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Rubi Raina, Inder Jeet Singh and Sudamani Sharma

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Regional Variations of Food Security in Himachal Pradesh

Rubi Raina*[1], Inder Jeet Singh[2] and Sudamani Sharma[3]

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ABSTRACT

The word food security is recurrently used in the past few years as the government is putting more stress on ensuring food security. Despite remarkable progress in economy, India still faces extensive hunger and poverty. Hence, improving food security of the population is an issue of immense significance as it is vital for the upholding of human well-being. The present study is an endeavor to investigate food security status at district level in Himachal Pradesh. The study is entirely based on secondary information. Food security is analyzed through three key dimensions of food availability, food accessibility and food utilization. Selected indicators under each dimension have been analyzed by using variable index. In addition, food security index has been calculated at district level by using Composite Index given by UNDP. The findings revealed that the districts like Shimla, Mandi and Kangra are more food secure due to better performance in the selected indicators while the districts located in the eastern and the northern part has registered low food security.

***Key words*:** Food security, Food availability, Food accessibility, Food utilization, Hunger

Food security has been regarded as Fundamental Human Right by Universal Declaration of Human Rights. The word food security itself come up in the beginning of 1970s as a perception of food supply, but researchers at that moment acknowledged that merely availability of food was not enough for ensuring access to food by everyone [1]. It was the time when the second component of food accessibility added in the food security after the publication of Sen's work on "Poverty and Famines: An essay on Entitlement and Deprivation" in 1981. In this work, he argued that food insecurity occurred not only due to the insufficient supply of food but on account of poor access by the poor [2]. Now food security had been viewed with the availability and accessibility dimensions. The third domain of Utilization was included in late 1980s on the grounds that availability and accessibility of food is inadequate for providing food security to a household rather the consumption of secure and nutritious food along with adequate health care is significant to consider a household as food secure. In a general way, the central focus of food security has been shifted during three stages between 1973 World Food Conference and 1994 World Food Summit [3].

Eventually, the food security was defined by World Food Summit in 1996 as "Food security, at the individual, household, national, regional and global levels when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". The dimension of stability was appended when we make mention of "at all times" so according to this definition the food should be available, accessible and proper utilized throughout all the time. This description of food security is extensively applied in the present day. It embodied not only the three realms of food security nevertheless also the thought that the ability to obtain socially and culturally desirable practices is also important. Thus, the perception of food security has developed manifold during the past 50 years. In a broader sense, the notion has four domains like availability, accessibility, utilization and stability [1].

The issue of Food security has immense significance in the current scenario as according to the latest report by Concern Worldwide and Welthungerhilfe on Global Hunger Index [4] revealed that around 690 million global population is undernourished. In addition, the number of stunted children stood at 144 million. The requirement of food will be increased by 60 percent in order to feed the world population of 9 billion by 2050. Food security is also important from economic perspective as badly nourished citizen results in low productivity, that's why US President Barack Obama termed food security as an "Economic Imperative" at the 38th G8 Summit, held in Maryland, United States in 2012 [5].

The performance of India in GHI score at world level was also unsatisfactory as it was ranked at 94th position out of 117 nations by Global Hunger Index during 2020. The population of India will increase to 1.6 billion by 2030, so ensuring food security to such a huge number will be the major concern [6]. Although, India is leading globally in the

* Rubi Raina
✉ rubiraina1144@gmail.com
[1-3] Department of Geography, University of Jammu, Jammu - 180 006, Jammu and Kashmir

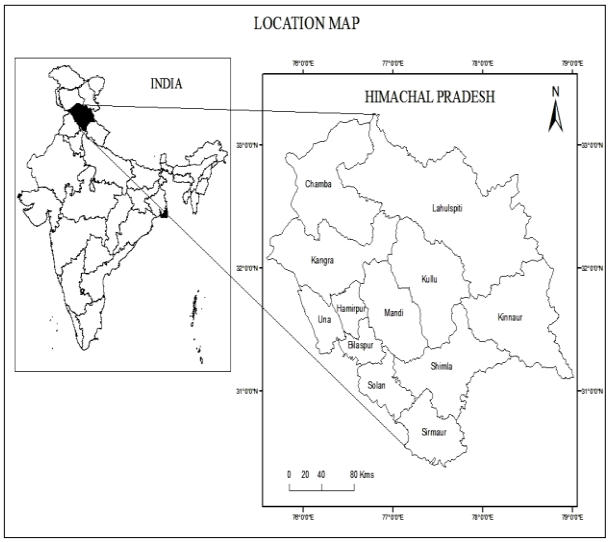
production of vegetables and fruits, but still the country has 195.9 million hungry population. This indicates that undernourished population constitutes about 14.8 percent of the total population. In addition, nearly 38.4 percent children below the age of five are stunted [7]. So, in view of all these facts, the discussions on food security are important to academician, practitioners and policy makers across the globe for the reason that the outcomes of food insecurity have an effect on every facet of the community.

The area of present study lies in the North-western Himalayan region of India is a complex of mountains, hills and valleys. Agriculture is the foremost source of living for the populace of Himachal Pradesh as nearly 69 percent of the major workforce is involved in agricultural activity. It contributes nearly 14 percent to state Gross Domestic Product. The state has about 543365 hectares net sown area out of which only 109940 hectares of area have guaranteed irrigation facilities during 2010-11 [8]. It depicts that about 80 percent of the net sown area of the state relied on monsoons for irrigation therefore; agriculture is driven by the performance of the monsoons owing to lack of irrigation facilities.

Since the state is marked by different physiographic zones ranging from Shiwaliks to Trans-Himalayas, the agricultural activities, level of development and range of opportunities vary in these zones. At the same time, about half of the total area of the state lies above the height of 3000 meters. The arable land is limited to the valleys of Kangra and Sutlej and also on the terraced slopes. The crop yield of Trans-Himalayan zone is registered low owing to extreme cold climate [9]. On the other hand, the occasional rainfall in the Shiwalik hill region results in gully erosion which leads to low crop productivity [10]. The fruits and vegetables are mostly cultivated in the middle and the Greater Himalayan region due to inadequate arable land [11]. Additionally, the mechanized farming cannot be successful owing to small holdings and farmers practice traditional methods of farming as the average landholding size of Himachal Pradesh is 1.04 hectare. The data on landholdings reveals that there is uneven distribution of land holdings in the study area. About 87.03 percent holdings are occupied by the small and marginal farmers, 12.54 percent by the medium farmers and 0.43 percent holdings by large farmers. In 2010-11, the production of food grains was 1420399 metric tonnes. The major crops are maize, wheat, paddy and barley. On the other hand, the significant cash crops are apple, ginger, potato and other vegetables grown in off season [8]. The land is shifted to cultivation of horticultural crops owing to more earnings. This diversion will lead to unsustainable agricultural development and food insecurity affecting the livelihood of the people. Hence, an attempt has been made to assess the level of food security in Himachal Pradesh.

MATERIALS AND METHODS

The state of Himachal Pradesh which lies in the North-Western Himalaya has been selected for study. It is bounded by the union territories of Jammu and Kashmir and Ladakh in the north, and Punjab on the west and the south-west. The states of Haryana and Uttarakhand surrounded it on the south and the south-east. Himachal Pradesh shares its international boundary with China in the east (Map 1).



Map 1 Location map of the study area

Table 1 Himachal Pradesh: Food security indicators

Domain of food security	Indicator	Source
Food Availability	Fruit Production	Statistical Abstract of Himachal Pradesh, 2015-16
	Vegetable Production	
	Food grains Production	
	Livestock Population	
	Food Availability (per head per day)	
Food Accessibility	Per Capita Income	http://niti.gov.in/state-statistics
	Number of Fair Price Shops	Food, Civil Supplies and Consumer Affairs, H.P.
	Percentage of Irrigated Area	Statistical Abstract of Himachal Pradesh, 2015-16
	Percent of Urban Population	
	Percent of Rural Population	
	Percent of Scheduled Caste Population	
Food Utilization	Number of Primary Health Centres	Statistical Abstract of Himachal Pradesh, 2015-16
	Safe Drinking Water Facilities	Census of India, 2011
	Toilet Facilities	

Himachal Pradesh is a sub- Himalayan state with elevation varies between 350 to 6975 meters above mean sea level. Himachal Pradesh extends between 30° 22' N to 33° 12' N latitude and 75° 45' E to 79° 04' E longitude. The state sprawls over an area of 55673 sq. Kms (Statistical Abstract of Himachal Pradesh, 2015-16). Administratively; Himachal Pradesh is divided into 12 districts. The total population of the state is 68, 64,602 according to 2011 census. Himachal Pradesh is primarily a rural state with 89.97 percent people residing in rural areas and the

proportion of urban population to total population recorded at just 10.03 percent [12].

The present study is principally based on secondary data. For assessing the regional variations of food security in Himachal Pradesh, the data on three domains of food availability, food accessibility and food utilization has been obtained from census of India (2011), Statistical Abstract of Himachal Pradesh (2015-16), Horticulture Department of Himachal Pradesh, and Department of Consumer Affairs, Himachal Pradesh (2011). A detailed description of the selected indicators and their sources has been presented in (Table 1).

The data has been tabulated to calculate variable index for each indicator by applying following formula [13].

$$\text{Variable Index} = \frac{\text{Xi} - \text{Min X}}{\text{Max X} - \text{Min X}}$$

Where, Xi = Actual value of the variable
Min X = Minimum value of the variable
Max X = Maximum value of the variable

However, for negatively related indicators like percentage of scheduled caste population and rural population, the variable index has been computed by following formula [14].

$$\text{Variable Index} = 1 - \frac{\text{Xi} - \text{Min X}}{\text{Max X} - \text{Min X}}$$

Finally, a composite index has been computed by taking the average of the variable index values of each selected indicator under the three domains of food security. Afterwards, the index value has been grouped into three categories of high, moderate and low food security regions which help in delineating the food security regions of Himachal Pradesh. Arc GIS 10.5 software has been used to prepare maps.

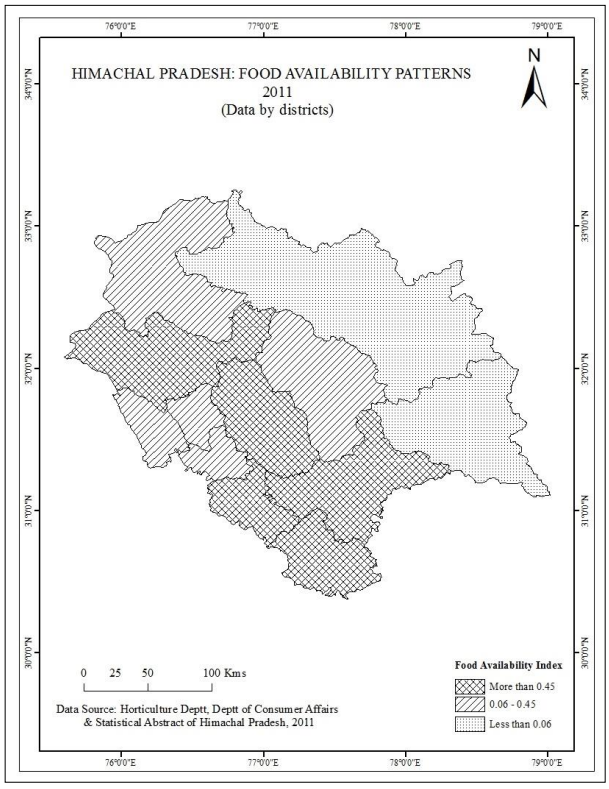
RESULTS AND DISCUSSION

Food availability

Availability of food is vital to ensure food security in any region. Food availability depends upon various factors operating in a region. In present study, food grain production, fruits production, vegetable production, number of livestock and food availability per head per day has been taken as important indicators to delineate the food availability region in the study area by calculating food availability index. In Himachal Pradesh, varied agro-climatic, physiographic conditions and lack of agricultural infrastructure are responsible for variation in food production. On the basis of food availability index, the study area has been delineated into three food availability zones discussed as under:

Region of high food availability (More than 0.45)

The region of high food availability is a contiguous belt stretched from western part to south eastern part of the study area. This region includes Kangra, Mandi, Solan, Sirmaur and Shimla districts of Himachal Pradesh. The lowest index value of 0.5 is registered in Sirmaur district while, Mandi district has observed the highest index value of 0.76 (Map 2). The food availability in this region has been recorded high owing to the fact that all districts in this zone have performed better in three or more than three selected indicators. The percentage of net sown area in these districts varies from 12.55 percent to 20.86 percent. In addition, the food grain production and livestock population has been recorded high in these districts. Apart from these, the physiographic conditions, better infrastructural facilities and historical factors are also playing the significant role in ensuring high food availability in this region. Kangra valley, one of the most fertile valleys of Himachal Pradesh also lies in this zone which is known for food grain production. Other districts of this zone are famous for fruits and vegetable production in the state which also contributed in the high food availability.



Map 2 Food availability patterns 2011

Region of medium food availability (0.05 - 0.45)

The central, western and the north-western parts of the study area have registered moderate food availability. This belt consists of five districts namely, Una, Hamirpur, Bilaspur, Kullu and Chamba (Map 2). These districts have displayed medium food availability because of the fact that out of the five indicators used for analyzing the patterns of food availability, all these districts have high index value for at least two indicators namely, food availability per head per day and food grain production. Whereas; the index value for the remaining three variables varies from zero to 0.4. This is largely due to the fact that although the climatic conditions are hospitable for the cultivation of tropical fruits in the districts of Una, Bilaspur and Hamirpur but has not proved remunerative so farmers are more inclined towards food grains cultivation. Likewise, in Kullu district, maximum agricultural activities are concentrated in the Beas valley, while in Chamba district, highly undulating topography, concentration of tribal population and diverse climatic conditions restricted the food availability at moderate level.

Region of low food availability (Less than 0.05)

This region comprises the two districts of Lahaul-Spiti and Kinnaur extending from the northern part to the

south-eastern part of the study area (Map 2). Both these districts are located in Trans-Himalayas owing to which the harsh climatic conditions restrict the agricultural activity in the region. The area under major food crops like rice, wheat and maize covers only 65 hectares in Lahaul-Spiti and 275 hectares in Kinnaur district due to which the production is also recorded very low which is just 1350 and 4430 quintals respectively. Furthermore, the food availability per head per day has also been registered very low as 0.011 kg in Lahaul-Spiti district and 0.014 kg in Kinnaur district. The other factors for low food availability are low index value for fruit and vegetable production as well as for livestock population. Besides, the cultivation period is also short in this region because of heavy snowfall during winters. Hence, on account of all the reasons, this zone has observed low food availability. In sum, we can say that in Himachal Pradesh overall food availability is better as 50 percent districts in the state have registered food availability index above the state average. Though regional variations have been registered in food availability owing to various physical, historical and social factors.

Table 2 Himachal Pradesh: Status of food security

District	Food availability	Food accessibility	Food utilization
Mandi	0.76	0.24	0.74
Kangra	0.64	0.38	0.61
Shimla	0.54	0.50	0.59
Kullu	0.43	0.26	0.35
Solan	0.53	0.45	0.53
Hamirpur	0.32	0.21	0.79
Sirmaur	0.5	0.27	0.39
Una	0.33	0.29	0.45
Chamba	0.45	0.24	0.46
Bilaspur	0.31	0.2	0.58
Kinnaur	0.05	0.3	0.64
Lahaul-Spiti	0.01	0.51	0.33
Himachal Pradesh	0.40	0.32	0.54

Source: Based on food availability, accessibility and utilization indicators

Food accessibility

Food accessibility is regarded as the second most important constituent of food security. This dimension was included into the conceptual framework of food security during 1980s after the publication of Sen's work on entitlement. He emphasized that food security cannot be ensured by food availability alone but the available food should be accessible to the citizens [15]. For investigating the spatial patterns of food accessibility in the study area, the indicators such as per capita income, availability of fair price shops, percentage of irrigated area, share of urban population, percentage of rural population and proportion of scheduled castes population to total population at district level have been taken into consideration for calculating food accessibility index. To study the food accessibility patterns, the study area has been divided in high, moderate and low food accessibility regions.

High food accessibility region (More than 0.37)

The zone of high food accessibility has been observed in two clusters. One cluster extends in the west, the north and the north-eastern part of the study area encompassing the districts of Kangra and Lahaul- Spiti. Kangra district has high index value for the variable like number of fair price shops (1.0) and scheduled caste population (0.4). While; Lahaul-Spiti have showed high index value for per capita income (1.0), irrigated area (1.0) and scheduled castes population (1.0). As a result, high food accessibility has been registered in Lahaul-Spiti.

Another pocket of this zone is positioned in the south-east and the south-west of Himachal Pradesh embracing Shimla and Solan districts (Map 3). Both these districts have shown high index value for the proportion of urban population as 1.0 in Shimla district and 0.71 in Solan district respectively. Since Shimla is the capital of the state due to which the share of urban population has been recorded higher as compare to other districts of the state. Likewise, Solan district is the second highest urbanized district of Himachal Pradesh as a result of which the index value has been observed high for the indicator of urban population. Furthermore; the lowest share of rural population in Shimla district also results in high index value (1.0). In addition, the index value for per capita income has also been recorded high in Solan district (0.64). Thus, the high index value for at least in two indicators helped these districts to fall into the high food accessibility region.

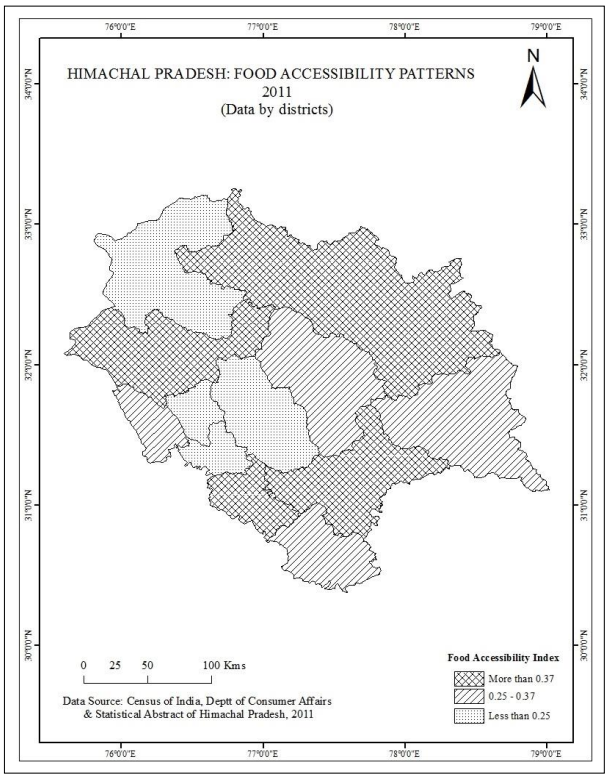
Moderate food accessibility region (0.25 - 0.37)

The region of moderate food accessibility has found in the south, the south-east and the central part of Himachal Pradesh which comprised of the districts of Sirmaur, Kinnaur, Kullu and Una (Map 3). The index value in these districts ranges between 0.26 in Kullu district to 0.30 in Kinnaur district. These districts fall in moderate food accessibility region on account of average performance of the indicators. Kinnaur district has displayed above 0.60 index values in two indicators of per capita income and percentage of irrigated area. But at the same time due to the lowest availability of fair price shops and non-urban population, this district falls into the zone of moderate food accessibility. Similarly, Kullu has performed moderately in variables like fair price shops and urbanization having index value of 0.38 as well as in per capita income registering index value of 0.30. In the same way, the remaining two districts of this cluster have moderate values for two or three indicators and low for the remaining indicators as a result of which this zone of Himachal Pradesh have recorded moderate food accessibility.

Low food accessibility region (less than 0.25)

This belt is formed in two patches situated in the south-western and the north-western part of the study area encompassing the districts of Bilaspur, Hamirpur, Mandi and Chamba (Map 3). The value ranges between 0.20 in Bilaspur district to 0.24 in Chamba and Mandi districts of the state. All these districts have recorded low index values for net sown area under irrigation (0.1) and per capita income (0.2). Similarly, the low share of urban population (less than 7 percent) also results in low index value (less than 0.28) in these districts. Hence, on account of poor performance in three undertaken indicators and moderate performance in the remaining indicators, these districts have displayed low food accessibility. Thus, the preceding discussion depicts that the district of Lahaul-Spiti which was at the bottom in the food availability patterns has shown highest index value of 0.51 in respect of food accessibility. This is mainly due to the fact that Lahaul-Spiti is the smallest populated district of Himachal Pradesh as a result

of which the per capita income has been registered high in this district. Furthermore, the agriculture is practiced in few locations due to low cultivable land availability and availability of irrigation facilities. This also results in higher percentage of net sown area under irrigation (99.8 percent). Alternatively, the districts like Bilaspur, Hamirpur and Chamba having moderate food availability have displayed low food accessibility.



Map 3 Food accessibility patterns 2011

Food utilization

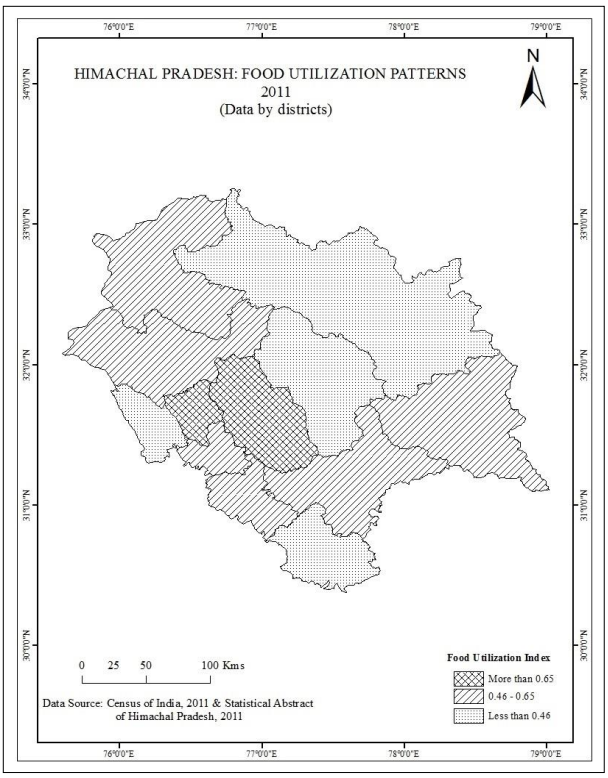
This domain of food security became a matter of discussion during 1990s and it was accepted that without considering the utilization aspect, food security cannot be attained. Generally, food utilization consists of meal preparation, preference of food, intake practices, and also the awareness of nutritional food [16]. Food utilization takes into account the nutritional quality of the consumed food which can be accomplished through proper diet, safe drinking water and the availability of sanitation facilities as well as the provisions of health care facilities [17]. So, in view of this definition, three indicators such as the availability of safe drinking water facilities, toilet facilities and the availability of primary health centres have been considered for assessing the patterns of food utilization.

High food utilization region (More than 0.65)

High food utilization region is located in a small patch located in the central part of the study area (Map 4). This zone comprises the two districts of Mandi and Hamirpur. The high index value has been recorded in Hamirpur district (0.79) while Mandi district has registered 0.74 index value. Hamirpur district has registered the highest index value (1.0) both for availability of safe drinking water facilities and toilet facilities. As nearly 96 percent households of Hamirpur district have safe drinking water facilities and 85 percent households have the availability of toilet within the premises. Likewise, Mandi district has the availability of safe drinking water for 93 percent of the total households which was the third highest percentage among the districts of Himachal Pradesh. Furthermore, toilet facilities were available for 80 percent of the total households. However, the index values for the third indicator of population served by the primary health centres have displayed moderate value of 0.45 in Mandi district and 0.38 in Hamirpur district respectively. Thus, the better performance of these districts in two indicators caused high food utilization index values.

Medium food utilization region (0.46 - 0.65)

This zone has been identified in two different clusters of the study area. One cluster extends in the south and the south-eastern part encompassing the districts of Solan, Shimla, Kinnaur and Bilaspur (Map 4). The second pocket of this region stretches in the west and the north-western parts of Himachal Pradesh. This belt is constituted by two districts specifically, Kangra and Chamba. Except Kangra district, all other districts have recorded moderate index values between 0.43 to 0.53 for safe drinking water facilities. In the similar way, the index values for toilet facilities varies between 0.31 in Chamba district to 0.73 in Solan district. In the third indicator of population served per primary health centre, the results showed that in Kinnaur district one primary centre served nearly 4000 persons which results in the second highest index value of 0.91. In the remaining districts, the index value for the population served per primary health centre ranges between 0.34 and 0.70. Hence, the districts of this zone have displayed high index value for one indicator and moderate index values for the other two indicators results in moderate food utilization patterns.



Map 4 Food utilization patterns 2011

Low food utilization region (less than 0.46)

The region of low food utilization has been identified in three distinct pockets of the study area. One patch extends

in the central, the north and the north-eastern part comprising the districts of Kullu and Lahaul-Spiti (Map 4). The other two patches have been located in the southern and the western part encompassing the districts of Sirmaur and Una. These districts have low index value (less than 0.49) for toilet facilities in fact; the district of Lahaul-Spiti has the lowest percentage of households both in safe drinking water facilities (78 percent) and toilet facility within the premises (33 percent). However, the population served per primary health centre has been recorded higher in Lahaul-Spiti as 1972 persons were served by one primary health centre. This is largely due to the fact that the total population of Lahaul-Spiti is extremely low (31564 persons). On account of this, Lahaul-Spiti has shown the lowest food utilization index value (0.33) among all the districts of the study area. Similarly, the other districts have displayed low index values for one indicator and moderate for the remaining two indicators which results in low food utilization index value. Thus, it can be inferred from the above analysis that in Himachal Pradesh, food utilization infrastructure has moderately developed as more than 50 percent of the total districts have registered moderate index value. Lahaul-Spiti was the only district which registered low food utilization index which is attributed to the rural population base causing poor performance in all the selected indicators [18].

Food security regions of Himachal Pradesh

After analyzing the three dimensions of food security namely, food availability, food accessibility and food utilization in the study area, the food security regions of Himachal Pradesh have been delineated by categorizing the index value into three groups.

- High Food Secure Regions (More than 0.43)
- Moderate Food Secure Regions (0.36 – 0.43)
- Low Food Secure Regions (Less than 0.36)

High food secure regions (More than 0.43)

The zone of high food security has spread over the five districts of Shimla, Solan, Mandi, Hamirpur and Kangra. Geographically this region is situated in a long narrow belt stretched from the south-eastern part to the western part of the study area (Map 5). The highest index value of 0.58 has been registered in Mandi district while the lowest index value of 0.44 has been observed in Hamirpur district (Table 2). Being high food secure region of the state, these three districts have performed better in two domains of food security namely; food availability and food utilization. Food accessibility has moderate index values in this region. In the domain of food availability, Mandi, Kangra and Shimla ranked first, second and third respectively among the twelve districts of the state. Furthermore, except Hamirpur district all other four districts have registered index value above state average in this domain of food security. In food accessibility domain, Kangra (0.38), Solan (0.45) and Shimla (0.50) districts registered index value above state average (0.32) while; Mandi (0.24) and Hamirpur district (0.21) has recorded index value below state average (Table 2).

In the third domain of food security i.e., food utilization, all districts of this zone have performed impressibly. Thus, on account of above-mentioned reasons, these districts have displayed high index value and ranked top across the state. Furthermore, the natural and historical factors have their role in better performance of these districts in all food security domains. Among the natural factors, the presence of more fertile valleys in Kangra and Mandi districts and hospitable climatic conditions for cash crops particularly for apple in Shimla district are significant. Historically, the Britishers had played vital role in the development of Shimla district which contributed in the development of different infrastructure for making this district food secure [19]. Apart from it, political dominance of these districts in state politics also helped in the development process of these districts.

Table 3 Himachal Pradesh: Food Security Regions

Food security region	Index value	Name of the district	No. of districts	Percentage of districts	Major areas of concern
High	Above 0.44	Shimla, Solan, Mandi, Hamirpur and Kangra	5	42	Focus should be on enhancing food accessibility domain
Moderate	0.36– 0.44	Sirmaur, Bilaspur and Chamba	3	25	Provisions should be made for better performance in food accessibility and food utilization domains
Low	Below 0.36	Kinnaur, Lahaul- Spiti, Kullu and Una	4	33	Need to focus on the domains of food availability and food accessibility

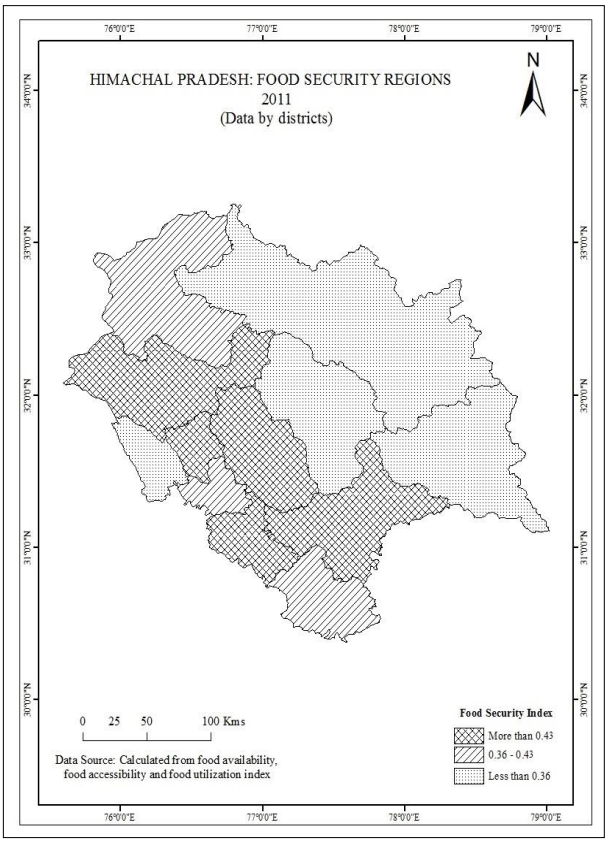
Source: Based on food availability, food accessibility and food utilization index values

Moderate food secure regions (0.36 – 0.43)

This region spread over three districts of Himachal Pradesh positioned in three distinct pockets. One pocket is located in the southern part including Sirmaur district. The second patch has been positioned in the western part of the study area encompassing the district of Bilaspur. The third pocket of this zone exists in the north-western part comprising the district of Chamba (Map 5). The factors behind moderate performance of these districts can be attributable to moderate performance of these districts in all three domains of food security. It is also interesting to note that all three districts of this region have registered index value below the state average (0.42). It can be analyzed from (Table 3) that the districts of this zone have high value for food availability component and moderate in food utilization domain. On the other hand, in the domain of food accessibility, these districts have displayed low index values (less than 0.27). As a result, the high index value for one domain and moderate to low for the remaining two food security domains results in moderate index value in this region.

Low food secure regions (Less than 0.30)

The zone of low food security has been situated in a belt extending from the northern and the north-eastern part to the eastern part to the study area (Map 5). This region is formed by three districts of Himachal Pradesh namely, Kinnaur, Kullu and Lahaul-Spiti. Another pocket of this zone has been found in the western part comprising the district of Una. Data in (Table 3) depicts that Lahaul-Spiti and Kinnaur districts have registered very low index value of 0.01 and 0.05 in food availability domain. The low availability of cultivable land has been found to be the main reason behind low food availability. Forests covered about 70 percent of the geographical area and only 30 percent of land is available for cultivation. Furthermore, the proportion of fallow land has been recorded high in both these districts due to largest share of tribal population as 58 percent in Kinnaur to 81 percent in Lahaul-Spiti district. In addition, these districts are located in Trans- Himalayan range, the harsh climate and rugged landscape does not permit the inhabitants to engage in agricultural activity as a result of which the value has been observed meager for food availability dimension.



Map 5 Food security regions 2011

Besides, the low index value for food utilization domain also results in low food security as 0.333 in Lahaul-Spiti and 0.35 in Kullu district. The findings on food accessibility domain reveal that except for Lahaul-Spiti, all other three districts have low index values as less than 0.30. Thus, on account of poor performance in maximum domains, the food security index has been recorded very low in these districts.

Correlation analysis

Pearson's correlation has been computed for assessing the relationship between food security regions and the major components of food security namely, food availability, food accessibility and food utilization.

It can be analyzed from (Table 4) that food security of Himachal Pradesh is very strongly and positively related with the food availability component because the value of correlation coefficient (r) is 0.91. In addition, the p value of 0.00 indicates that the relationship is significant as the value is less than 0.05. Additionally, the food security of the study area displayed a strong positive correlation ($r = 0.895$, $p < 0.05$) with the food utilization domain. In contrast, the correlation analysis reveals that food accessibility has a very weak and insignificant relationship with the food security of Himachal Pradesh as the value of r is 0.094 and p is 0.772. It indicates that the districts performing better in food availability and food utilization are more food secure whereas, the districts performing better in food accessibility are less food secure [20].

Table 4 Correlation between food security region and food security components

Variables		Food security regions
Food Availability	Pearson Correlation	.909**
	Significance (2-tailed)	.000
Food Accessibility	Pearson Correlation	.094**
	Significance (2-tailed)	.772
Food utilization	Pearson Correlation	.895**
	Significance (2-tailed)	.000

**Correlation is significant at the 0.01 level (2- tailed)

CONCLUSION

In brief, this paper attempts to analyze the regional variations of food security in Himachal Pradesh by taking into consideration the three components of food availability, food accessibility and food utilization. The study reflects that the share of food secure districts has been registered high (42 percent) as compare to 25 percent districts in moderate food secure region and 33 percent in low food security region. It has also been found that physiographically the districts falling in lesser Himalaya are more food secure as compare to the districts located in Shiwaliks, Greater Himalaya and Trans-Himalaya. The districts performing better in the variables like urban population, number of fair price shops, availability of safe drinking water and toilet facilities are likely to more food secure. Further, the findings suggest that the share of scheduled caste population does not affect the status of food security. However, the higher share of rural population has been found to be an important determinant as it negatively impacted the food security in the study area. In order to improve the food security status of the study area, it is necessary to focus on enhancing the food availability domain. This can be achieved through proper management of water and soil and by making availability of improved varieties of seeds to the farmers. Since 80 percent area of Himachal Pradesh is rainfed, so efforts are needed in improving the irrigation facilities infrastructure. Additionally, the fallow land in low food secure districts can be utilized for the cultivation of cereals and horticultural crops. The improvement in the public distribution system can also increase food availability. Since land degradation is the major problem in Himachal Pradesh, adequate strategies should be adopted to lessen the land degradation so that crop

productivity can be increased. This will result in enhancing food security by increasing farm income.

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