AN EMPIRICAL ANALYSIS OF HOUSEHOLD CONSUMPTION IN RURAL MAHARASHTRA DURING MARCH 2020

Mrs Nandini Jagannarayan, Associate Professor, B.Com (Banking & Insurance), RJ College, Ghatkopar (West), Mumbai-86
Dr Asha Prasunna, Professor of Economics & International Finance, K.J.Somaiya Institute of Management Studies

Abstract

Current research investigates the nuanced impact of the COVID-19 pandemic on consumption patterns in rural Maharashtra, India.

Our research has two main goals. First, we want to understand how factors like age, gender, job, education, and family size have affected how people in rural Maharashtra spent money during the pandemic. Second, we want to find out which of these factors had the biggest impact on spending in different parts of the state. Since rural areas have their own unique economic situations, we know it's important to look at how the pandemic affected these communities specifically. We're using math and tables to analyze the information and provide a detailed look at how the pandemic immediately changed spending habits and what it might mean for the future in rural households. This research is not only timely but also essential for informing policy decisions aimed at supporting rural communities in the aftermath of the pandemic. By unraveling the intricate dynamics of consumption in rural Maharashtra, we contribute to a deeper understanding of the economic challenges faced by these communities and provide insights that can guide targeted interventions to foster resilience and recovery.

Keywords: Maharashtra, Consumption, Covid-19, Rural

Introduction

During the April–June quarter of 2020, India's GDP contracted by 23.9% year-on-year. The subsequent economic recovery was hindered by a resurgence of the pandemic in 2021, straining the healthcare system. Like other nations, India grappled with new virus variants and recurring local outbreaks, prompting state and local restrictions but avoiding a nationwide lockdown to prevent further economic harm. Nevertheless, regional lockdowns and altered behaviors due to the pandemic had notable economic repercussions.

The persisting challenges highlight the ongoing relevance of understanding and evaluating the economic impacts of the initial lockdowns. Recent research aims to assess the pandemic and lockdown effects, primarily focusing on income, employment, food consumption, and food security. This study utilizes data from a large-scale survey to gauge the repercussions of the initial lockdown on household income, particularly wages and business earnings—major contributors to household income. The research distinguishes impacts on rural versus urban households and delves into vulnerable households, specifically those reliant on daily labor and those headed by women. Additionally, it examines how these impacts varied across different income brackets.

As rural areas are often characterized by unique economic landscapes, the study acknowledges the need for a tailored examination of the pandemic's impact on these communities. By employing statistical tools and frequency tables, we aim to provide a detailed analysis that not only captures the immediate effects of the pandemic on consumption but also unveils potential long-term implications for rural households.

Review of Literature

Beyer, Franco-Bedoya, and Galdo (2021) and Beyer, Jain, and Sinha (2023) used this data to document and quantify how declines in economic activity varied with the severity of restrictions across different parts of India, as well as with other characteristics such as the share of older residents or of services employment. Our empirical analysis is partly distinguished from other works on the economic effects of the lockdown in India by focusing on different consumption expenditure

impacts on rural versus urban households, female-headed households, and households with daily laborers. Evidence of this nature can be useful in guiding appropriate targeting of policy responses, especially at the state level, where welfare policies are often implemented.

The authors summarized various surveys indicating that income declines exceeded 40% (Dreze and Somanchi 2021). Afridi, Mahajan, and Sangwan (2022) observed that areas in India with stronger state capacity to implement the Mahatma Gandhi National Rural Employment Guarantee Act (MG-NREGA) were more successful in mitigating job losses during the pandemic, particularly benefiting rural women and even more so less-skilled women. Basu, Basu, Basu, and Tapia (2020) offered an international viewpoint on the importance of governance quality in managing the pandemic, with particular attention to India and Peru. Gupta, Malani, and Woda (2021) utilized CMIE–CPHS data nationwide, revealing that the income decline for daily laborers was substantially higher compared to salaried workers (75% versus 35%), with greater income reductions observed in households from the highest-income quartile. Sanyal, Kapoor, and Singh (2021) similarly noted significant income reductions following the initial lockdown, especially impacting laborer households in rural regions. Abraham, Basole, and Kesar (2022) also utilized CMIE–CPHS data, demonstrating a severe impact on women's employment due to the lockdowns.

In the light of the above literature, the current study focuses on examining the socio-economic conditions of the rural households in Maharashtra, which has had a significant impact on their consumption expenditures of food and non-food items.

Methodology

In the light of the above literature reviewed, the study focuses on examining the socio-economic conditions of the rural households in Maharashtra, as these play a major role in the Income consumption association. The study uses data collected from secondary sources published by CMIE-CPHS during March 2020.

The second focus of the research lies in analysing the impact of food and non- food expenditures on the Income. Non-food expenditures of select categories are included for the study (Health, Vacation, Recreation and restaurants). Though there was a significant impact on the income, which,in turn, affected the household expenditures of the respondents,the study focuses on studying impact on these expenditures as a result of the affected income, during the period (March 2020) of study.

The researchers have used Descriptive tools like graphs, tables to explain the data along with chi-squared test and regression analysis for inferential purposes.

Results and Discussions

To study the above objective, only the households of rural regions and the following question on the age group, gender group, occupation group, education group, household size are considered to understand their socio-economic conditions and is used for analysis. The following null and alternate hypotheses are designed for the study of each condition.

Null hypothesis H$_{02A}$: There is no significant difference in the proportion of the age groups of the rural households in Maharashtra.

Alternate hypothesis H$_{12A}$: There is a significant difference in the proportion of the age groups of the rural households in Maharashtra.

To test the above null hypothesis, the non-parametric Chi-square test is applied. The results are as shown in the below table.

Table 1 Age Group of the respondents

Statistics	Age Group
Chi Square	1127.629a
df	3
p-value	0.000

Source: Analysis based on data collected from CPHS- March 2020

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 598.

The above table indicates that the p-value is 0.000. It is less than the standard p-value of 0.05. Therefore, the Chi-square test is rejected. Hence the null hypothesis is rejected, and the alternate hypothesis is accepted. There is a significant difference in the proportion of the age groups of the rural households in Maharashtra. Hence the researchers are unable to accept the null hypothesis and conclude that To understand the findings, the expected and observed frequency table of the responses are obtained and presented as follows

**Table 2 Age Profile of the households surveyed**

AGE_Profile	Observed N	Expected N	Residual
Balanced	644	598.0	46.0
Dominant Younger Members	1228	598.0	630.0
Dominant Grown-ups	413	598.0	-185.0
Dominant Seniors	107	598.0	-491.0
Total	2392		

Source: Analysis based on data collected from CPHS- March 2024

The above table indicates the observed and expected counts of the age groups of the rural households in Maharashtra, as well as the residual values which represent the difference between the observed and expected counts. The observed number of Balanced households (644) is slightly greater than the expected number (598.0). For the Dominant Younger Members group, the observed number (1228) is significantly greater than the expected number (598.0). The observed number of Dominant Grown-ups (413) and Dominant Seniors (107) are less than the expected number (598.0).

This concludes that there is a significant difference in the proportion of age groups, with the majority number of households being Dominant Younger Members, followed by Balanced, and fewer being Dominant Grown-ups, or Dominant Seniors. The above information is represented in a bar chart as shown below.

Figure 1 AGE_Profile of the respondents - Chi Square Analysis
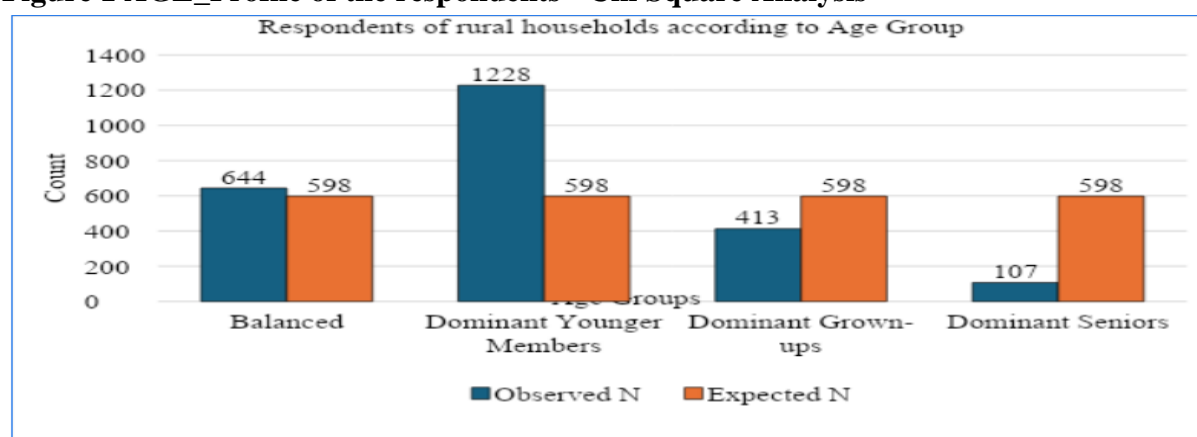
Source: Analysis based on data collected from CPHS- March 2020

Null hypothesis H$_{02B}$: There is no significant difference in the proportion of the gender groups of the rural households in Maharashtra.

Alternate hypothesis H$_{12B}$: There is a significant difference in the proportion of the gender groups of the rural households in Maharashtra.

To test the above null hypothesis, the non-parametric Chi-square test is applied. The results are as shown in the below table.

Table 3 Gender Association test

Test Statistics	Gender Group
Chi-Square	764.090a
df	3
P-value	0.000

Source: Analysis based on data collected from CPHS- March 202

a.0.0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 598.

The above table indicates that the p-value is 0.000. It is less than the standard p-value of 0.05. Therefore, the Chi-square test is rejected. Hence the null hypothesis is rejected, and the alternate hypothesis is accepted. There is a significant difference in the proportion of the gender groups of the rural households in Maharashtra.

To understand the findings, the expected and observed frequency table of the responses are obtained and presented as follows.

**Table 4 Gender Profile of Households– Chi Square Analysis**

GENDER_GROUP	Observed N	Expected N	Residual
Balanced	898	598.0	300.0
Female Dominant	476	598.0	-122.0
Male Dominant	919	598.0	321.0
Exclusively Female or Male	99	598.0	-499.0
Total	2392		

Source: Analysis based on data collected from CPHS- March 2020

The above table indicates the observed and expected counts of the gender groups of the rural households in Maharashtra, as well as the residual values which represent the difference between the observed and expected counts. The observed number of Balanced households (898) and Male Dominant households (919) are greater than the expected number (598.0). For the Female Dominant group, the observed number (476) is less than the expected number (598.0). The observed number of Exclusively Female or Male households (99) is significantly less than the expected number (598.0).

This concludes that there is a significant difference in the proportion of gender groups, with the majority number of households being either Balanced or Male Dominant, and fewer being Female Dominant or Exclusively Female or Male. The above information is represented in a bar chart as shown below.

Figure 2 Gender Profile of Households– Chi Square Analysis
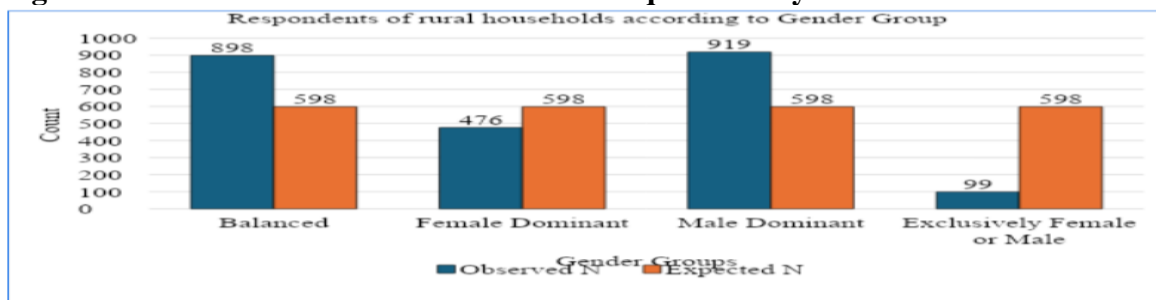
Source: Analysis based on data collected from CPHS- March 2020

Null hypothesis H_{02C}: There is no significant difference in the proportion of the occupation groups of the rural households in Maharashtra.

Alternate hypothesis H_{12C}: There is a significant difference in the proportion of occupation groups of the rural households in Maharashtra.

To test the above null hypothesis, the non-parametric Chi-square test is applied. The results are as shown in the below table.

Table 5 Occupation Profile

Test Statistics	OCCUPATION_GROUP
Chi-Square	2152.916[a]
df	3
p-value	.000

Source: Analysis based on data collected from CPHS- March 2020

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 598.0.

The above table indicates that the p-value is 0.000. It is less than the standard p-value of 0.05. Therefore, the Chi-square test is rejected. Hence the null hypothesis is rejected. There is a significant difference in the proportion of occupation groups of the rural households in Maharashtra.

To understand the findings, the expected and observed frequency table of the responses are obtained and presented as follows.

Table 6 Occupation Profile of the respondents – Chi Square Analysis

OCCUPATION_GROUP	Observed N	Expected N	Residual
Blue-collar Workers	651	598.0	53.0
White-collar Professionals and Management	61	598.0	-537.0
Self-employed and Entrepreneurs	177	598.0	-421.0
Miscellaneous and Others	1503	598.0	905.0
Total	2392		

Source: Analysis based on data collected from CPHS- March 2020

The above table indicates the observed and expected counts of the occupation groups of the rural households in Maharashtra, as well as the residual values which represent the difference between the observed and expected counts. The observed number of Blue-collar Workers (651) is slightly greater than the expected number (598.0). For the White-collar Professionals and Management group, the observed number (61) is significantly less than the expected number (598.0). The observed number of Self-employed and Entrepreneurs (177) is less than the expected number (598.0). The observed number of Miscellaneous and Others (1503) is significantly greater than the expected number (598.0).

This concludes that there is a significant difference in the proportion of occupation groups, with the majority number of households being Miscellaneous and Others, followed by Blue-collar Workers, and fewer being White-collar Professionals and Management, or Self-employed and Entrepreneurs. The above information is represented in a bar chart as shown below.

Figure3 Occupation Profile of the respondents – Chi Square Analysis
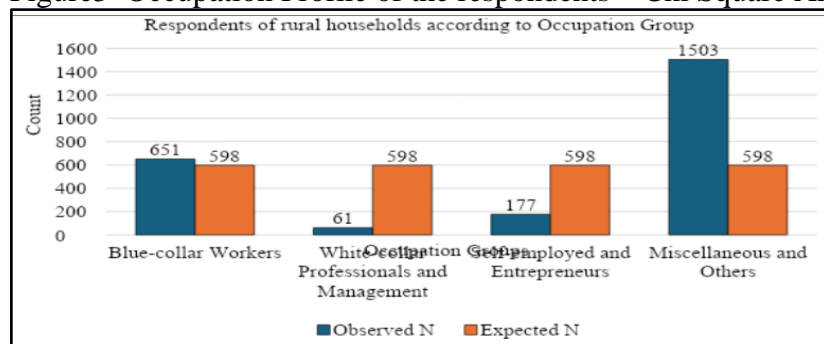
Source: Analysis based on data collected from CPHS- March 2020

Null hypothesis H$_{02D}$: There is no significant difference in the proportion of the education groups of the rural households in Maharashtra.

Alternate hypothesis H$_{12D}$: There is a significant difference in the proportion of education groups of the rural households in Maharashtra.

To test the above null hypothesis, the non-parametric Chi-square test is applied. The results are as shown in the below table.

Table 7 Educational Profile of the households surveyed

Test Statistics	EDU_GROUP
Chi-Square	969.763^a
df	2
p-value	.000

Source: Analysis based on data collected from CPHS- March 2020

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 797.3.

The above table indicates that the p-value is 0.000. It is less than the standard p-value of 0.05. Therefore, the Chi-square test is rejected. Hence the null hypothesis is rejected, and the alternate hypothesis is accepted. There is a significant difference in the proportion of education groups of the rural households in Maharashtra.

To understand the findings, the expected and observed frequency table of the responses are obtained and presented as follows.

Table 8: Educational Group

EDU_GROUP	Observed N	Expected N	Residual
Highly Educated	142	797.3	-655.3
Moderately Educated	1379	797.3	581.7
Educationally Homogeneous	871	797.3	73.7
Total	2392		

Source: Analysis based on data collected from CPHS- March 2020

The above table indicates the observed and expected counts of the education groups of the rural households in Maharashtra, as well as the residual values which represent the difference between the observed and expected counts. The observed number of Highly Educated households (142) is significantly less than the expected number (797.3). For the Moderately Educated group, the observed number (1379) is greater than the expected number (797.3). The observed number of Educationally Homogeneous households (871) is slightly greater than the expected number (797.3).

This concludes that there is a significant difference in the proportion of education groups, with the majority of households being Moderately Educated, followed by Educationally Homogeneous and fewer being Highly Educated. The above information is represented in a bar chart as shown below.

Figure 4 **Educational Group of the households surved**
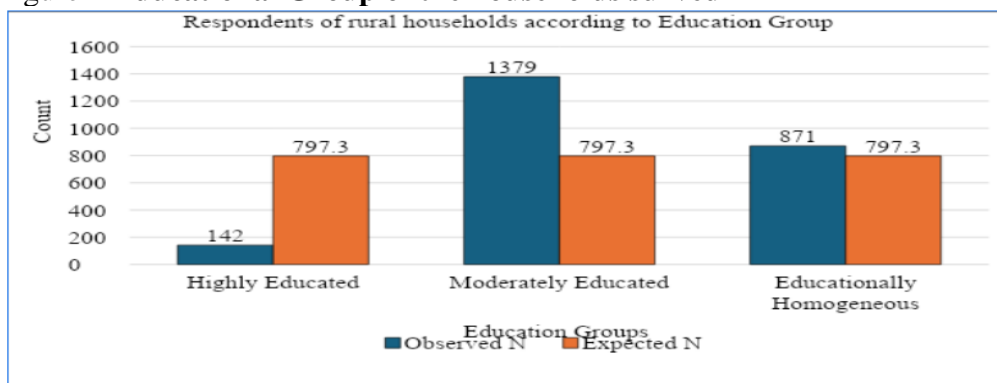
Source: Analysis based on data collected from CPHS- March 2020

Null hypothesis H$_{01E}$: There is no significant difference in the proportion of the household size of the rural households in Maharashtra.

Alternate hypothesis H₁₁ₑ: There is a significant difference in the proportion of household size of the rural households in Maharashtra.

To test the above null hypothesis, the non-parametric Chi-square test is applied. The results are as shown in the below table.

Table 9 Family Size

Test Statistics	SIZE_GROUP
Chi-Square	608.484[a]
df	2
p-value	.000

Source: Analysis based on data collected from CPHS- March 2020

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 797.3.

The above table indicates that the p-value is 0.000. It is less than the standard p-value of 0.05. Therefore, the Chi-square test is rejected. Hence the null hypothesis is rejected, and the alternate hypothesis is accepted. There is a significant difference in the proportion of household size of the rural households in Maharashtra. To understand the findings, the expected and observed frequency table of the responses are obtained and presented as follows.

Table 10 Family size - Chi Square analysis

SIZE_GROUP	Observed N	Expected N	Residual
Small Households	917	797.3	119.7
Medium-Sized Households	1219	797.3	421.7
Large Households	256	797.3	-541.3
Total	2392		

Source: Analysis based on data collected from CPHS- March 2020

The above table indicates the observed and expected counts of the household size of the rural households in Maharashtra, as well as the residual values which represent the difference between the observed and expected counts. The observed number of Small Households (917) and Medium-Sized Households (1219) are greater than the expected number (797.3). For the Large Households group, the observed number (256) is less than the expected number (797.3).

This concludes that there is a significant difference in the proportion of household size, with the majority number of households being either Medium-Sized or Small, and fewer being Large sized. The above information is represented in a bar chart as shown below.

Ho1: There is no significant association between the consumption expenditure of the households and their income during the study period

H11: There is a significant association between the consumption expenditure of the households and their income during the study period

Dependent Variable: Adjusted Total Income

Independent Variables: Adjusted Food Expenditure, Adjusted Non-Food Expenditure

Adjusted Non-Food Expenditure include - expenditure on Health, Recreation, Restaurant and vacation

Table 11 Anova

Model	Sum of Squares	df	Mean Square	F	p-value
lRegression	59545765660.727	2	29772882830.364	103.836	.000[b]
Residual	684995649634.881	2389	286729028.730		
Total	744541415295.608	2391			

Source: Analysis based on data collected from CPHS- March 2020

a. Dependent Variable: ADJ_TOT_INC

b. Predictors: (Constant), ADJ_EXP_NONFOOD, ADJ_EXP_FOOD

This ANOVA table summarizes the results of a regression analysis.

Overall, this ANOVA table suggests that the model, which includes adjusted non-food expenditure and adjusted food expenditure as predictors, significantly explains the variance in the adjusted total income. The low p-value supports the notion that these predictors collectively have a strong impact on the adjusted total. The above table indicates the p-value for the regression model is 0.000, which is less than the standard p-value of 0.05. Hence, the linear regression model is applicable.

Table 12 Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	p-value
1 (Constant)	4671.059	928.377		5.031	.000
ADJ_EXP_FOOD	1.851	.195	.192	9.505	.000
ADJ_EXP_NONFOOD	7.468	.895	.168	8.345	.000

Source: Analysis based on data collected from CPHS- March 2020
a. Dependent Variable: ADJ_TOT_INC

These coefficients represent the relationships between the predictors (ADJ_EXP_FOOD and ADJ_EXP_NONFOOD) and the dependent variable (ADJ_TOT_INC).

In summary, both adjusted food expenditure and adjusted non-food expenditure appear to have statistically significant relationships with adjusted total income. Adjusted non-food expenditure might have a slightly stronger impact based on the coefficient magnitudes and the associated t-values, although both predictors significantly contribute to explaining the variance in the adjusted total income.

In the above results, the p-values for all the independent variables are 0.000 or less than 0.05. It is less than the standard p-value of 0.05. This indicates that independent variables, Adjusted Food Expenditure and Adjusted Non-Food Expenditure, are significant predictors of Adjusted Total Income for rural households.

The regression equation is as follows. Adjusted Total Income = 4671.059+ (1.851) Adjusted Food Expenditure + (7.468) Adjusted Non-Food Expenditure

The Adjusted Total Income is modeled as a linear combination of Adjusted Food Expenditure and Adjusted Non-Food Expenditure. The numbers in parentheses are coefficients associated with each respective variable, indicating the estimated impact or contribution of that variable to the Adjusted Total Income.

Adjusted Food Expenditure: Each unit increase in Adjusted Food Expenditure is associated with an increase of 1.851 units in Adjusted Total Income, assuming all other variables remain constant.

Adjusted Non-Food Expenditure: Each unit increase in Adjusted Non-Food Expenditure is associated with a larger increase of 7.468 units in Adjusted Total Income, assuming all other variables remain constant.

This equation is a simplified representation, and the actual interpretation might depend on the context of the data and the statistical methods used to estimate the coefficients

To Conclude, it can be said that socio economic and demographic composition of the rural households have a significant impact on the consumption expenditures of select categories (food and non-food- health, recreation, restaurant and vacation) of the households, which have significantly impacted their incomes, and hence, at a macro level.

The equation shows a reverse relationship between total Income, which is influenced by the mounting food expenditures and health expenditure during the period of study, while due to the lockdowns imposed by the government and social distancing, expenditures of recreation, restaurant or eating out and vacations were a total taboo and hence, though, these were very low, health expenditure, which was very much on the higher side, due to increase in ailments and also increased cost of treatments and medicines, resulted in dis saving, this is evident from the negative constants. Also, the negative constants of the total adjusted food expenditures, indicate that food expenditures

were on the higher side, and also, people were having lower or no incomes, due to job losses, work from home and such other reasons.

References
1.   Abiad, Abdul, Rosa Mia Arao, Suzette Dagli, Benno Ferrarini, Ilan Noy, Patrick L. Osewe, Jesson Pagaduan, Donghyun Park, and Reizle Platitas. 2020. "The Economic Impact of the COVID-19 Outbreak on Developing Asia." ADB Briefs No. 128, March 6.
2.   Beyer, Robert C. M., Sebastian Franco-Bedoya, and Virgilio Galdo. 2021. "Examining the Economic Impact of COVID-19 in India through Daily Electricity Consumption and Nighttime Light Intensity." World Development 140: 105287.
3.   Afridi, Farzana, Kanika Mahajan, and Nikita Sangwan. 2022. "Employment Guaranteed? Social Protection during a Pandemic." Oxford Open Economics 1 (1): odab003.
4.   Beyer, Robert C. M., Tarun Jain, and Sonalika Sinha. 2023. "Lights Out? COVID-19 Containment Policies and Economic Activity." Journal of Asian Economics 85: 101589.
5.   Dreze, Jean, and Anmol Somanchi. 2021. "The COVID-19 Crisis and People's Right to Food." Preprint, SocArXiv. https://doi.org/10.31235/osf.io/ybrmg.
6.   Basu, Alaka M., Kaushik Basu, and Jose Maria U. Tapia. 2020. "The Complexity of Managing COVID-19: How Important Is Good Governance?" In Reimagining the Global Economy: Building Back Better in a Post-COVID-19 World, edited by Brahima S. Coulibaly, Kemal Derviş, Homi Karas, and Zia Qureshi, 87–95. Washington, DC: Brookings Institution.
7.   Gupta, Arpit, Anup Malani, and Bartek Woda. 2021. "Explaining the Income and Consumption Effects of COVID in India." NBER Working Paper No. 28935
8.   Sanyal, Anirban, Rolly Kapoor, and Nirvikar Singh. 2021. "Impacts of the COVID Lockdown on Household Incomes: Evidence from India."
https://doi.org/10.2139/ssrn.3948266.