.2	79570	**11.4**
Pahalgam	618905.4	314282.4	304623	**49.2**
Total	**5101652**	**3174944**	**1926709**	**37.8**

Source: *Field study, 2015*
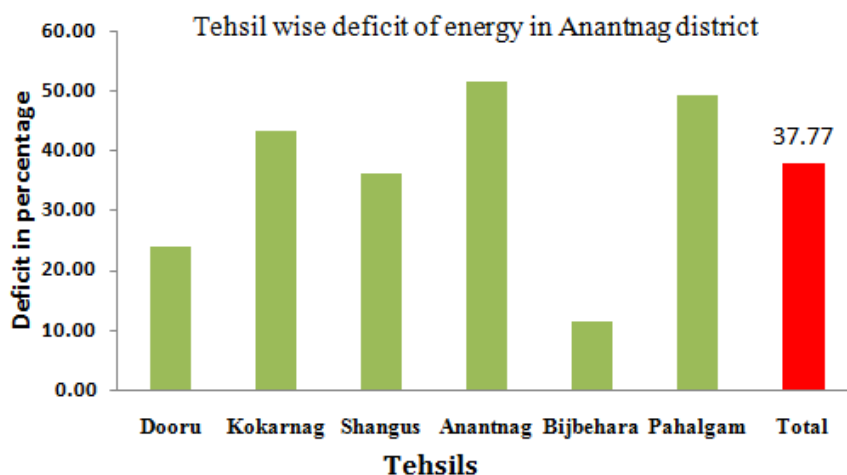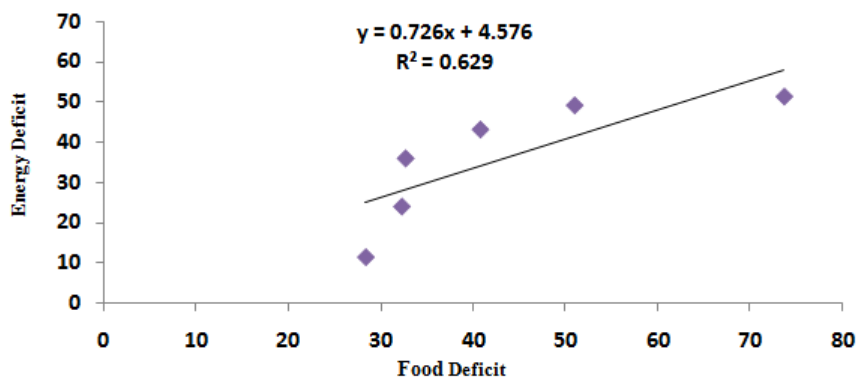

Figure- 4

y = 0.726x + 4.576
R² = 0.629

Fig. 5

IV. VULNERABLE FOOD DEFICIT ZONES

The Standard score technique was used to classify the tehsils into three vulnerable zones (table 5) based on food deficit index. Tehsil Bijbehara, Dooru and Shangus were low vulnerable while Anantnag and Pahalgam are highly vulnerable and Kokernag was found in medium vulnerable zone. The reasons are attributed Low productive soils, low irrigation facilities, and Socio-economic backwardness, Traditional practices in place and low awareness regarding scientific methods and HYV seeds and most important the conversion of agricultural land into horticulture. In tehsil Anantnag the deficit was more because agriculture land was converted into built up while as in other spatial units (Tehsils) most of agricultural land was converted into horticulture

Table-5 Vulnerable food Deficit Index of Anantnag District

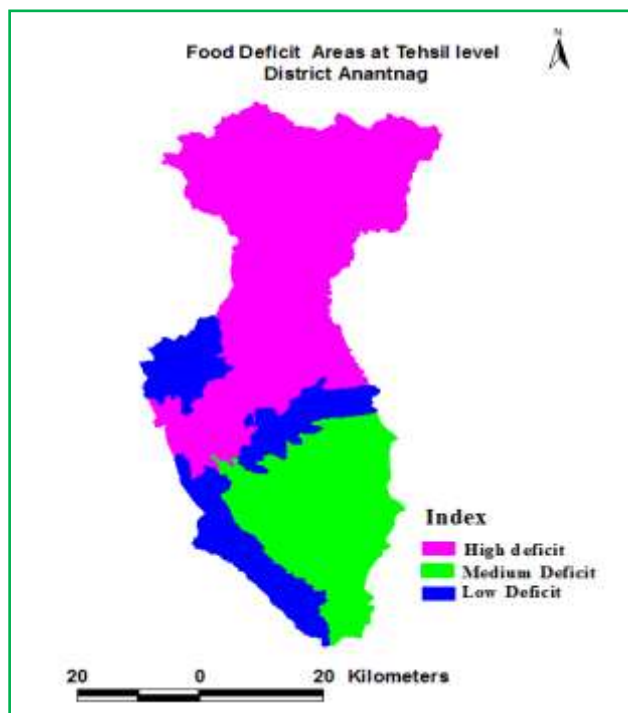| Tehsil	Z- Score	Vulnerable Zones
Bijbehara	-2.78	
Dooru	-2.27	Low
Shangus	-2.27	
Kokarnag	-0.87	Medium
Anantnag	3.08	
Pahalgam	1.75	High

Figure-6 *Based on table 5*

V. CONCLUSION AND SUGGESTION

The average food deficit in the district stands at 41.2 percent. However, there is spatial variation in the deficit levels across the different Tehsils. The highest food deficit was observed in Anantnag (73.6 percent) followed by Pahalgam (50.9 percent) and lowest deficit was observed in Bijbehara (28.3 percent) and Dooru (32.6 percent). However, the overall energy intake in the study area was 3174944 calories against requirement of 5101652 calories, leading a deficit of 1926709 calories (37.8 percent) per year with highest deficit of energy (calorie) in Anantnag (786988 calories) and Pahalgam (304623 calories) while as lowest in Bijbehara (79570 calories) and Shangus (135177 calories). Resulting both Anantnag and Pahalgam tehsils as highly vulnerable, Kokernag tehsil as medium and tehsil Dooru and Bijbehara as low vulnerable areas. The energy departure shows a positive correlation with food deficit areas with $R2=0.629$. So, agriculture planning is badly needed to curb this grave problem and impose restrictions to land conversion a burning issue nowadays. Rice promotion awareness programs by agricultural department need to be held at lowest administrative level and HYV seeds and other allied requirements should be locally available at reasonable rates, besides legislations pertaining to the prohibition of encroachment of agricultural land must be implemented in letter and spirit to avoid the wanton conversion of productive agricultural land into other land uses.

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