

## Household Food Security and Coping Strategies in Palghar District, Maharashtra

R.G.Jaybhaye, Pune, Pravin Kokane<sup>1</sup>, Mumbai

---

**Abstract:** Notwithstanding the right to food is one of the fundamental human rights; there is striking diversity and disparity in access and availability of food at the household level in India. This situation warrants an in-depth understanding of the scenario at the household level, especially in tribal and remote areas resided by people depending for a livelihood on forest products or subsistence farming in their locale.

The present study picked up Palghar district of Maharashtra to measure household-level food security with the help of data/information collected through fieldwork. Characterized by forested land and tribal population, the district's economy is highly dependent on rainfed subsistence agriculture and forest products. The income level is low and unreliable. For studying food security, the authors conducted a field survey in 2019 to collect data from 808 households distributed in sixteen sampled villages to analyze quantity, severity, frequency, diversity and coping strategies through household food security indicators, namely Daily Calorie Intake (DCI), Household Food Insecurity Access Scale (HFIAS), Coping Strategy Index (CSI) and Food Consumption Score (FCS). The results indicate that a good DCI value reveals high availability of food quantity. However, poor HFIAS, FCS, and CSI values highlight the need to improve access to and diversity of food and coping mechanisms of households to improve the food security of people living there.

*Keywords:* Household Food Security (HFS), Daily Calorie Intake(DCI), Household Food Insecurity Access Scale (HFISA), Coping Strategy Index (CSI), Food Consumption Score (FCS)

---

Date of submission: 14.05.2021

Date of review: 27.06.2021

Date of acceptance: 18.11.2021

---

### Introduction

Adequate food and nutrition are basic needs for human growth and development. Most societies prospered due to successful cultivation and proper food security. Despite advances in technology, we have failed to ensure the fulfilment of the basic human need of all on the planet earth. According to FAO (1996), food security is a condition '*when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.*' Such a condition demands constant efforts that systematically monitor and make provisions for its fulfilment. The ability to conceptualize food security at an adequate depth and breadth as objectives demand is critical to this effort.

Four widely recognized dimensions of food security are *availability, accessibility, adsorption (utilization) and stability* (see FAO 2008; Webb and Rogers 2003). Food availability refers to the physical accessibility of quality food resources, whereas an individual's endowments allowing her to

---

<sup>1</sup> Corresponding author

## 16 Household Food Security and Coping Strategies in Palghar District, Maharashtra

acquire food resources is access to food. Food accessibility stands for both physical and economic access, i.e. affordability factor. Utilization or absorption encompasses nutritional sufficiency and the emphasis put on non-food elements that allow proper food absorption due to hygiene, sanitation, and water supply, among other things. The final component of stability highlights challenges to achieving food security across time for everyone (FAO 1996, 2008). These dimensions make it imperative to use a bag of indicators to assess food security, identifying food-insecure households, individuals and nations rather than relying on a single measure (FIVIMS 2002; Hoddinott 1999; Haddad et al., 1994).

Further, levels of analysis of food security measurement can vary at different spatial scales: global, regional, national, sub-national, local/micro and households. This change from macro to micro levels is testimony to recognizing food security's cultural and geographical specificity (Leroy et al., 2015). This limitation is also reflected in food security indicators, which rely on local specificity, like food varieties consumed, and therefore are not easily comparable across geographies. Further, studies have also moved from quantitative analyses of food security measurement to the study of food security experiences (Maxwell 1996).

Household-level analysis of food security gained prominence in the 1980s with a shift in concern of solely quantity or supply of food available to multidimensionality of the concept, including problems of economic access and nutritional adequacy (Maxwell and Smith 1992). The 'household' is used as the study unit to reflect the collaborative practices enacted at this level. Unlike the rational-individual economic models using a single criterion for decision-making, household-based decisions and strategies emerge from a particular socio-cultural milieu (Wallace 2002; Wheelock and Oughton 1996). While it is a unit of consumption in most cases, one must also be mindful of intra-household disparities in gender, age and other factors (Kabeer, 1994; Niehof, 2011; Sen, 1990).

The household level provides a reliable micro-scale to assess food security dimensions due to the cohesive behaviour of its members. Availability of food and access to it is a pooled phenomenon for household members. Even in crisis times, it is at the household level where coping mechanisms such as food rationing are implemented. As a result, it seems appropriate to do a micro-level analysis at the household level.

### **Research Objectives**

In the light of the above statements, the present study examines food security and coping studies at the household level using multifactorial indices in the Palghar district of Maharashtra state with the following objectives:

1. To measure the quantity of food consumed through DCI and the severity and frequency of problems in accessing food with the help of HFIAS.

2. To assess quality and diversity in food consumption through FCS and coping strategies adopted during food crisis through CSI.

### **Research Questions**

In the light of the above-stated research objectives, the present study attempts to answer the following research questions with the help of data analysis and interpretation:

1. What is the quantity of food consumed (Kcal) by each household?
2. Which are the challenges the households face to access sufficient food regularly? and
3. What are different types of coping strategies adopted by households?

### **Study Area**

Palghar, a newly formed district, is located along the Konkan coast in western Maharashtra. Two-fifths area of the district is under forest cover. The district has a significant share (37.4 per cent) of the tribal population. Four of the eight tehsils in the district have a tribal population of more than nine-tenths of the total. The density of population varies widely across the district. Among the tehsils, Vasai has the highest population density of 2371 persons/km<sup>2</sup>. It is distantly followed by Talasari (532), Palghar (438) and Dahanu (336) in the coastal part. Against this, tehsils to the east, Jawahar (219) and Mokkada (170), part of the Sahyadri range, have the lowest densities. The Vikramgad (252) and central Vada (230) have moderate densities. Such a pattern of population density is explained mainly by topographical and rainfall differentials. The tehsils located in the eastern part have hilly terrain and forested areas. Against this, those in the western part have relatively flat topography and fertile lands.

The district, located on the periphery of the Mumbai Metropolitan area, has benefitted from its spillover effect. Palghat is an urban majority district, with more than half (52.2 per cent) population residing in urban areas (Census of India, 2011). However, only a few tehsils have a high concentration of urban population, especially Vasai, a highly urbanized tehsil.

Palghar has more than two-fifths or 42.0 per cent of land area under agriculture. However, the size of landholdings is tiny. Three-fifths of the farmers fall under the marginal farmers' category, having less than one hectare of farmland. The combined share of marginal landholding made only less than one-seventh or 15.0 per cent of the farmland in the district. Agriculture is highly dependent on monsoonal rains; the irrigated area is only less than 4.0 per cent of the total cropped area. Agriculture is of subsistence type, and land productivity is relatively low.

In tehsils, where the share of the tribal population is relatively high, the prevalence of malnutrition is significantly higher. The tribal people living in the Mokkada and Jawahar tehsils of the district recorded an increased incidence of infant and child death rates in the child population. The infant mortality rate in Mokkada and Jawahar tehsils was 44 and 33, against the district average

## 18 Household Food Security and Coping Strategies in Palghar District, Maharashtra

of 21. Child population death rates were 64 and 45 against the district average of 30 per thousand (see Ghosh and Varerkar (2019). The prevalence of poverty, illiteracy and seasonal migration among the tribals and the failure of welfare policies of the state government is considered the major factors contributing to food insecurity among the tribals of the district. The food security mapping for the district shows that insecurity in terms of availability, access, and adsorption (utilization) increases from coastal areas to hilly, forest tribal areas of Palghar (Kokane and Jaybhaye 2019).

### Data Source and Methodology

A structured questionnaire was prepared and pre-tested to collect information from 808 households distributed in sixteen sampled villages; selected two from each of the eight tehsils in the district. The authors used the purposive sampling technique to determine the number of households giving due consideration to the population size of the villages. While selecting households, efforts were made to provide a fair representation of urban and rural areas and tribal and non-tribal populations living in the district. The questionnaire was organized into six sections to calculate the following indices on Household Food Security (HFS).

**Daily Calorie Intake(DCI)** calculates the amount of food consumed in Kilocalories (Kcal). It set the threshold for classifying households as food secure or food insecure, covering many food sources, including own-production, markets and PDS purchases. As a comprehensive measure of food intake, the respondents from the selected villages were asked questions about different food items consumed from the morning meal to the night's dinner. The responses were compiled to generate a list of food items consumed daily in the household, converted into kilocalories based on a chart of calorie content per unit of food as per the 26<sup>th</sup> round of NSS, Government of India. The food, which the individual members of the households consumed, was converted into per adult equivalent kilocalories consumption.

Hence, the total food a household consumes is calculated as follows,

$$A_i = B_i + k_i$$

Where,

$A_i$  = Total consumption of food in the household;  $B_i$  = purchased food consumption;  $k_i$  = consumption of food either from own production or PDS

The total food consumed per adult equivalent in Kilocalories is calculated by taking the ratio of the total consumption of food to the number of members in the  $i^{\text{th}}$  household in terms of adult equivalent.

Where,

$$X_i = \frac{a_i}{H_i}$$



$X_i$  = Total food consumed per adult equivalent in Kcal

$a_i$  = Total consumption of food by household

$H_i$  = No. of members in the  $i^{\text{th}}$  household in terms of adult equivalent

Lastly, 2100 kilocalories per day per adult equivalent by household is considered a threshold to divide household into food security. This threshold is determined based on the recommendation given by ICMR and FAO. Based on kilocalories consumption per day adult equivalent, households were classified into three categories: (i) Food secure (>2100 Kcal), (ii) Mildly food insecure (2100-1800 Kcal) and (iii) Severely food insecure (<1800 Kcal).

**Household Food Insecurity Access Scale (HFIAS)** calculates the severity and frequency of food shortages in selected households over 30 days. It uses a set of nine questions to determine food secure or food insecure households. The HFIAS questions were designed to elicit knowledge about food security, food shortages, food quantity, and diet efficiency. There are four indicators of HFIAS, namely "Household Food Insecurity Access related Conditions", "Household Food Insecurity Access related Domains", "Household Food Insecurity Access Scale Score", and "Household Food Insecurity Access Prevalence". The present study takes into account "Household Food Insecurity Access Scale Score" for the calculation of the mean scores of households and "Household Food Insecurity Access Prevalence" for categorization of a household into three levels of food access based on the prevalence of accessibility scores based on questions (Goshu, 2016). Primarily HFIAS deals with households' access to food and the degree of anxiety involved in access to food.

HFIAS Score = Sum of the frequency of occurrence during the last thirty days for the 9-food insecurity related conditions

$$\text{HFIAS Score} = \frac{\text{sum of HFIAS score of households}}{\text{number of households (808)}}$$

Based on the HFIAS score, households were classified into three categories viz. food secure (0-2), mildly food insecure (3-10) and severely food insecure (>10).

**Coping Strategy Index (CSI)** measures behavioural responses or coping strategies during a food crisis in the household during the last thirty days. These are easily observable and provide simple, cost-effective, and relatively rapid alternatives to collecting data on households' food consumption (CARE-WFP,2013). All such behavioural responses are termed coping strategies. The CSI is used to assess food security conditions in crisis, target households, serve as an early warning indicator, and measure the impact of interventions and long-term changes in food security. In this method, a set of 13 questions asked from the respondents are generally categorized: (i) dietary change, (ii) increase in short term availability, (iii) decrease in the number of people in the household, and (iv) rationing strategies. In preparation for CSI, the present study considers 11 of 13 questions.

## 20 Household Food Security and Coping Strategies in Palghar District, Maharashtra

In the sampled villages of Palghar district, the respondents were asked questions on coping strategies or mechanisms adopted during the recall period of 30 days. Range values of severity or frequency are from "0" (Never), "1" (<one time /week)," 2" (1-2 times/week), 3" (3-6 times /week), and "4" (always every day). CSI has been calculated by multiplying severity/frequencies with the weights of questions. Finally, households were categorized based on CSI score into food secure (0-2), mildly food insecure (3-12) and severely food insecure (>13).

*The Food Consumption Score (FCS) developed by World Food Programme* calculates food intake in diversity, quantity, and adequacy. It calculates FCS based on household consumption categorization in eight food groups: Cereals (2), Pulses (3), Vegetables (1), Fruits (1), Meat or Fish or Egg (4), Milk (4), Sugar (0.5), and Oil (0.5) during the last seven days. FCS is calculated by taking the multiplication of frequency into weights of food groups, and the final summation gives FCS. The score of FCS ranges from "0" to "112", where "0" shows the household didn't consume any food during the last seven days, and the score of "112" indicates the household had consumed each food group during the previous seven days.

Finally, the score of each food group is multiplied by the respective weights, and the results are summed up to get FCS. There is no universal cut-off range for food consumption scores. This study classifies households as per FCS score given by Leroy et al. (2015) into severely food insecure (0- 21), mildly food insecure (21- 35), and food secure (> 35).

### Results and Discussion

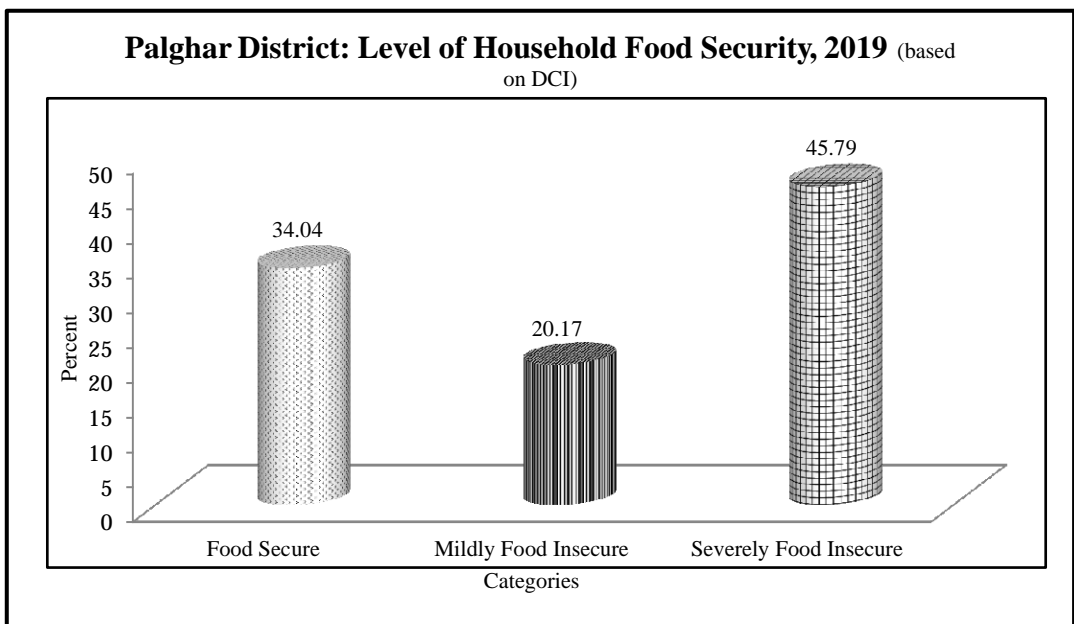
Household Food Security (HFS), a multifactor concept not solely dependent on calorie intake, is difficult to analyze (Rajput and Arora, 2020). HFS is often ignored for its interlinkages with numerous socio-economic, political, demographic, and environmental factors. The nutritional status of the household is dependent on the levels of dietary intake and the prevalence of morbidity among individuals in the house. Food availability, access, and utilization are used to assess HFS. Interdependence and symbiotic relationships are seen across these dimensions; food availability is crucial for food security, but it is not enough to ensure food accessibility. Access to food is also needed but not enough to provide food utilization (Barret,2010).

A variety of factors, including food production at the spatial scales of the household, region and globe, and food system infrastructure (transport and storage), are involved in the households' food availability. Against this, food access is determined by household income and assets, food and non-food prices, social security, women's agency, and food system infrastructure like marketing and exchange. Food utilization at the household level is a function of ownership of cooking or food storage facilities, cultural food practices and household food preferences, knowledge of nutritional requirements, household nutritional needs and availability of time for food preparation (Harris-Fry et al., 2015). The studies suggest that a single indicator cannot capture all dimensions of household food security (FIVIMS,2002; Hoddinott,1999). Hence, a combination of household food security

indicators is required to represent the complex reality of household food insecurity fully. The present study considers popular and commonly used indicators of household food security like Household Food Insecurity Access Scale (HFIAS), Direct Calorie Intake (DCI), Food Consumption Scores (FCS), and Coping Strategy Index (CSI) in selected villages of Palghar district.

### Household Food Security based on DCI

Direct Calorie Intake (DCI) collects information on the quantity of food consumed by the household. This information is converted into kilocalories with the help of appropriate food conversion factors to understand the energy requirements of families and individuals. One must take care of the specific prerequisites like converting consumed food into adult equivalent, appropriate use of calorie conversion tables, and conversion of prepared food at home in kilocalories in DCI calculation. Finally, the derived output is compared with a given norm or reference point to understand the shortfall in food energy deficiency.



Source: Field Survey, 2019

**Fig. 1**

The present study uses a daily calorie intake of ICMR and FAO of 2100 kilocalories per day per adult equivalent by household to divide households into food secure or insecure. In addition, households with consumption between 2100 kcal to 1800 kcal daily per adult equivalent and below 1800 kcal daily per adult equivalent are classified as mildly food insecure and severely food

## 22 Household Food Security and Coping Strategies in Palghar District, Maharashtra

insecure. For the result of the DCI of sampled villages in Palghar district, see Fig. 1. Data analysis shows that one-third (or 34.0 per cent) of the studied households are food secure, one-fifth (20.2 per cent) mildly food insecure, and more than two-fifths (45.8 per cent) severely insecure. The share of households consuming below the threshold range of 2100 kcal is 66.0 per cent, which is relatively high.

The headcount ratio method has been used to calculate the number of households falling below the threshold line of 2100 kcal. The headcount ratio for sampled villages of Palghar district shows that 66.0 per cent of households fall below 2100 kcal daily per adult equivalent, whereas 45.0 per cent of households fall below 1800 kcal daily per adult equivalent. The gap index is calculated by considering the average food insecurity gap with zero gaps for food-secure households. The gap index below 2100 and 1800 kcal daily per adult equivalent are 0.11 and 0.21, respectively (Table 1).

Summary statistics of kilocalorie consumption give 1905 kcal daily per adult, equivalent to the mean for selected households. 3118 kcal and 1440 kcal are maximum and minimum daily per adult equivalent, respectively, with standard deviation (N=377), indicating a high degree of differentials among households (Table 2). One can conclude that performance in terms of DCI is poor, requiring the priority attention of the government to cover them under the safety net programs of food security.

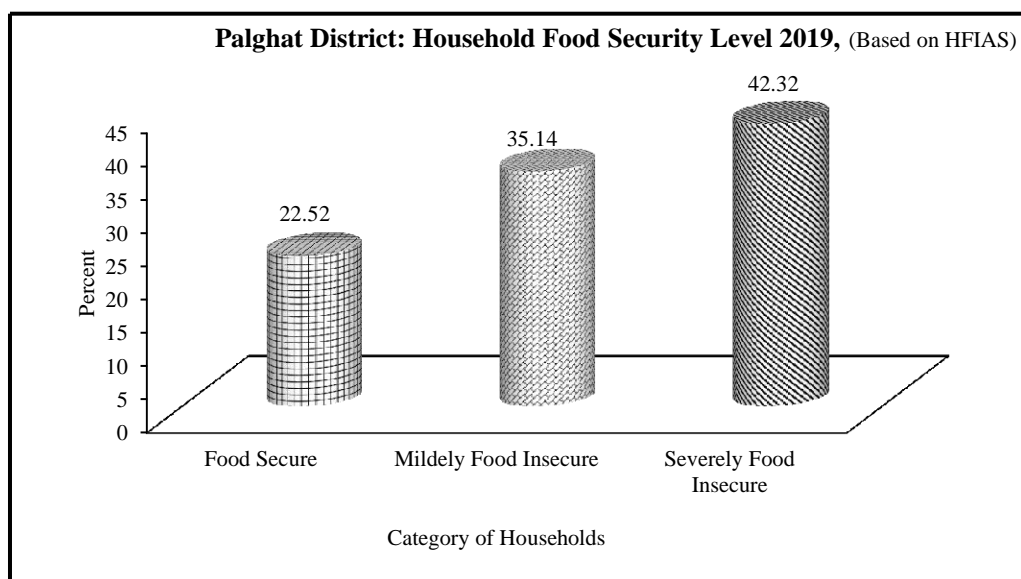
<b>Table 1: Palghar district: Indices calculated based on kilocalorie consumption, 2019</b>				
<b>Indices</b>	<b>Below 2100</b>	<b>Below 1770</b>		
Head-Count Ratio	0.66	0.458		
Gap Index	0.11	0.21		
<b>Table 2: Palghar district: Kilocalorie Consumption-Summary Statistics</b>				
<b>Name of parameter</b>	<b>Kilocalorie Consumption value</b>	<b>HFIAS</b>	<b>CSI</b>	<b>FCS</b>
<b>Mean</b>	1905	10.18	13.83	27.12
<b>Minimum</b>	1440	0	1	17
<b>Maximum</b>	3118	25	41	51
<b>Standard Deviation</b>	377	8.19	12.23	8.41
Source: Field Survey, 2019				

### Household Food Security based on HFIAS

Household Food Insecurity Access Scale (HFIAS) summarises a set of predictable reactions related to food insecurity experiences and its quantified set of measurements related to food access carried through household surveys. The present study used two indicators of HFIAS, the Household Food Insecurity Access Score for calculations of mean scores and the Household Food Insecurity Access Prevalence for categorizing households into three different levels based on scores.

For the performance of HFIAS to understand household food insecurity status see Table 2. The value of the performance level score of HFIAS ranges from 0 (for the household reporting 'no' to all HFIAS questions) to 27 (for households reporting 'often' for all occurrences of HFIAS questions). Higher the value of the performance score of the HFIAS higher, the food insecurity in terms of accessibility experienced by a household, and vice-versa. The average score for the sampled villages of Palghar district is 10.18.

The minimum score for HFIAS for the study area is '0', and the maximum score for respective households is '25'. As far as the standard deviation of HFIAS summary statistics is concerned, it is 8.19, which shows a high level of disparity in HFIAS scores among households. There is no clear boundary of cut-off points for the classification of households based on the HFIAS score.



Source: *Field survey, 2019*

**Fig. 2**

Household Food Insecurity Prevalence is used to classify households into three categories: response, behaviour, and experience related to food access (Coates et al., 2007; Goshu, 2016). For the final output of HFIAS as per methodological procedure, see Figure 2. The result shows that 22.5 per cent of households are food secure, 35.1 per cent are mildly food insecure, and 42.3 per cent are severely food insecure. More than three-fourths (77.0 per cent) of selected villages are, thus, food insecure in terms of food accessibility, indicating a grim situation of food accessibility at the household level.

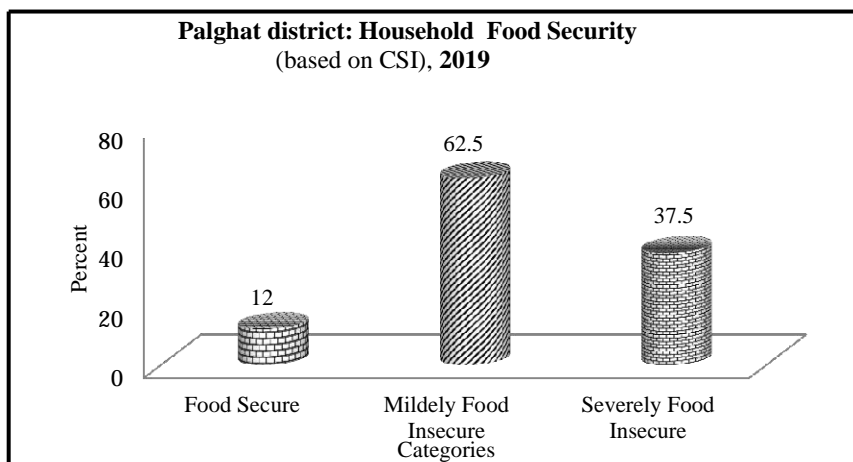
### Household Food Security based on CSI

Coping Strategy Index (CSI) assesses food security conditions in crisis by measuring the behavioural responses to the shortage. These are specific to target households and serve as an early warning of food insecurity and measure the impact of interventions and long-term changes in food security.

This study has considered the classification method devised by Maxwell et al. (2014) and used by Goshu (2015) to classify households in Ethiopia. As per Maxwell et al. (2014), households with a score of 0-2 are treated as food secure, 3-12 considered mildly food insecure, and above 13 as severely food insecure.

As per this classification, 12.0 per cent of households from selected villages of Palghar district are food secure, 62.5 per cent of households are mildly food insecure, whereas 37.5 per cent of households are severely food insecure. It means that 88 per cent of households are food insecure when it comes to adopting appropriate coping strategies during a food crisis (Fig. 3)

For summary statistics based on the score of CSI, see Table 2. CSI's mean score is 13.83, with a high level of household variation ( $SD=12.23$ ), whereas the maximum and minimum for the study area are 1 and 41, respectively. The performance of CSI in selected villages of Palghar district indicates poor strategies to cope with the food crisis. There is immediate priority support needed to provide to households through food safety net programs to cope with the food crisis.

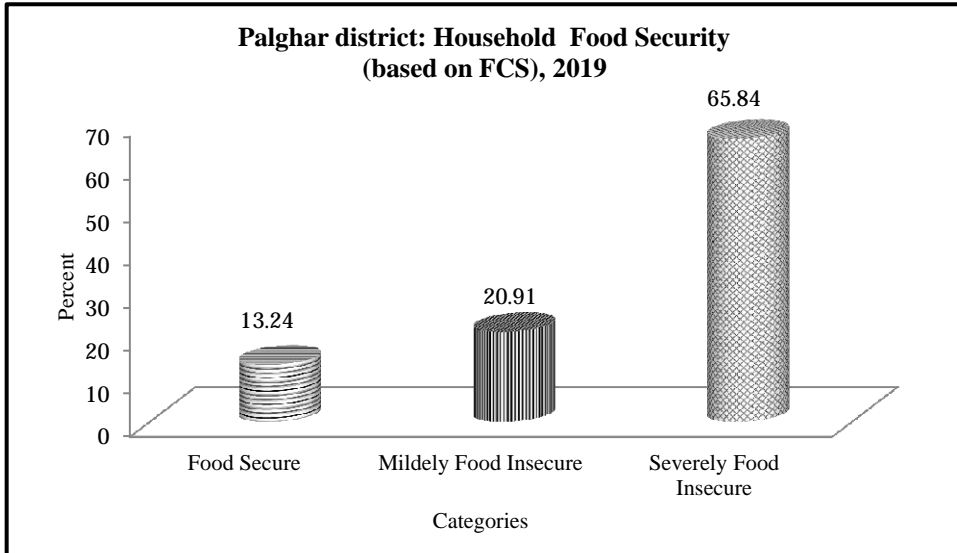


Source: Field Survey, 2019

Fig. 3

### Household Food Security based on FCS

Food Consumption Score (FCS) is a widely used frequency-weighted dietary diversity score based on a household consumption categorization in eight food groups.



Source: Field Survey, 2019

**Fig. 4**

As per the performance of FCS, 13.2 per cent of households are food secure, with FCS being more than 42, 20.9 per cent of households are mildly food insecure, FCS ranging between 28 and 42, and 65.8 per cent of households are severely food insecure, FCS being less than 28 (See Fig.4).

The mean FCS of selected villages in Palghar district is 27.12, and minimum and maximum scores are 17 and 51, respectively. A high level of intra-household variation is seen through a standard deviation value of 8.41 (see Table 2).

The mean of all food groups consumed by households during the last seven days is collected during a field survey and represented in Table 3. Consumption of food from each group shows the level of food diversity in different tehsils of Palghar district. Data analysis shows that rice is the most consumed and staple food in the study area, followed by pulses and vegetables. Wheat consumption is more towards semi-urban areas in selected villages of tehsils like Talasari, Dahanu, Palghar, and Vasai. Low consumption of fruits, chicken, fish or meat and dairy products is seen in all sampled households except selected households in Palghar and Vasai tehsil. The sugar and oil consumption level of households during the last seven days is above the threshold. The mean of all food groups consumed during the previous seven days indicates households' inclination towards rice and pulses. To improve household food security, it is necessary to increase the consumption of vegetables, fruits, chicken/meat/fish, and dairy products to enhance food consumption quantity, quality, and diversity. This will tackle deep-rooted food insecurity conditions among tribal households.

## 26 Household Food Security and Coping Strategies in Palghar District, Maharashtra

**Table 3: Mean of food baskets consumed during the past seven days**

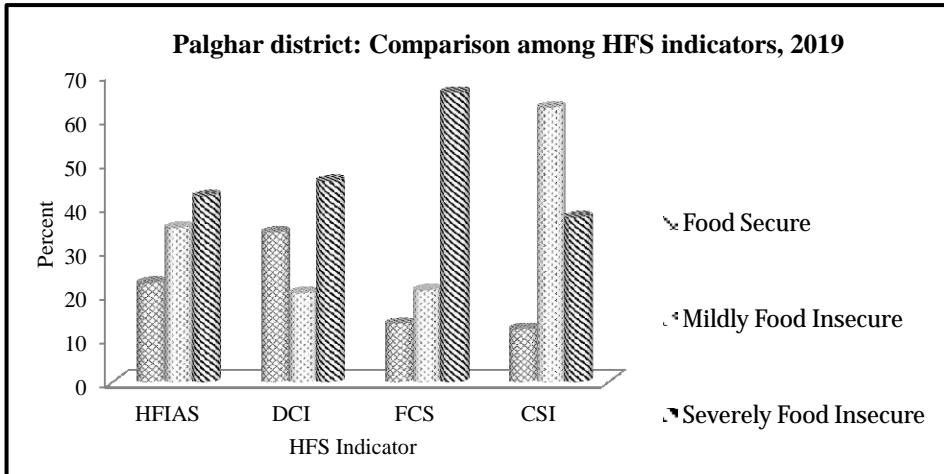
Name of sampled village	Rice	Wheat	Pulses	Vegetables	Fruits	Chicken /meat	Dairy Products	Sugar	Oil
Kainad and Waki (Dahanu)	7	3	5	4	0.5	0.5	1	5	4
Kasatwadi and Jaradwadi (Jawhar)	7	4	4.5	4	0.5	1	1	5	4
Nilmati and Poshera (Mokhada)	7	3.5	4.5	3	0	0.5	0.5	5	3
Durves and Bot (Palghar)	7	1	5	3	0	0.5	0.5	5	3
Sutrakhar and Savroli (Talasari)	7	1	4.5	3	0	0.5	0.5	5	3
Khardi and Dolivpada (Vasai)	7	1	5	3	0	0.5	0.5	5	4
Uparale and Bhopoli (Vikramgad)	6.5	4	6	5	0.5	2	3	6	5
Amgaon and Khutal (Wada)	6.	5	6	5	1	2	3	6	5

Source: Fieldwork, 2019

The relative differences in the food security/insecurity captured by the indicators highlight the spread of various dimensions of food security in households in the Palghar district (Fig. 5). FCS indicators report a high level of severely food insecure households, whereas DCI reports the prevalence of high food-secure households in the study area. While the DCI method focuses solely on the quantity of food consumed, FCS also includes the qualitative dimension. This difference means that households consuming more of a limited variety of food can be regarded as secure under DCI. It can provide them with caloric requirements without meeting the need for diversity. The quantity of food consumption through DCI methods indicates a high level of food availability in urban, semi-urban and rural and tribal parts of the study area.

Regarding dietary diversity through FCS among households in the study area, it highlights a high diversity in food baskets in urban and semi-urban parts than in rural and tribal areas. A high level of non-agricultural income and consequent spending on food among urban and semi-urban households are associated with a more diverse food basket. Yet, the literature highlights that this relationship is not always present, and hence researchers need to be careful before benchmarking one another (Lovon and Mathiassen 2014).





Source: *Field Survey, 2019*

**Fig. 5**

This study also points to a high level of 'mildly food-insecure households' reported by CSI. Ordinarily, HFIAS is expected to show higher levels of food insecurity, followed by CSI and FCS. This is because HFIAS captures nuanced psychological experiential facets that indicators like FCS do not. However, as a measure of strategies during extreme instances of the food security crisis, CSI is expected to capture a lower incidence of food insecurity (Maxwell, Vaitla, and Coates, 2014). However, food-insecure households (severe and mild together) are highest under CSI measures, followed by FCS measures and finally, the HFIAS index. A justification for this can be perhaps derived from analyzing the questions administered to gather data for each indicator. HFIAS questions are framed from a perspective of worry or anxiety about an impending resource shortfall or a decline compared to an assumed average rate.

On the other hand, CSI questions are on the understanding that such shortfall is relatively prevalent and hence enquires the strategies in the face of the crisis. Thus there is a progression from anxiety to active strategy on an actual course of actions. Therefore, if the households studied are already under severe stress of food insecurity and actively practising coping strategies, these become habitual and no longer an active component of worry. There is evidence for this in literature, where food intake is low, and self-reported scores can have a downward bias (Maitra 2017).

## Conclusion

For its connection with various unstable and dynamic human factors, food security at the household level is a challenging task. A relatively good DCI value for the study area shows the high availability of the quantity of food. However, poor HFIAS, FCS, and CSI values indicate a need to improve access and diversity to food and coping mechanisms of the household to serve their food security

## 28 Household Food Security and Coping Strategies in Palghar District, Maharashtra

prospects better. It also emphasizes that food availability is not a concern. Still, sufficient quantity, quality, and diverse access to food is a significant issue in the Palghar district since households fulfil their caloric needs but fail to meet the demand for food diversity, low income, and subsequent limited choices.

Furthermore, households examined are already under significant stress from food insecurity, and they are actively exercising coping strategies. Such routine activities do not add substantial worries to their food access. However, the lack of coping strategies in households exacerbates the problem, especially among tribal people.

*Acknowledgement:* The authors express their sincere gratitude to Professor Swati Rajput and Ms Chaithra Naveda for their invaluable help in preparing the paper and to the journal's anonymous referee for valuable comments and suggestions helping to improve the manuscript submitted for publication.

### References

- Barrett, C.B. (2010). Measuring food insecurity. *Science*, 327 (5967), 825–828.
- CARE/WFP.( 2003). *The Coping Strategies Index: Field Methods Manual*. Nairobi: CARE and WFP.
- Census of India (2011). *District Census Handbook, Thane District- Part B Tables*, Census Commissioner and Registrar General, India, New Delhi.
- Coates, J., Swindale, A. and Bilinsky, P., ( 2007). Household Food Insecurity Access Scale (HFIAS) for measurement of household food access: Indicator guide (v. 3). *Food and Nutrition Technical Assistance Project*, Academy for Educational Development, Washington, D.C.
- FAO, Food and Agriculture Organisation. (1996). *Rome Declaration on World Food Security and World Food Summit Plan of Action*, World Food Summit 13-17 November 1996, Rome, Italy. FAO.
- FAO (2008). *Report on the use of Household Food Insecurity Access Scale and Household Dietary Diversity Score in two survey rounds in Manica and Sofala Provinces, Mozambique, 2006-2007*. FAO Food Security Project GCP/MOZ/079/BEL. 2<sup>nd</sup> version, Rome, 2008.
- FIVIMS.( 2002). *Measurement and Assessment of Food Deprivation and Under-Nutrition*. FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy.
- Ghosh, Soumitra, and Sarika A. Varerkar. (2019). Undernutrition among tribal children in Palghar district, Maharashtra, India. *PloS One* 14(2):e0212560.
- Goshu, M.T. (2015). The Link between rural household food security and child nutrition: Evidence from Gubalafto district of North Wollo Zone, Ethiopia, *European Academic Journal*, 3(9).
- Goshu, M.T. (2016). *Determinants of Rural Food Security and Child Nutrition-The Case Study of Gubalafto District of Amhara Regional State, Ethiopia*, Unpublished PhD thesis, Aligarh Muslim University, Aligarh, India.
- Haddad, Lawrence, Eileen Kennedy, and Joan Sullivan. (1994). Choice of Indicators for Food Security and Nutrition Monitoring. *Food Policy* 19(3):329–43. DOI: 10.1016/0306-9192(94)90079-5.

- Harris-Fry, H., Azad, K., Kuddus, A., Shaha, S., Nahar, B., Hossen, M., and Fottrell, E., (2015). Socio-economic determinants of household food security and women's dietary diversity in rural Bangladesh: A cross-sectional study. *Journal of Health, Population and Nutrition*. <https://doi.org/10.1186/s41043-015-0022-0>.
- Hoddinott, J., (1999). *Choosing Outcome Indicators of Household Food Security*. International Food Policy Research Institute, Washington, DC.
- Kabeer, Naila. (1994). *Reversed Realities: Gender Hierarchies in Development Thought*. Verso, London.
- Kokane, Pravin, and R.G. Jaybhaye (2019). Mapping food security at district level : A case study of Palghar district of Maharashtra. *Indian Journal of Spatial Science* 10(2):31–41.
- Leroy, Jef L., Marie Ruel, Edward A. Frongillo, Jody Harris and Terri J. Ballard. (2015). Measuring the food access dimension of food security: A critical review and mapping of indicators. *Food and Nutrition Bulletin* 36(2):167–195. DOI: 10.1177/0379572115587274.
- Lovon, Margarita and Astrid Mathiassen. (2014). Are the world food programme's food consumption groups a good proxy for energy deficiency? *Food Security* 6(4):461–470. DOI: 10.1007/s12571-014-0367-z.
- Maitra, Chandana. (2017). Adapting an experiential scale to measure food insecurity in urban slum households of India. *Global Food Security* 15:53–64. DOI: 10.1016/j.gfs.2017.04.005.
- Maxwell, Daniel, Babu Vaitla and Jennifer Coates. (2014). How do indicators of household food insecurity measure up? An empirical comparison from Ethiopia. *Food Policy*, 47:107–116. DOI: 10.1016/j.foodpol.2014.04.003.
- Maxwell, Simon. (1996). Food security: A post-modern perspective. *Food Policy* 21(2):155–170. DOI: 10.1016/0306-9192(95)00074-7.
- Maxwell, Simon and Marisol Smith. (1992). *Household Food Security: A Conceptual Review: Part-I*. UNICEF, New York, pp. 1–72.
- Niehof, Anke. (2011). Conceptualizing the household as an object of study. *International Journal of Consumer Studies* 35(5):488–497. DOI: <https://doi.org/10.1111/j.1470-6431.2011.01026.x>.
- Rajput, Swati and Arora, Kavita .(2020). Measuring and mapping the state of food insecurity in Rajasthan, India. *Geography, Environment, Sustainability*, 14 (1):30-39.
- Sen, Amartya. (1990). *Gender and co-operative conflicts*. In Tinker, I. (ed.) *Persistent Inequalities: Women and World Development*. Oxford University Press, New York.
- Wallace, Claire. (2002). Household strategies: Their conceptual relevance and analytical scope in social research. *Sociology*, 36(2):275–292. DOI: 10.1177/0038038502036002003.
- Webb, Patrick and Beatrice Rogers. (2003). *Addressing the 'In' in Food Insecurity*, Occasional Paper I, United States Agency for International Development (USAID), Washington, DC.
- Wheelock, Jane and Elizabeth Oughton. (1996). The household as a focus for research. *Journal of Economic Issues* 30(1):143–159. DOI: 10.1080/00213624.1996.11505770.

\*\*\*\*\*