

## Food Insecurity and Coping Mechanisms during Covid-19 in India

Nidhi Kaicker and Aashi Gupta

### Abstract

The socioeconomic impacts of the Covid-19 pandemic, particularly in terms of income losses at the household level, are exacerbating and intensifying the already fragile food security conditions. The present study provides empirical evidence on food security and the coping strategies of households belonging to varied socio-economic and demographic characteristics during the Covid-19 pandemic in India. The analysis is based on a nationally representative consumer pyramids household survey (CPHS) conducted by Centre for Monitoring Indian Economy (CMIE). The authors use 8 waves (16th wave for the period January – April 2019 to 23rd wave for the period May 2021 – August 2021) of data. Pooling the cross-sectional data they draw conclusions on food insecurity and coping capacity of households over time, especially before and during the Covid-19 pandemic in India.

### Author Profiles

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### Introduction

The socioeconomic impacts of the Covid-19 pandemic, particularly in terms of income losses at the household level, are exacerbating and intensifying the already fragile food security conditions. The global food commodity prices were at a ten year high in early 2022 due to the economic effects of Covid-19 pandemic - rising energy prices leading to increased transport, freight, and fertilizer costs; bottlenecks in global supply chains and production disruptions arising out of restrictions put in place to counter rising infection; adverse weather conditions; conflict and insecurity contributing to production shortfalls and restricting trade; and currency depreciation in many import dependent countries. The war in Ukraine further deepened this crisis (FSIN and Global Network against Food Crises, 2022).

Food security has been defined as a state ‘when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’ (FAO, 2009). From this broadly accepted definition, food security can be seen as economic access to food (which is a function of income generation and food prices), availability (which is a function of robust food supply systems), and utilisation (which is a function of food composition and nutrient content). The fourth cross-cutting dimension is the stability of the food systems over time to withstand unfavourable conditions that place households, individuals or communities at risk of becoming food insecure. The Covid-19 pandemic, began as a health emergency, but soon translated into a full blown economic and humanitarian crisis. The pandemic has affected all four pillars of food security, but most directly and severely impacted access to food, even though impacts are also felt through disruptions to availability; shifts in consumer demand toward cheaper, less nutritious foods; and food price instability (Devereux et. al., 2020; Laborde et. al., 2020). Several studies that look at the impact on the pandemic in specific countries (Hirvonen et. al., 2021 in case of Addis Ababa; Ibukun and Adebayo, 2021 in case of Nigeria; Kansiime et. al., 2021 in case of Kenya and Uganda; Nechifor et. al., 2021 in case of Sub Saharan Africa; Arndt et. al., 2020 in case of South Africa, Kaicker et. al., 2022a,b in case of India; Deaton and Deaton, 2020 in case of Canada, among others) suggest deterioration of food security, particularly among the vulnerable and the marginalised.

When faced with shocks that threaten food security, households use a variety of coping strategies. Thus, food security is a managed process whereby households are not passive agents, but respond to the shocks to reduce their vulnerability (Sassi, 2021). Resilience refers to the ability of a household to bounce back after exposure to a shock or a stressor (such as natural calamities, income and employment shocks) (Bene, 2013). This ability is a combination of *ex-ante* actions to mitigate a shock or a stressor, and also *ex-post* actions to cope up with a shock. Given this definition, resilience can be categorized into absorptive capacity to bounce back after a shock; adaptive capacity to adapt to a deteriorating environment; and transformative capacity of an

enabling institutional environment (Bene, 2013). The coping strategies could relate to short term measures involving food acquiring or dietary modification activities, or long term measures involving income, expenditures and assets.

The present study provides empirical evidence on food security and the coping strategies of households belonging to varied socio-economic and demographic characteristics during the Covid-19 pandemic in India. The Indian government announced a complete lockdown of the country in the last week of March 2020 in response to rising numbers of Covid-19 cases and deaths. The lockdown continued for several weeks, and was followed by partial and gradual opening. The pandemic containment measures resulted in economics stressors such as income losses, job losses and uncertainty regarding future livelihoods. India witnessed the peak of the first wave in October 2020, and a more deadly second wave in April-May 2021. In the present study, the time period covered is January 2019 to August 2021, which helps us to look at changes in food security and coping mechanisms prior to and during the Covid-19 pandemic in India.

Our analysis is based on a nationally representative consumer pyramids household survey (CPHS) conducted by Centre for Monitoring Indian Economy (CMIE). Consumer Pyramids Household Survey (CPHS) is a continuous survey administered on a panel of sample households by Centre for Monitoring Indian Economy (CMIE). It delivers fast-frequency data on consumption expenditure of households, collected thrice every year. CMIE adopts a multi-stage stratified sampling approach. Within states, districts with similar agro-climatic conditions, urbanisation levels, and female literacy rates are clubbed together to form homogenous regions (HR) which are further divided into rural and urban strata consisting of all Census 2011 villages and towns, respectively. The urban strata are further sub-divided into four sub-strata – very large, large, medium and small – based on the population of towns. From the rural stratum, villages are chosen via simple random sampling, whereas from the urban stratum, one town is randomly sampled from each of the four sub-strata. In each sample town, census enumeration blocks (CEB) are randomly sampled. We use 8 waves (16th wave for the period January – April 2019 to 23rd wave for the period May 2021 – August 2021) of data. Pooling the cross-sectional data from these 8 waves helps us understand food insecurity and coping capacity of households over time, especially before and during the Covid-19 pandemic in India. Estimation at the household level is preferred, as there is greater variation in expenditure levels than is found in less disaggregated data (say, at the district level).

Following WFP (2015), we capture the availability, access and utilization dimensions of food security by measuring the current status of household food consumption. The ability of households to stabilize consumption over time, or the coping capacity is measured through economic vulnerability and livelihood coping strategies.

The rest of the paper is organised as follows. Section 2 presents evidence on the status of food consumption and economic vulnerability of households. Section 3 examines the importance of various household socio-economic and demographic characteristics in explaining variations in two important indicators of food insecurity during the Covid-19 pandemic in India. Section 4 discusses the coping strategies adopted by households in response to the economic stressors posed by the pandemic. Section 5 concludes with a summary and policy recommendations.

## Status of Food Consumption and Economic Vulnerability of Households

Current household food consumption is an important indicator of food security, and should capture household's dietary diversity, food frequency and relative nutritional importance of different food groups. A commonly used measure of current household food consumption is the food consumption score (FCS) calculated by inspecting how often households consume food items from the different food groups during a specific reference period. Since CMIE-CPHS reports expenditures on food, broken down by major food groups on a monthly basis, we use in this study an Index of Dietary Diversification (IDD) as a proxy of household's food access. This reflects the adequacy of funds to afford nutritious food for the family. The last few decades have witnessed dietary transition – shifts away from staples and increasingly towards livestock and dairy products, fruits and vegetables, and fats and oils - in economies across the world. This dietary transition is primarily driven by growing affluence, urbanisation and lifestyle changes, as well as rapid growth of supermarkets offering greater consumer choice (Gaiha et. al., 2014; 2015; Kaicker et. al., 2018; Timmer, 2009). Often diet diversity is assumed to be synonymous with diet quality. Increasing the variety of foods across and within groups ensures adequate intake of essential nutrients that promote good health. However, dietary changes in the past two decades have had both positive and negative impacts on nutrition. Diets increasingly contain more energy-dense, semi-processed foods, saturated fats and sugars and such shifts/changes are associated with an increase in overnutrition and obesity. Dietary transition has been an on-going phenomenon not just in urban but also in rural areas, and across socio-economic groups. Whether the pandemic induced supply shocks and contraction in demand had a prolonged impact on diet composition needs, even after the restrictions were lifted need investigation.

IDD is an alternate measure of dietary diversity that captures not just the number of different items in the food consumption basket, as used in existing studies, but also the relative importance of different items or groups in total food expenditure. It is calculated as the sum of squares of expenditure shares of various food groups in a households' food consumption basket in a given period of time<sup>1</sup>. In particular, given the 0–1 range for this index, a high value implies a more concentrated diet, and a low value implies a more diversified diet. Thus, higher the IDD, the lower is the food diversity. This is akin to the Simpsons Index (Simpson, 1949), an index used in the ecological literature to measure species diversity or biodiversity and in some cases crop diversity. We use 8 food groups to construct the Food Diversity Index (FDI), namely, (i) staples (cereals and pulses), (ii) vegetables, (iii) fruits, (iv) milk and milk products, (v) oil, (vi) eggs, meat and fish, (vii) sugar and (viii) other food items.

WFP (2015) recommends using Economic Capacity to Meet Essential Needs (ECMEN), defined as proportion by which households expenditure exceed or fall short of the minimum expenditure basket, as an indicator of economic vulnerability. However, given the non-availability of data on minimum expenditure baskets in most countries, the alternate indicator is the food expenditure shares (FES) in total expenditure of a household. In the study of household consumption and expenditures, Engel's Law has attracted considerable attention in academic literature. This Law states the following: "the poorer is a family, the greater is the proportion of the total outgo which must be used for food. The proportion of the outgo used for food, other things being equal, is the

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<sup>1</sup> Algebraically,  $IDD_{it} = \sum_{j=1}^n S_{ijt}^2$ , where  $IDD_{it}$  is the index of dietary diversification for household  $i$  at time period  $t$ ,  $S_{ijt}$  is the share of  $j$ th commodity in total food expenditure.

best measure of the material standard of living of a population” (Engel, 1895). Thus, the greater the importance of food within a household’s overall budget, the more economically vulnerable is the household. We report on the shifts in food Engel curves during the Covid-19 pandemic in India, and variations in the same across households with different socio-economic demographic and location characteristics. The extent to which households allocate their income between food and non-food items is captured by FES<sup>2</sup>. A shift in expenditure composition – away from discretionary spending towards necessities – is a widely used coping strategy among households. The higher the FES, the higher is the vulnerability.

Figures 1 and 2 shows the Index of Dietary Diversification (IDD), and Food Expenditure Shares (FES), respectively, for rural and urban areas for the period January 2019 to August 2021.

Urban areas show greater dietary diversity, and lower food expenditure shares compared to rural areas throughout the period. We see a steep increase in IDD, and in FES at the onset of the pandemic in India, and a sharp reversal once the lockdown restrictions were lifted. The reduced dietary diversity during the first nationwide lockdown (of about 10% in rural areas and 7% in urban areas, in April 2020 over the previous month) may be explained by supply restrictions, forcing households to consume only what is readily available. The share of food in total expenditure for rural India declined by 17% and in urban India by 20% in April 2020 over the previous month. The movement restrictions at the onset of the pandemic acted more like a temporary shock than a permanent one, which resulted in declining shares of food in total expenditure and dietary diversity scores, but stabilizing at a level higher than that observed pre-pandemic. It is interesting to note that during the peaks of first Covid-19 wave (and the second wave too, especially in urban areas), a greater dietary diversity is observed. A reason behind the greater diet diversity in this period could be the rising awareness among the households to take care of their health amid the on-going health crisis, as well as the fact that the economy and food supply chains had been restored to function even in the situation of pandemic in the country. A slight increase in these indicators was observed during the more deadly second wave, where some states used closures and containments as measures to control the spread of the coronavirus, but no nationwide restrictions were imposed.

The extent of shifts in demand for food and diet composition due to the pandemic induced nationwide lockdowns, and their reversal to pre-pandemic levels varied across households with different socio-economic, demographic and locational characteristics. This heterogeneity in the impact of the pandemic on food security outcomes is discussed in detail in the next section.

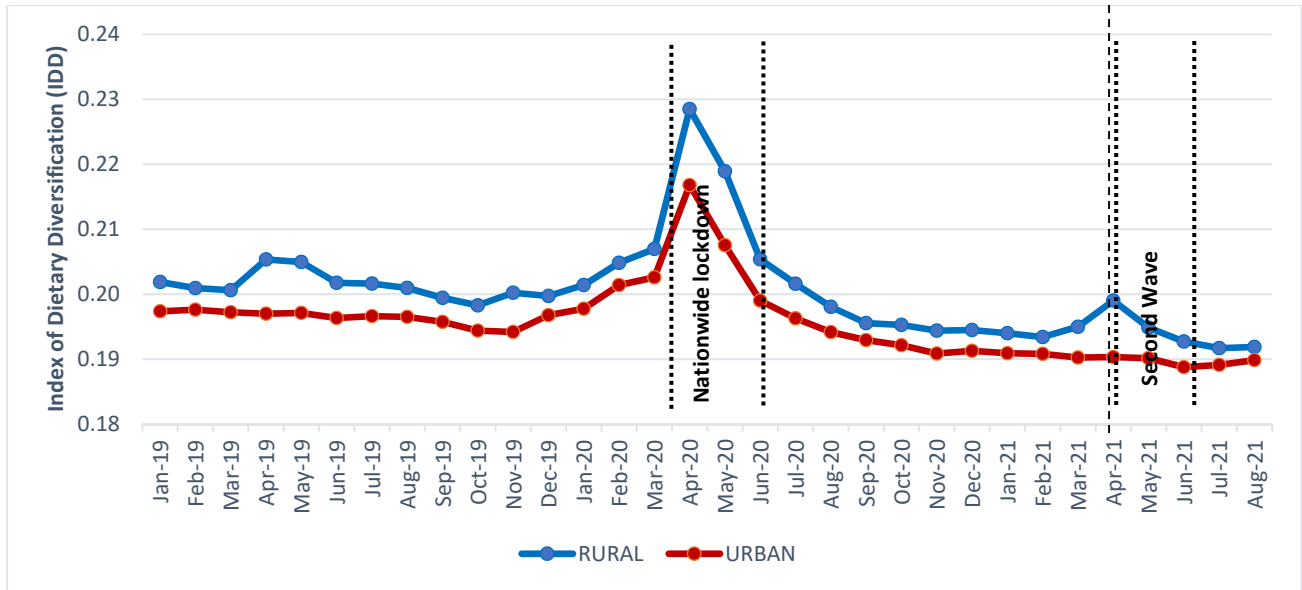
### **Covariates of Dietary Diversity and Food Expenditure Shares**

We present a summary of two recent studies conducted by the authors of this article examining food security as measured by food expenditure shares, and dietary diversity in the Indian context and its socio-economic and pandemic mediated determinants, based on a nationally representative comprehensive consumption and expenditure survey over the period, i.e. January 2019 to August

**Figure 1: Index of Dietary Diversification in India (January 2019 – August 2021)**

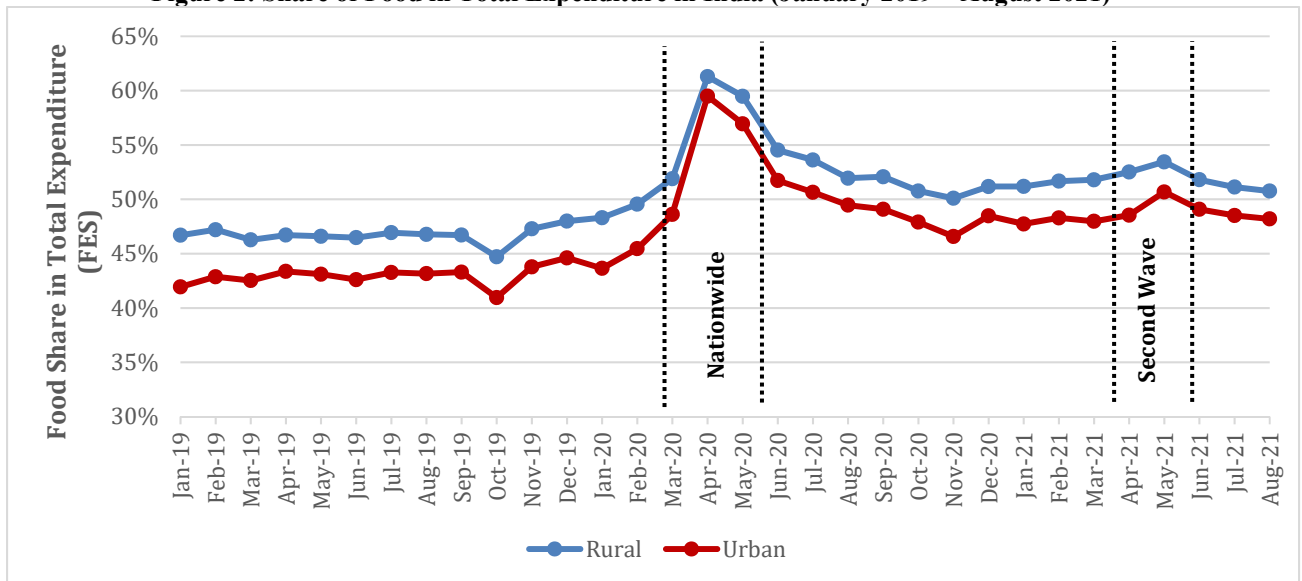
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<sup>2</sup> Algebraically,  $FES_{it}$  is the food share in total expenditure of a household  $i$  in time period  $t$ .



Source: Authors' calculations based on CMIE-CPHS

Figure 2: Share of Food in Total Expenditure in India (January 2019 – August 2021)



Source: Author Calculations using CMIE-CPHS

2021 (Kaicker et. al., 2022a,b; Gupta and Kaicker, 2022). Our econometric specification<sup>3</sup> allows us to examine the effect of the intensity of the pandemic as measured by the number of Covid-19 cases in a state, prices of various food items, incomes, household characteristics such as age and gender of household head, education and occupation of the members, size and composition, caste,

<sup>3</sup> The econometric specification is based on two-stage least squares panel regression model. Two separate specifications use the dependent variables – Index of Dietary Diversification (IDD) and Food Expenditure Shares (FES). Details of model specification, variables and instruments used available on request.

religion, and time, on the dietary diversity and food expenditure shares<sup>4</sup>. Our comments below focus on selected socio-economic demographic and pandemic mediated factors.

*Relationship of Dietary Diversity and Food Expenditure Shares with socio-economic characteristics*

Throughout the period of the study, the poorest have a more concentrated diet, presumably comprising mostly staples, followed by the middle income group, and the high income groups have more diversified diets, relatively. The nationwide lockdown resulted in a reduction in dietary diversity across all income groups, but the effect size varies - the maximum reduction in dietary diversity is observed for households belonging to the poorest income tercile. While the rich could still afford their original consumption bundles amid rising prices during the lockdowns due to higher savings, varied income sources and a relatively secure monthly income, the same does not hold for the poor households that survive by meeting their ends every month. This could be one of the reasons behind the higher shift to a more concentrated diet during the pandemic among the low income households.

Dietary diversity increases as we move from the poorest quintile in income distribution to the higher quintiles, and then becomes slightly concentrated at the highest quintile. Greater concentration of diets among the poorest household is perhaps due to larger shares of staples (cereals and pulses) in the total food expenditure. With affluence, households substitute more expensive and micro-nutrient rich sources of calories such as dairy products, meats, fruits and vegetables for staples such as cereals and pulses. While the richest quintiles spend larger (absolute) amounts on a variety of foods ensuring adequate intake of all nutrients, the reduction in the index value (or more concentrated diets than the lower quintiles), may perhaps be due to greater expenditure on 'others' category, comprising packaged foods, condiments, ready to cook and eat, processed cereals such as noodles, pastas, breads and snacks. As some of these foods are high in sugar, saturated fat, salt, and calorie content, their excessive consumption may be associated with higher risks of obesity, hypertension, and impaired glucose tolerance.

Our analysis also reveals an inverted U-shaped relationship (Engel Curve) between food expenditure shares and total expenditures in rural areas, and a U-shaped relationship in urban areas, as well as at the all-India level. While urban households usually have higher per capita incomes and depend on purchased food, rural households depend on relatively cheap farm food explaining in part the different shapes of Food Engel curves in both the sectors, apart from differences in consumer food preferences.

Caste and social groups plays an important role too. The more deprived socio-economic groups, namely, the scheduled castes, scheduled tribes and other backward classes have higher food expenditure shares and more diversified diets compared to the unreserved category. The caste-based disparity in food expenditure shares is higher in rural areas. The caste-based inequality in India exists not only in terms of income and wealth, but household food consumption patterns as

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<sup>4</sup> The results of the panel regression model presented in this sections are based on variables obtained from the CMIE-CPHS, in addition to state-level variables on the number of Covid-19 cases at the end of each month of the study period obtained from the Ministry of Health and Family Welfare, Government of India. The demand function estimated for food and food diversity includes prices at the state level of staples, milk, vegetables, sugar and oil. These are obtained from the Department of Consumer Affairs.

well, which further lead to disparities in nutrition levels among them. Greater dietary diversity among the lower castes, confirms that dietary transition is not just a middle income/expenditure class phenomenon but far more pervasive. While relatively affluent are more prone to consuming larger varieties of food and spend larger amounts, some of the deprived segments, using not just income/expenditure criteria but also caste, do not seem to lag far behind. Perhaps, the poor with a tighter food budget tend to mix cheaper cereals and vegetables/fruits.

#### *Relationship of Dietary Diversity and Food Expenditure Shares with Household Size and Composition*

Household size has a negative impact on food expenditure shares, and a positive impact on dietary diversity. Economies of scale in buying, storing and cooking food, and consumption of a varied diet by all family members, considering individual tastes and preferences explain these results. Further, households with greater proportion of children have the high food expenditure shares and better dietary diversity, as they need energy, water and oxygen to support their growth process, and more diversified diets inclusive of dairy, fruits and vegetables given the income constraint.

Households with female head, on average, have higher dietary diversity in urban areas, but a lower dietary diversity in the rural areas, as compared to households with a male head. Our results are consistent with the extant literature suggesting that female headed households are found to be more food secure than male headed households (Kennedy and Peters, 1992; Hoddinott and Haddad, 1995; Sraboni et al, 2014). However, households with female head, on average, have higher food expenditure shares compared to households with a male head. A possible explanation of these results could be that women are more likely to spend a larger share of their incomes on their children and household consumption, relative to men who spend a greater proportion of their income on status consumer goods, alcohol, cigarettes (Hoddinott and Haddad, 1995). These results highlight the importance of women empowerment. Households where women have better representation and autonomy to take household decisions are better in terms of household food security (Kennedy and Peters, 1992) and nutritional outcomes (Imai et. al, 2014). Therefore, policies aimed towards women empowerment such as improving their access to education, promoting employment, minimizing gender gaps in wages, doesn't only improve the outcomes for women, but for all household members as well-especially children.

#### *Relationship of Dietary Diversity and Food Expenditure Shares with Education*

Spending on food as a share of total expenditure reduces as education levels rise, but surprisingly, dietary diversity reduces with rising education levels. Education level of households play an important role in shaping preferences, as it increases awareness of safe and healthy diets and also widens access to markets through better information availability.

#### *Relationship of Dietary Diversity and Food Expenditure Shares with spatial characteristics*

Our results also confirm lower elasticities of food demand, and higher diversification of diets in urban areas. Whether this is in part due to easier access to PDS/subsidized food distribution in urban areas cannot be ruled out. Further, urban lifestyles driving dietary changes is an ongoing phenomenon.

A negative relationship is also found between FES shares and the incidence of cumulative Covid-19 cases in the state, and a positive coefficient between IDD and Covid-19 cases. This implies that



the households shifted to a more concentrated diet as the pandemic intensified. The result is not surprising, given the fact that the supply chains were disrupted, supply of many food categories contracted and the retail prices spiked during the first nationwide lockdown.

### **Coping Strategies**

The coping capacity of the household depends on the economic vulnerability, and the strategies employed when faced with a shock. When faced with food insecurity, households resort to various coping strategies. Following the extant literature, the coping strategies commonly used are listed below and may be classified into two categories (WFP, 2015; Sassi, 2021; Maxwell, 1996; Maxwell and Caldwell, 2008; Kyaw, 2009). Firstly, households resort to changed food consumption behaviours such as: (i) relying on less preferred, less expensive foods, (ii) reducing number of meals eaten per day, or portion size of meals by some members of the households, and (iii) borrowing food or money for food from relatives or friends. Secondly, households alter their livelihood strategies to build medium and long term capacity for future food security. These include: (i) migration of few or all members, (ii) withdrawal of children from school to work for additional household income, or shifting children to a less expensive school to reduce education costs, (iii) sale or mortgage of assets including livestock and land, (iv) bartering of non-food items and assistances for food, (v) borrowing money for food or purchasing food on credit, (vi) decreased expenditure on essential non-food expenses such as health, (vii) decreased expenditure on agricultural inputs and early harvesting, and (viii) illegal activities such as theft, or begging for food, among others. Some of these coping strategies have negative long term impacts on a household's well-being such as withdrawal of children from school and sale of productive assets (Sassi, 2021). Moreover, coping strategies vary based on cultural and geographic differences, and on the socio-economic and demographic characteristics of the food insecure households (Farzana, 2017).

A popular resilience measurement instrument used by Allinovi et. al. (2009), d'Errico et. al. (2018) and Food and Agricultural Organisation (FAO, 2016) using observed variables to estimate pillars of resilience, namely, (i) access to basic services, (ii) assets, (iii) social safety nets and (iv) adaptive capacity. The adaptive capacity is an essential dimension that not only measures household's ability to adapt to shocks, but is also critical in reducing food insecurity. An important observed variable used to measure adaptive capacity of households' resilience to food insecurity is the diversity of income sources, in addition to education levels of the members and especially the head of the household.

We look at some of these coping strategies that our survey data permit us to examine, and their implications for future food security of households. Specifically, we look at changes in share of staples in total food expenditures, assets, diversity of income sources, and borrowings.

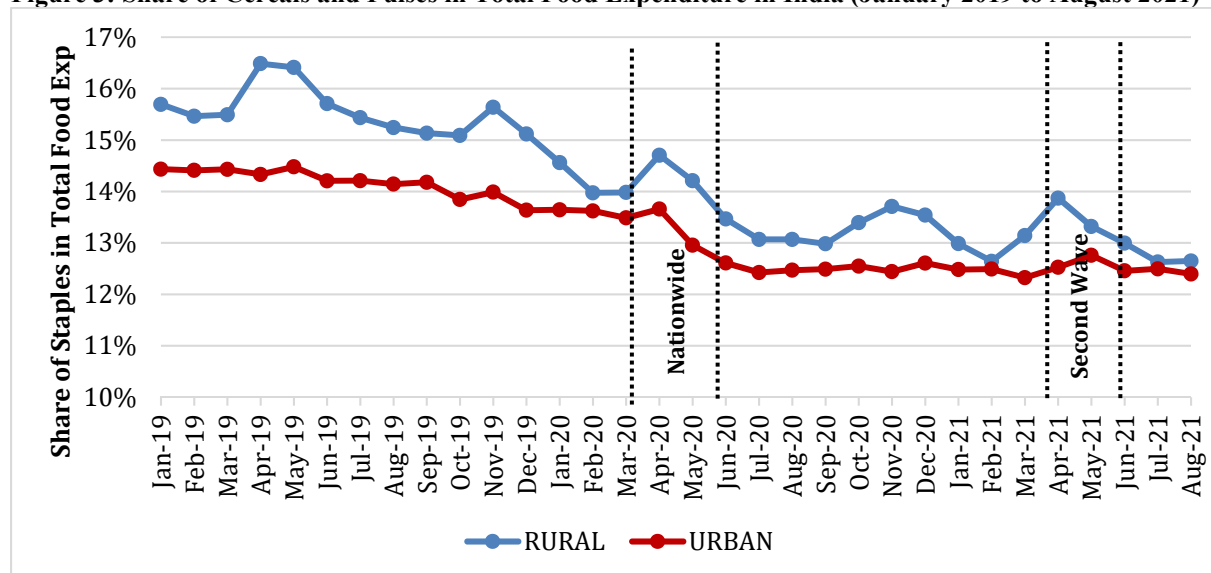
### ***Changes in Food Composition: Shares of Staples***

When faced with shocks, households often change their food consumption behaviour, such as substituting more expensive sources of calories with cheap sources, reducing portion sizes, having fewer meals, and changing the intra-household allocation of food. We examine the share of staples (cereals and pulses) in total food expenditures among households before and during the Covid-19

pandemic in India, and the association of this indicator with key household characteristics, namely, the level of total expenditure (which is a proxy of a household’s place in income distribution), size, composition, caste, gender of household head and education levels.

Figure 2 plots the share of staples in total food expenditure for rural and urban household in India for the period January 2019 to August 2021. A general trend – declining share of food expenditure on staples – is observed in both rural and urban India, consistent with the extant literature on Dietary Transition and Dietary Diversification. Two interesting results emerge on careful examination. Firstly, while the urban trend of decline is relatively smooth, the rural trend shows sudden jumps, and the three peaks observed in the rural graph after the onset of the Covid-19 pandemic in India coincide with the nationwide lockdown-specifically, the peak of the first wave and the peak of the second wave. Secondly, there is a sharp reduction post nationwide lockdown in March – April 2020 in urban India, and no reversal to the previous or pre-pandemic levels.

**Figure 3: Share of Cereals and Pulses in Total Food Expenditure in India (January 2019 to August 2021)**



Source: Authors’ Calculations using CMIE-CPHS

Econometric analysis<sup>5</sup> examining the covariates of staples share in total food expenditure suggest an inverse relationship between monthly per capita expenditures of households and spending on staples as a share of total food expenditure. This implies higher consumption of staples among poor households. What is interesting is that the relationship became weaker during the pandemic months, compared to the pre-pandemic times. This implies how during lockdowns and the consequent mobility restrictions, households focused on consumption of staples, and *probably* substituting more expensive sources of calories by cheaper sources of calories such as cereals. According to our results, i.e. a greater response of total food in the expenditure share of households as a result of the income shock, and lower staples expenditure elasticity implies majority of food expenditure being spent on staples to meet the necessary calorie requirements, and less on other sources of calories and other nutrients.

<sup>5</sup> Details of the model specification and tables available on request.

Surprisingly, the staples share is lower for the scheduled caste, scheduled tribe households, compared to the unreserved ones, implying that lower castes have a lower share of staples' expenditure in their total food expenditures. Among the different socioeconomic groups, the gap in average staples expenditure shares widened in the second period. For instance, relative to the unreserved category, the shares of staples expenditure of SC were lower, and even lower in the pandemic period.

Household size has a negative association with staples expenditure shares, and this relationship weakened during the pandemic compared to the pre-pandemic months. If staples expenditure shares are taken as a measure of dietary diversity, a reduction in the coefficient during the pandemic implies reduced variety of food being consumed in large households and more emphasis on staples and cheaper sources of calories. Children-dominated households have lower staples expenditures on average, and the same reduced even more in the pandemic period. Whether this increased dietary diversity was due to closure of schools and hence mid-day meals, and at the cost of consuming more packaged foods with higher saturated fats and sugar content is worrying. We also find Female-headed households having staples share lower than male-headed households, and this gap widened during the pandemic.

Staples as share of food expenditure reduces as education levels rise. The gap in shares of the illiterate households via-a-vis those with higher levels of education increased post the outbreak of Covid-19, implying reduced food security and lower diet diversity during the pandemic among the uneducated.

Thus, our findings indicate a spurt in staples expenditure shares during the lockdowns, with some reversal once the lockdown was lifted, but not to the pre-pandemic levels. This structural shift in the consumption basket of households as a result of income and unemployment shocks, compounded by supply restrictions is witnessed among households across the income distribution, but more so among the poor, among larger households, and among those with lower levels of education. The greater responsiveness of staples expenditure shares after the outbreak of Covid-19 in India raises concerns about the household's resilience to such unprecedented shocks.

### ***Asset Ownership***

Selling of productive assets and means of transport due to lack of food, and in extreme cases, selling of livestock, have been used as coping strategies in times of crises. The 'Aspirational India' module of the CMIE-CPHS provides detailed information on the number of assets owned by households, including housing, consumer durables, vehicles (cars and two wheelers), tractors, cattle and financial assets. We estimate the average number of units owned of: (i) housing, (ii) cattle; (iii) two wheelers; (iv) four wheelers; and (v) tractors by households during the periods prior to and during the outbreak of the Covid-19 pandemic in India<sup>6</sup>. The estimates are obtained separately for groups with varied households characteristics. While the data on consumption expenditure are available on a monthly basis from CMIE-CPHS, data on assets and borrowings is available wave-wise with each wave spanning a period of four months.

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<sup>6</sup> We estimate the ownership of cattle and tractors only for rural areas, and ownership of four wheelers only for urban areas.

Table 1 shows the average number of units of specific assets owned by households in rural and urban India during the periods prior to and during the Covid-19 pandemic. In both rural and urban areas, we notice a decline in average number of housing units per household in the initial months of the pandemic (i.e. the first half of year 2020) compared to 2019. A decline in average number of two-wheelers owned by 10% in rural areas and 6% in urban areas in the period May-August 2020 compared to January – April 2020, may be due to closure of shops selling two-wheelers. However, selling of these assets to release money for necessities cannot be ruled out. A decline in number of tractors owned per house in rural areas by 25% in the year 2020 compared to 2019, is worrying, as decreased spending on agricultural inputs traps households into a vicious circle of poverty and vulnerability. A 16% reduction in cattle owned in the period May-August 2020 compared to January – April 2020 points to a similar worry. Car ownership declined by 25% in this period in urban areas. By the time the second wave subsided, there was, on an average, an increase in all these indicators, but in case of cattle and four wheelers, this remained much below the pre-pandemic levels.

**Table 1: Average number of units of assets owned per household in India**

	Rural				Urban		
	Houses	Two-Wheelers	Tractors	Cattle	Houses	Cars	Two-Wheelers
<b>Jan-Apr19</b>	1.04	0.60	0.04	1.16	1.01	0.14	0.84
<b>May-Aug19</b>	1.02	0.65	0.04	1.22	1.01	0.15	0.85
<b>Sep-Dec19</b>	1.02	0.67	0.04	1.21	1.01	0.15	0.87
<b>Jan-Apr20</b>	1.01	0.66	0.03	0.96	1.00	0.12	0.83
<b>May-Aug20</b>	1.02	0.59	0.03	0.83	1.01	0.09	0.78
<b>Sep-Dec20</b>	1.01	0.66	0.03	0.81	1.00	0.12	0.81
<b>Jan-Apr21</b>	1.03	0.71	0.04	1.03	1.01	0.13	0.86
<b>May-Aug21</b>	1.02	0.70	0.04	0.84	1.00	0.11	0.85

Source: Authors' Calculations using CMIE-CPHS

We need to further investigate whether these worrying trends varied across households with different levels of vulnerabilities, as indicated by their incomes, education levels, caste, and the gender of the household head. The decline in average number of housing units is almost the same across various social groups, income groups and education groups.

The decline in two-wheeler ownership between period May-August 2020 compared to January – April 2020 is higher in female headed households (20% in rural areas and 13% in urban areas) compared to male headed households (10% in rural and 6% in urban areas). Similarly, the illiterate households faced higher declines compared to the more educated, and the more deprived socio-economic groups faced higher declines compared to the unreserved category. The declines in two wheeler ownership among scheduled caste households is 16% in rural and 11% in urban, among scheduled tribes 9% in rural and 7% in urban, and among other backwards classes is 12% in rural and 6% in urban, compared to a 4% in rural and 3% in urban decline among unreserved category households. The decline in four wheeler ownership was also higher among the more deprived socio-economic groups, the poorest income quartile, the least educated, and among female headed households, relative to their counterparts.

Cattle ownership in rural areas declined by 30% and 14% among the lowest, and second lowest income quartile between the period May-August 2020 compared to January – April 2020. The declines for the highest and the second highest quartiles were about 5% only. The declines for female headed households were 22% compared to 13% for male headed households. The declines were 13%, 18% and 17% for scheduled castes, scheduled tribes and OBC households, respectively, compared to 6% for unreserved categories.

The extent of decline in tractor ownership in 2020 compared to 2019 was double among male headed households compared to female headed households. The two poorest income quartiles had already low tractor ownership compared to their richer counterparts, but these also faced significant declines (25% and 42%). The tractor ownership has been very low among the SC and ST households (with hardly any change over time) compared to OBCs and unreserved category households.

Even when the lockdown restrictions were lifted, the asset ownership did not come back to the pre-pandemic levels. For all the assets discussed in this section, and across groups with households belonging to different social groups, education levels, income quartiles, the average number of units owned declined in August 2021 relative to the year 2019. The only exception is two wheelers ownership that increased. Moreover, in rural areas, agriculture is the main activity for the majority of the people, and self-production is the largest food source for many households. Selling productive assets such as cattle and tractors may increase inequality with long term consequences on wellbeing.

### ***Borrowings***

In addition to assets, the ‘Aspirational India’ module also provides detailed information on borrowing of household by purpose and source. While borrowing food, begging for food, or buying food on credit are frequent coping strategies, we use a proxy. i.e. borrowing for consumption expenditure, that is captured in the survey. This is a sum total of borrowing for consumption expenditure from banks, moneylenders, employers, relatives or friends, non-banking financial institutions, self-help groups, microfinance institutions, shops or any other formal or informal sources. The survey data do not capture the amount of borrowing, however. The information is captured in the form of a binary variable on whether the household has borrowing or not. We look at the proportion of households with borrowings for consumption expenditure prior to and during the Covid-19 pandemic. As in the case of previous indicators, the estimates are obtained separately for groups with varied households characteristics.

Table 2(a) shows the proportion of households with borrowing for consumption expenditure in rural and urban India during the periods prior to and during the Covid-19 pandemic. A general trend – lower proportion of households reported borrowings for consumption expenditure in 2010 compared to 2019, and then a slight increase in 2021. This reflects the low borrowing capacity of households, probably due to lack of collateral, or non-availability of funds through a well-functioning financial system during the containment periods. An increase in 2021 may be attributed to greater capital available with banks and non-banking financial companies for disbursement under the various stimulus packages announced by the state. The proportion of households with borrowings for consumption expenditure in 2021 still remains below the pre-

pandemic levels. While this trend is common across households groups with varied characteristics, there are some minor variations. Firstly, the poorest income quartile is the only household group to have witnessed greater proportion of households with borrowings at the end of the second wave compared to the pre-pandemic levels. Secondly, in rural areas, the proportion of households with borrowings in 2020 was lower than in 2019 for all household groups, but the declines were lowest for the more vulnerable – the lowest income quartile households, scheduled caste households, and the illiterate households, compared to their better off counterparts. A somewhat similar story manifests for urban areas too.

**Table 2: Borrowing for Consumption Expenditure and Diversity of Income Sources in India**

	(a) Proportion of Households with Borrowing for Consumption Expenditure		(b) Mean number of income sources in a household	
	Rural	Urban	Rural	Urban
<b>Jan-Apr19</b>	50.9%	46.8%	2.34	2.98
<b>May-Aug19</b>	51.1%	49.6%	2.35	2.97
<b>Sep-Dec19</b>	54.3%	51.1%	2.39	2.98
<b>Jan-Apr20</b>	46.6%	41.6%	2.47	3.06
<b>May-Aug20</b>	46.4%	40.7%	2.55	3.23
<b>Sep-Dec20</b>	44.0%	32.3%	2.51	3.07
<b>Jan-Apr21</b>	48.9%	37.8%	2.48	3.02
<b>May-Aug21</b>	53.0%	43.1%	2.46	3.02

Source: Authors' Calculations using CMIE-CPHS

### *Diversity of Income Sources*

The CMIE-CPHS dataset gives information about the industry of occupation (Retail Trade, Agriculture, Textiles, Education, Tourism, Healthcare, Food industries, Automobiles, Mining) of each household member. We estimate the average number of income sources for the households, and aggregate them over groups with similar characteristics for the pre-pandemic and during pandemic periods.

Table 2(b) shows the average number of income sources for households in rural and urban India during the periods prior to and during the Covid-19 pandemic. In rural areas, households belonging to the lower income quartiles have more diversified income sources compared to those in higher quartiles. Similarly, SCs and STs households have more diversified income sources compared to those in unreserved categories. The diversification of income sources increased with education levels, and male headed households have higher diversified income sources compared to female headed households. The patterns are similar in urban areas.

In both rural and urban areas, there is a general trend of an increase in the mean number of income sources in a household in each 4 month block starting January – April 2019. This increase peaks during the period coinciding with the lockdown months (i.e. May – August 2020), and starts declining thereafter. The sharpest period-on-period jump was witnessed in May-August 2020, in both rural and urban areas. Thus the initial months of the pandemic, characterised by strict closures and mobility restrictions led households to explore alternate income sources to support living expenses.

## Conclusions and Policy Recommendations

Building resilience has received growing recognition as an important risk reduction channel for food insecurity. Food insecurity is not just a result of poverty, but a host of other conditions such as environmental changes, that result in income and employment losses, inflation, disruptions to food supply chains, and a whole lot of contextual factors that influence a households' capacity to respond to environmental changes. This explains why some households may experience greater negative outcomes from shocks and stressors than others, even though they may be at the same poverty or income level. Using resilience, and vulnerability to understand food security, or the lack of it, is helpful in drawing attention of policy makers to factors, beyond incomes, that enable or disable households to mitigate the impacts of food insecurity when threatened by environmental changes.

In the present study, we have identified key indicators of food consumption status and coping capacity of households, and examined the changes in these indicators from the pre-pandemic period to the periods of strict nationwide lockdowns, the peaks of the first and the more deadly second wave. Firstly, we look at the index of dietary diversification (IDD) as a measure of food consumption status. Secondly, we look at food expenditure shares (FES) as an index of economic vulnerability. And finally, we look at several indicators of coping strategies. These include: (i) share of staples in total food expenditure; (ii) ownership of assets; (iii) diversity of income sources; and (iv) borrowings for consumption expenditure. While various other coping mechanisms need examination too, such as withdrawal of children from school, or intra-household allocation of food, we are constrained by data availability. We explore the changes in these indicators during the period January 2019 to August 2021, and also variation in these indicators among households belonging to different income groups, castes, occupations and other household socio-economic and demographic characteristics to examine the disproportionate burden of the Covid-19 pandemic on food insecurity among the disadvantaged and minorities.

We also report our findings from recent studies (Kaicker et. al., 2022a,b; Gupta and Kaicker, 2022) on the socio-economic and pandemic mediated determinants of key food security indicators, i.e. the food expenditure shares and index of dietary diversification, based on a rigorous econometric methodology. The study is useful as the findings from this study are expected to help policymakers formulate suitable policies to improve food security and nutrition outcomes not only in India but perhaps other developing countries as well.

The disproportionate burden of the pandemic induced lockdowns and the consequent food insecurity, is seen through rising food expenditure shares, and lower dietary diversity, particularly among the disadvantaged and minorities. Selling of productive assets negatively affects an already weak household food system, especially in rural areas. The poor and vulnerable households experience the most difficulty in adapting to shocks, adopting coping strategies that are costly to both short- and long-term well-being. The important point is that despite affirmative action (quotas for SCs, STs and OBCs in public employment and education) economic disparities persist. Both lower castes and minorities bore the brunt of the alarming spurts of higher food expenditure shares. Even though discriminatory practices against religious minorities and lower castes are illegal, such practices remain pervasive. Even if attitudinal and behavioural changes are slow, social networks

ought to be strengthened and motivated to initiate such changes. This is of course easier said than done.

Further, there is a need for effective action on the part of policymakers to boost aggregate demand, especially among the deprived. Social safety nets such as PDS and MGNREGA have suffered cutbacks in public expenditure despite growing demand for them. While access to PDS has risen, as also quantities purchased, the issue is not just greater funding but checking huge diversion of food supplies from PDS retailers to the market. However, additional food in the market does not lead to lower market prices as large fractions are stored for speculative purposes. Although demand for MGNREGA has risen, the benefits have not because of rampant corruption in the payment of wages and choice of projects that do not reflect local needs (e.g. roads that get washed away).

A major dimension of food security is access. Controlling inflation, revamping of the public distribution systems, and restoration of food supply chains is crucial at this juncture. The premise underlying hiking of policy interest rates is that food price inflation is largely a monetary phenomenon. We disagree as we believe that the economy has still not fully recovered from disruption in food supply chains. Uncertainty about availability of energy and fertiliser is a direct outcome of the prolonged Russian war against Ukraine. This combined with continuing surge in food prices have entrenched inflationary expectations. As a consequence, precautionary storage of food and speculative hoarding by traders would only imperil food security for large masses.

Restoration of these supply chains requires not just expansion of transport systems but also liberalisation of food movements from food surplus states to food deficit states. Even though the banks are flush with liquidity, there is aversion to lending to small holders and SMEs. As argued recently by Bardhan (2022), an important policy priority is to promote the latter through easier access to credit and easier infrastructural support (e.g. easier access to electricity, transport, and to markets). Much ink has been spilled over these concerns but has failed to translate into policy measures.

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