Impact of COVID on food consumption, job loss and income: Empirical evidence from rural households in eastern India

by Prakashan Chellattan Veettil

Impact of COVID on food consumption, job loss and income: Empirical evidence from rural households in eastern India

Abstract

CVOID-19 pandemic caused serious disruptions in the way people live, interact and work leading to emerging of a new normal life. In this process, the poor and the vulnerable suffered, and this paper analysed how smallholder farmers cope up with COVID pandemic, specifically the disruptions happened due to the dramatic and unprepared nationwide lockdown in India. Building on a baseline data, we implemented a telephonic survey of farmers in eastern India. The results indicated that farmers are anxious and variables associated with lockdown restrictions were found significantly increasing anxiety level of smallholders. One fourth of households lost their job and 32 per cent of the families stopped receiving remittance. More than 80 per cent of farmers faced some loss of agricultural income due to COVID-19, half of them had to sell their crop at a lower price, 15% delayed harvest due to labour or machine availability, two fourth missed market opportunities and one third did not find any buyer for their produce. As a consequence of this income shock, nearly half of the rural households responded with reduction in their food consumption, more importantly they significantly reduced fruits, vegetables and protein sources such as eggs, meat, fish and legume.

Key words: COVID, lockdown, income loss, job, food consumption, India

JEL: Q120, D100, Q180

1. Introduction

CVOID-19 pandemic, the gravest health emergency of our times, caused serious disruptions in the economic, social and political systems and lives worldwide (Sengupta and Jha, 2020), including agricultural production and food systems. Soon after early spread of COVID-19 in China, followed by European countries, an unprecedented global chaos emerged, and different countries started taking various measures to curb the disease spread such as border closures, travel bans, restrictions of public gatherings, political rallies, quarantines, curfews, social distance, trade restrictions, restrictions on manufacturing and other goods & services, and a complete shutdown of economy and the social life, In general, it had impacted many economies causing unemployment, wage-cut, business failure, market and food supply system disruptions with a changed patterns in the production and distribution of food, reduced consumption, etc. (Farrell, et al. 2020). According to the IMF forecast, global economic growth will fall to -4.9% for the year 2020, compared to 3.4% in 2019. It is estimated that with a scenario of a twenty percent income or consumption reduction, global poverty will increase to 420–580 million people (Sumner et al., 2020). Approximately, 14 to 22 million people globally could slip into extreme poverty and as COVID-19 leads to widespread income losses, an increasing number of consumers may unable to afford food, amplify the food and nutritional security crisis (IPES-Food 2020). World Bank forecasted a reversal from declining trend of global poverty due to COVID-19, causing an increase of poverty in the first time since 1998 and will push 49 million people into extreme poverty in 2020 (World Bank, 2020). The disproportionate effect of COVID-19 related measures on smallholders and other population who are already vulnerable to poverty and malnutrition is to be understood and addressed carefully (Laborde et al., 2020). Various policy responses in areas of broad fiscal, business, health, farm, governance, monetary and financial, transportation and population movement, social protection and trade are adopted to curtail the disease spread and improve the economic condition of people (IFPRI, 2020). Indian government

imposed one of the strictest measures to tackle the virus spread, including a lockdown for several weeks where all economic activities resulting in disruption of all production and supply of goods and services (Ramakumar, 2020). Various policy responses including stimulus packages as well as social support measures such as cash transfer, food aids, moratorium on bank loans, financial support for business units, free testing of COVID and health care etc. were laid down to address critical sectors impacted due to the lockdown. Unfortunately, India's GDP contracts by a staggering 23.9% in the COVID hit first quarter of 2020-21 which is the lowest figure among the G-20 countries. Agriculture showed a modest positive growth of 3.4%, and naturally one would expect, less pronounced effect of COVID on rural households who are primarily depend on agriculture as their primary income and livelihood source. In contrast to this positive agriculture growth, the responses from smallholders in under developed states are not very encouraging (Ceballos et al, 2020). Using primary data from field, we investigate the impact of COVID on agriculture, income and rural jobs. As a consequence of these impacts, we further study the response mechanism of the rural farming households in terms of their food consumption.

Though agriculture production in the summer season was not affected, the winter season is expected to be impacted due to COVID restrictions (Pu and Zhong, 2020). In India, the harvesting of winter crop (mainly wheat) as well as production activities of kharif rice were affected due to supply chain and market disruptions of output and inputs, as well as due to mobility restrictions during the lockdown. Agricultural services including machinery, extension and information etc. and labor were also seriously constrained during initial weeks of lockdown when the interstate and inter district movements (Balwinder-Singh et al, 2020, Ceallos et al, 2020). The widespread yield gap and rural poverty in eastern India is well known. Many families or family members from this region resort to migration to western or southern states of the country in search of jobs. Those migrant populations

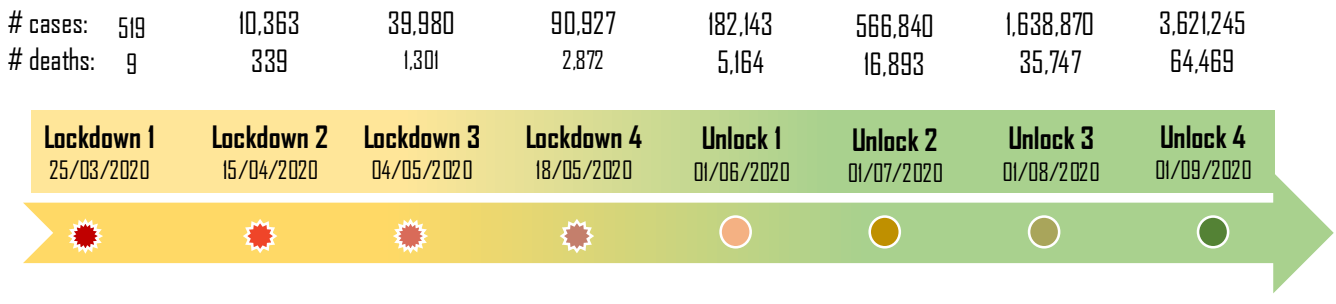
involved in casual and other unskilled or semiskilled jobs in cities as well as offer labor to the rural areas of southern and western states. Stating that, the migrant population plays a critical role in agriculture in two ways: first, by offering agricultural labor to the productive regions in western and southern states, and by investing in agriculture back home (eastern states) through remittance. This linkage is also critical in bringing new technology or information back to their home, consequently improves the farm productivity and innovativeness in agriculture. Due to COVID-19 induced restrictions and consequent job loss, millions of those workers in India started their long trek home with scant opportunities, no hope and increased uncertainties of migration in near future (Chaba and Damodara, 2020). This exodus of migrant labors can have two major consequences on food security – through production disruptions in major food producing states (Balwinder-Singh et al., 2020) and via decreased opportunities and income for the migrant population to secure food for their own household. The scale and depth of income loss and food insecurity of rural population and their migrant family members is the central of this paper. On top of the economic slowdown prior to COVID-19, the lock down induced a steep recession (Torero, 2020) putting the food systems under grave risks (WFP, FAO & UNICEF, 2020).

So far most studies have focused on either secondary data or scenario based simulation analysis to understand the impact of COVID-19 on agriculture. Many consequences of COVID on agriculture and food security are yet to be understood (Jambor et al, 2020) and in this study, by utilizing RMS baseline data, we developed a novel dataset on COVID-19 impact on agriculture and rural household using CATI (computer assisted telephonic interview) of 1443 rural households in Bihar and Eastern UP. Ceballos et al (2020) highlighted a differential impact on smallholders as producers and as consumers. We expect that the impact of COVID induced restrictions are manifold in this region – directly to their agriculture production and income due to lock down restrictions and consequent

supply chain disruptions, and second due to the economic shocks of households including those family members who were migrant labors who lost their jobs and set to return home state. We extending the discourse on COVID impact on agriculture, by analyzing the personal and household effects such as their anxiety about the pandemic, rural mobility, job loss, remittance, food consumption, etc. and agricultural consequences such as income loss, availability of critical inputs such as rental land, seeds, fertilizers and machine services etc. The paper is structured as follows – next session discusses the lockdown as India's response to COVID pandemic with a specific focus on agriculture, third session briefly detail the survey protocol and fourth session explain the results from the study. Finally, the paper concludes with highlighting the impacts and potential support mechanism to safeguard the interest of those poor rural households in eastern India.

2. **Lockdown - India's response to COVID**

The government of India, after the successful piloting of a 14 hour 'janata (people's)' curfew on 22nd March 2020, a nationwide lockdown was ordered on 24th March 2020 for 21 days (phase I: 25th March to 14th April) against COVID-19 whereby limit the movement of entire population, which was later extended for another three phases (phase II: 15th April to 3rd May, phase III: 4th to 17th May and phase IV: 18th to 31st May), with some conditional relaxations till 31st May 2020. Thereafter, a long unlock process started with phased relaxations (Unlock I: 1st to 30th June, Unlock II: 1st to 31st July, Unlock III: 1st to 31st August, Unlock IV: 1st to 30th September). As of 24th September 2020, India reported second highest COVID-19 cases (5.73 million) in the world (31.80 million), a staggering 17.95% of the global cases with no sign of flattening the curve.



Inevitably, the agriculture sector is also affected due to COVID-19 lockdown. At the time of lockdown announcement, it concurs with the harvest of winter (Rabi) crops. Some of the major winter crops include wheat, barley, oats, pulses and grams, oil seeds, fruits, vegetables, etc. The lockdown restriction has affected the harvest due to labour shortage and access to fuel for farm machineries among others (Arumugam et al., 2020). Due to lack of transport restrictions, mainly fresh food supply chains are disrupted and it results in increased levels of food loss and waste (Purdy, 2020). Small-scale vegetables and fruits cultivators are predominantly affected by lack of markets due to wide closure of farmers markets (Altieri and Nicholls, 2020). Further, it added considerable additional economic burden on farmers because of higher costs, increased debt burden, inability to sell the produce at reasonable prices and crop losses (Bhavani and Gopinath, 2020; Rawal et al., 2020).

3. Telephonic survey

The government of India on 24th March 2020 has ordered a nationwide lockdown for 21 days (phase I: 25th March to 14th April) against COVID-19 whereby limit the movement of entire population, which was later extended for another three phases (phase II: 15th April to 3rd May, phase III: 4th to 17th May and phase IV: 18th to 31st May), with some conditional relaxations till 31st May 2020. Thereafter, a long unlock process started with phased relaxations (Unlock I: 1st to 30th June, Unlock II: 1st to 31st July, Unlock III: 1st to 31st August, Unlock IV: 1st to 30th September). We did a telephonic survey with 1500 rural households (Bihar and eastern Uttar Pradhesh) immediately after the lockdown ends and completed survey before the unlock process ends (from first week of June to the first week of September). The respondents are selected using the list of households obtained from a recent survey (Rice Monitoring Survey (RMS), 2018). RMS employed a probability proportionate sampling approach to select villages using Census 2011 data. After choosing the village, a complete census of the villages was done and 12 rural households from each village was selected for the detailed household survey. This survey is not restricted to farmers, and hence the sample is a representative survey of the rural households in the region.

The survey captured information regarding awareness of COVID, agricultural income and rural job loss, access and affordability of agricultural inputs due to COVID, changes in food consumption, crop planning for the next season, etc. It was conducted after taking prior appointment from respondents and questions were asked in local language. It took on average 30 minutes to complete one questionnaire. The respondents were the same people who responded to our previous rice monitoring interview in 2018 and covers 58 districts in the region (713 farmers from 38 districts in Bihar and 730 farmers from 20 districts in eastern UP).

4. Results and Discussion

4.1 Awareness, anxiety and incidence of COVID-19

Almost all respondents are aware about lockdown and attributed COVID-19 as the reason for imposing lockdown. 7.4% of them have reported incidence of COVID-19 at their village, but only 1.4% had any COVID related symptoms at the time of survey. The reported incidence of COVID is double in Bihar (10%) than in UP, but the reported COVID-19 related symptoms among respondents are higher in UP (2%) than in Bihar (0.7%). As indicated in figure 1, only one fifth respondents are not worried about COVID and a similar proportion of people are scared of COVID. Majority of Bihar respondent are slightly worried (69%), only 13 % are very worried and 5% scared. Whereas in UP the extreme cases are very high – one fourth population not scared, 25% slightly worried, 10% very worried and 38% scared. The economic and employment shocks resulting from COVID-19 pandemic affect the physical and mental health of people, increasingly for the vulnerable people (including children, pregnant women etc.) who are worst hit both economically and socially (Roberton et al 2020. WFP, FAO & UNICEF, 2020).

Fig 1. Are rural people worried about COVID-19?

The ordered probit model estimates (table 1) showed that the lockdown induced variables such as mobility restriction, unavailability of agricultural inputs, significant decrease in labour availability in the village, job loss, reduced food consumption, COVID related variables such as presence of COVID similar symptoms (fever, cold, cough etc.) and number of COVID cases in the village are significantly increasing the anxiety among people whereas increased labour availability in the village, reduced female wage, increased agricultural income and no or minor effect on food consumption in the household are found significantly reducing the anxiety of the people. We also found the anxiety has not reduced over time post lock down.

Table 1. Ordered probit model for anxiety

Dependent variable: Anxiety	**Coeff (std. err.)**	**Odds Ratio**
Lockdown & COVID related variables		
Weeks after starting of lockdown	0.028 (0.028)	1.029 (0.028)
Mobility affected		
Moderately	0.570*** (0.176)	1.768*** (0.176)
Severely	0.709*** (0.172)	2.031*** (0.172)
Slightly	0.808*** (0.205)	2.243*** (0.205)
Input NOT available	0.449*** (0.114)	1.567*** (0.114)
Labour availability in the village		
Significant decrease	1.150*** (0.372)	3.157*** (0.372)
Significant increase	-0.212 (0.134)	0.809 (0.134)
Slight decrease	-0.871 (0.550)	0.419 (0.550)
Slight increase	-0.506*** (0.142)	0.603*** (0.142)
Male wage difference	-0.001 (0.001)	0.999 (0.001)
Female wage difference	-0.002** (0.001)	0.998** (0.001)
Agri. income	-0.326** (0.146)	0.722** (0.146)
Job loss	0.857*** (0.132)	2.355*** (0.132)
Food consumption response		

Moderately reduced	0.228 (0.141)	1.256 (0.141)
Significantly reduced	0.612** (0.261)	1.843** (0.261)
Slightly reduced	-0.314** (0.130)	0.730** (0.130)
COVID symptoms	0.839* (0.453)	2.314* (0.453)
COVID cases in village	0.434** (0.199)	1.543** (0.199)
Personal & HH characters		
Age	0.004 (0.004)	1.004 (0.004)
Education	0.017 (0.011)	1.018 (0.011)
Caste		
SC or ST	0.114 (0.175)	1.121 (0.175)
OBC	0.072 (0.111)	1.075 (0.111)
Land owned	0.016 (0.011)	1.017 (0.011)
Threshold parameters		
Not worried to Little worried	-0.342 (0.631)	
Little worried to Very worried	1.922 (0.633)***	
Very worried to Scared	2.615 (0.636)***	

Number of observations = 1418; AIC = 3423; *p < 0.10, **p < 0.05, ***p < 0.01.

4.2 Household mobility, job loss and remittance

Lockdown imposed serious restrictions on people mobility. Here we investigate whether the mobility restrictions are largely an urban phenomenon or it is visible in rural areas as well. The results indicated that majority had faced moderate (32%) to severe (40%) mobility restrictions in rural areas. Nevertheless, 14% reported they are not affected. It means those people were mostly confined within village and as evident from the data the mobility within village is not restricted and hence the mobility of those who travels outside village are mostly been affected by the lockdown. As noted from figure 2, the restrictions are found more affected in rural areas of UP (77% moderate to highly affected) than in Bihar (66% moderate to highly affected).

Fig 2. Mobility of rural people during lockdown

COVID-19 pandemic has already resulted in significant job loss and increased unemployment across different countries (ILO, 2020). As evident from table 1, more than one fourth of the households faced a job loss due to the COVID induced measures such as lockdown. The job loss is more pronounced in UP (31%) than in Bihar (21%). The major sectors that suffered job loss are in manufacturing (35%), construction (13%), transport (8%), casual jobs (14%), textile (11%) and software/electronic (10%). Nearly half of the households did not receive any remittance, but among those who receive, 63% of the households reported a complete stop of remittance and 32% reported no change in amount of remittance that they receive. Rural areas in UP is more impacted in terms of households receiving remittance than Bihar (table 1).

Table 1. COVID19 and job loss and remittance

Item	Bihar	UP	Overall
Job loss during lockdown (yes=1)	153 (21.46%)	228 (31.23%)	381 (26.40%)
Change in remittance			
1. No change in amount	115 (16.13%)	116 (15.89%)	231 (16.08%)

2. Reduced amount	23 (3.23%)	18 (2.47%)	41 (2.84%)
3. Completely stopped	176 (24.68%)	284 (38.90%)	460 (31.88%)
4. No remittance	399 (55.96%)	312 (42.74%)	711 (49.27%)

4.3 COVID-19 and agriculture income loss

The lockdown imposed in India coincided with the harvesting of winter crop. During the lockdown, millions of seasonal migrants set to return home state and this has huge implications in harvesting of winter crops specifically in north western part of the country (Ceballos et al, 2020). Mandis (regulated markets) were closed till the second phase of lockdown (GoI, 2020) and several farmers missed marketing opportunity of their harvested produce. The field data showed that majority of farmers (83%) faced an income loss due to COVID. There can be multiple factors contributing to this income loss during lockdown – disruptions in the food supply chain and transportation, causing marketing problems for the harvested produce resulting in huge gap between prices received by farmers and the prices paid by consumers, and delay in harvesting the produce itself due to lockdown restrictions resulting in availing labour and machine services. From figure 3, it is clearly observed that nearly half of them had to sell their crop at a lower price, 15% delayed harvest due to labour or machine availability, two fourth missed market opportunities and one third did not find any buyer for their produce. It is important to note here that not all harvest delays resulted in agricultural income loss.

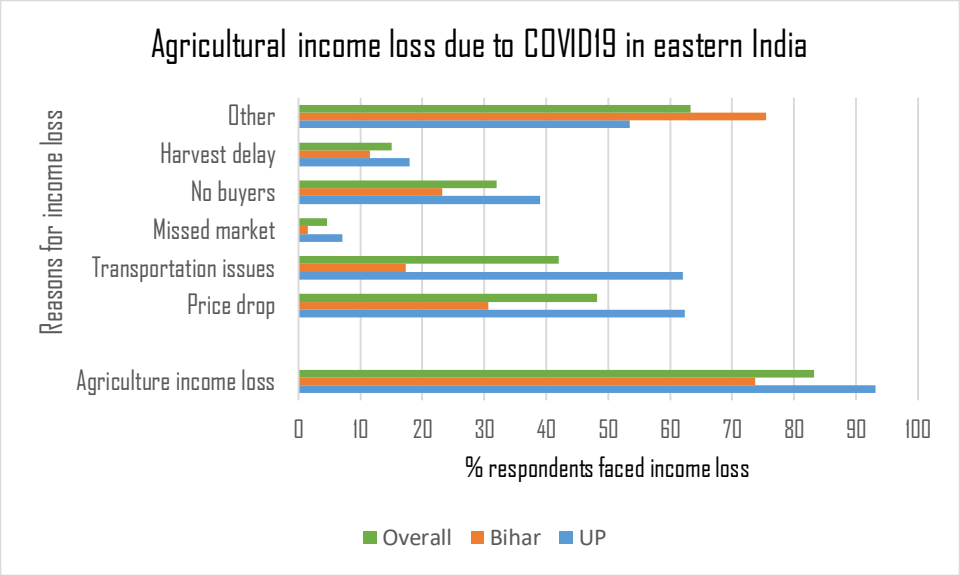


Fig 3. Agricultural income loss due to COVID19 in eastern India

We look deeper into the major winter crop, wheat harvest delays and selling problems during the lockdown and found that on average one-week delay in wheat harvest is observed. But in UP, 20% farmers faced more than two weeks and another 26% two weeks delay in harvest whereas the COVID-19 induced wheat harvest delay is much lower in UP (only 5% reported a delay of >2 weeks and 10% a delay of 2 weeks). Majority farmers in UP (78%) could harvest the crop on time whereas it is significantly lower in Bihar (43%). A similar trend is observed in terms of difficulties encountered with selling wheat harvest. Bihar is severely impacted with a nearly half of the sample farmers could not sell their produce and another 25% could sell only half of the wheat harvest. Only one fourth Bihar farmers could sell their produce completely. In sharp contrast, majority of UP farmers could sell their wheat harvest during the lockdown (73%) and only 17% could not sell their produce completely. Another 10% farmers could not sell half or one fourth of their produce.

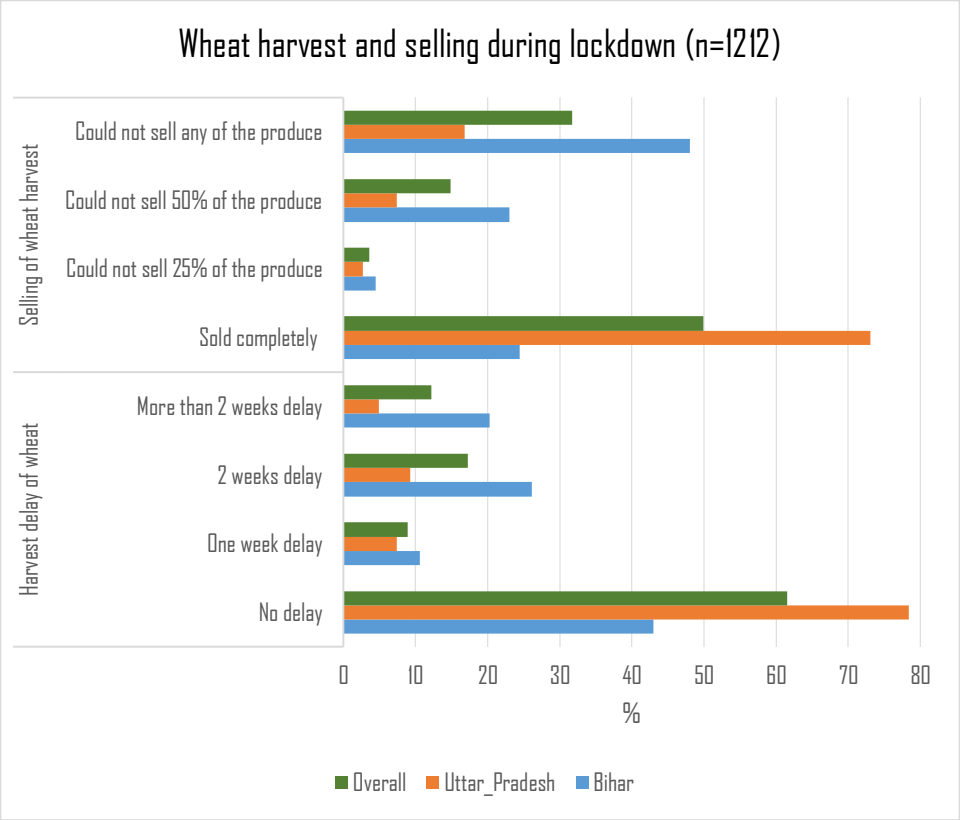


Fig 4. Agricultural income loss due to COVID19 in eastern India

4.4 Land rental market, cash constraints and availability of critical inputs during lockdown

Lockdown has temporarily suspended most economic activities in rural areas as well. In this session, we analyse how did the lockdown impact on critical inputs of agricultural production including land rental markets, availability of seeds. Chemicals and other production inputs. An increase of on average 401 Rs. per acre (4%) in land rental rate is reported, with almost double the increase in UP than in Bihar.

Table 2. Land rental markets and critical inputs during lockdown

Items	Bihar	UP	Overall
Change in land rental rate due to COVID (Rs.) (n=743)	275.22 (831.65)	515.98 (7511.96)	400.94 (5456.74)
Availability of inputs for kharif 2020 (yes=1)	393 (55.12%)	591 (80.96%)	984 (68.42%)

NON availability of critical inputs during lockdown			
1. Seeds (n=454)	235 (73.9%)	58 (42.65%)	293 (64.54%)
2. Pesticide (n=454)	230 (72.33%)	55 (40.44%)	285 (62.78%)
3. Fertilizer (n=454)	241 (75.79%)	80 (58.82%)	321 (70.7%)
4. Machine service (n=454)	206 (64.78%)	72 (52.94%)	278 (61.23%)
5. Labour (n=454)	246 (77.36%)	87 (63.97%)	333 (73.34%)
Seed shop as the source of seed	575 (80.65%)	494 (67.67%)	1069 (74.08%)
Change the variety due to unavailability in market (yes=1) n=1443)	133 (18.65%)	86 (11.78%)	219 (15.18%)
Change the fertilizer due to unavailability in market (yes=1) (n=611)*	49 (13.21%)	18 (7.5%)	67 (10.96%)
Face cash or credit constraint (yes=1) (n=1442)	417 (58.49%)	513 (70.27%)	930 (64.49%)

Almost one third farmers reported that they faced difficulty in availing inputs for agricultural production due to lockdown (Table 2). Amongst them, 62% to 73% of them are faced difficulties in accessing pesticide, seeds, fertilizer, machine services and labour. The labour availability is in sharp contrast with our expectations. Bihar and UP homes for the migrant workers, who happened to return to their home villages during the lockdown. But since the harvesting of the crop is done, before the migrant population returns and probably those migrant labours are not yet mentally ready to offer their labour or social stigma on COVID amongst the villagers making those 'outside' labours unaccounted temporarily etc. contribute to this large labour availability issue. We observed that the labour wage rate reduced post lockdown, indicating that there is higher supply of labour due to return migrants. Majority farmers (74%) depend on seed shops as their source of seed. Probably this will attribute to a reported changing of variety by 15% and fertilizer by 11% of farmers due to unavailability in market. 65% of rural people face cash constraint, that is, COVID aggravates already credit constraint farmers.

4.5 Food consumption and nutritional implications due to COVID-19

Food, nutrition, health and socioeconomic outcomes are interlinked and we established the negative impact of lockdown on farm gate price, their income, job loss and future production (availability of quality inputs and agricultural services). The impact of COVID on food and nutritional security have been relatively minor in developed countries, but would have far reaching consequences in the developing countries (Sumner et al, 2020). The food consumption pattern in developed countries are changed due to changes in eating behaviour (Torero, 2020). In this session, we unravel the consequences in developing country. As evident from the previous sessions, COVID-19 impacted on agricultural income, jobs and remittance. One of the immediate consequences on these income shock on rural households might reflect in their food consumption – food purchase and eating behaviour. In this session we analyse if the rural households responded to COVID-19 induced impacts with a changed consumption behaviour during and post lockdown period and if so, what types of foods are being removed from their plate. Data showed that nearly half of the rural people slightly (23%) to significantly (5%) reduced their food consumption during lockdown. That is, one fourth rural households responded with moderate to high reduction in their food basket, Bihar people significantly more affected than UP. As observed in figure 5, households reduced all types of food items, but fruits, vegetables and protein sources such as eggs, meat, fish and legumes were significantly being removed from their plate. This will have high nutritional consequences to the people, unless the situation improves soon. Comparatively the cereal reduction is low, 17% of the households who were affected by the lockdown. A similar result on COVID diet with larger energy intake and lower nutritional quality was reported in Spain (Batle-Bayer et al. 2020). The pattern of removal of food items from the rural household budget is alarming and required attention by the social safety policy and more so for Bihar where the reduction is significantly higher. On supply side, Chinese experience showed a significant reduction in marketing quantity of agricultural products including

grain, animal products, vegetables and fruits (Pu and Zhong, 2020). In Afrika, the proportion of food insecure respondents increased by a staggering 38% and 44% in Kenya and Uganda, respectively (Kansiime, et al, 2021). The fruit consumption in Afrika during COVID pandemic, as per this study, was decreased by 30% during the COVID pandemic, which is in line with our results.

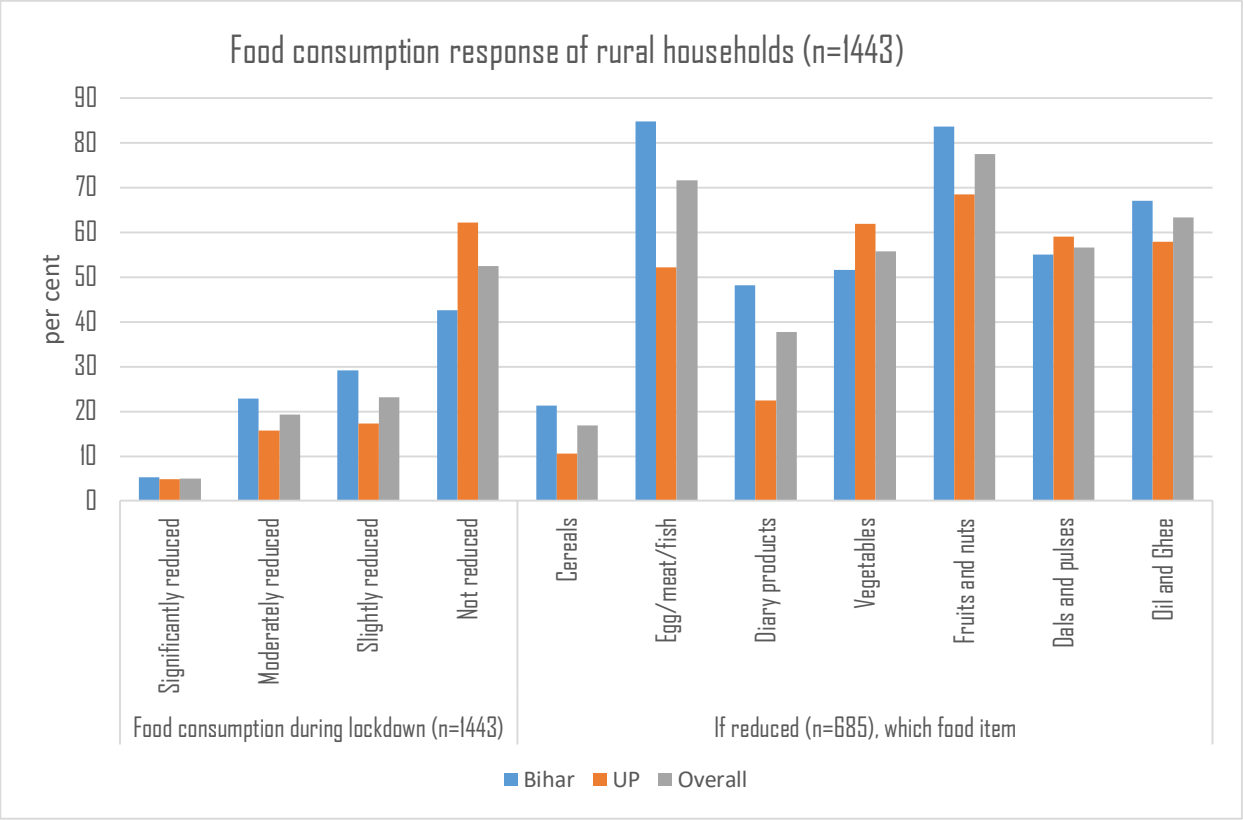


Fig 5. Food consumption of rural people during lockdown

5. Conclusion

CVOID-19 pandemic caused serious disruptions in the way people live, interact and work leading to emerging of a new normal life. In this process, the poor and the vulnerable suffered, and this paper analysed the impact of COVID on smallholder farmers, specifically looking at the consequences of the disruptions happened due to the dramatic and unprepared nationwide lockdown in India. Building on a baseline data, we implemented a telephonic survey of farmers in eastern India. The results indicated that majority rural

people are scared and the lockdown restrictions were found significantly increasing anxiety level of smallholders. This is pointing towards the unpreparedness of the large rural population in combating the health emergency and associated job loss and income shocks. A large proportion of the household faced job loss and associated income loss. Further to aggravate the scenario, income loss from agriculture as well as from remittance impacted the household. They rapidly responded with changing food consumption. That is, rural people reduced the budget for fruits, vegetables and protein sources such as eggs, meat, fish and legume. The nutritional implication of this undesirable food consumption with reduced diet diversity required to be duly and immediately addressed through social safety net program such public distribution system, continued provisioning through schools etc.

REFERENCES

Altieri, M.A., Nicholls, C.I. 2020. Agroecology and the emergence of a post COVID-19 agriculture. *Agric Hum Values* 37, 525–526.

Arumugam, K., Nagai, T., Haneishi. Y. 2020. Policy options for galvanizing Africa's rice sector against impacts of COVID-19. World Dev., 16, 105-126

Balwinder-Singh, Shirsath, P. B., Jat, M. L., McDonald, A. J., Srivastava, A. K., Craufurd, P., et al. 2020. Agricultural labor, COVID-19, and potential implications for food security and air quality in the breadbasket of India. *Agric. Syst.* 185, 102954.

Batlle-Bayer, L., Aldaco, R., Bala, A. Puig, R., Laso, J., Margallo, I. 2020. Vázquez-Rowe, J.M. Antó, P. Fullana-i-Palmer. 2020. Environmental and nutritional impacts of dietary changes in Spain during the COVID-19 lockdown. Sci. Total Environ., 748.

Bhavani, R. V., Gopinath, R. 2020. "The COVID19 pandemic crisis and the relevance of a farm-system-for-nutrition approach," Food Security: The Science, Sociology and Economics of Food Production and Access to Food, Springer;The International Society for Plant Pathology, vol. 12(4), pages 881-884

Ceballos, F. Kannan, S. Kramer, B. 2020. Impacts of a national lockdown on smallholder farmers' income and food security: Empirical evidence from two states in India, World Development,Volume 136,

Chaba, A.A., Damodara, H. 2020. The Covid Nudge: Labour Shortage makes Punjab, Haryana Farmers Switch from Paddy to Cotton The Indian Express (2020, April 30). https://indianexpress.com/article/india/covid-19-punjab-haryana-farmers-paddy-cotton-6385600/

WFP, FAO & UNICEF. 2020. *Interim guidance note: Mitigating the effects of the COVID-19 pandemic on food and nutrition of schoolchildren.* Rome. https://doi.org/10.4060/ca8434en

Farrell, P., Thow, A.M., Wate, J.T. *et al.* 2020. COVID-19 and Pacific food system resilience: opportunities to build a robust response. *Food Sec.* 12, 783–791.

IFPRI, 2020. COVID-19 Policy Response (CPR) portal. Available at: https://public.tableau.com/profile/ifpri.td7290#!/vizhome/CPRPORTAL/Overview?publish=yes . Accessed on December 2, 2020.

ILO, 2020. ILO Monitor: COVID-19 and the world of work. Fifth edition Updated estimates and analysis. Available online at: https://ilostat.ilo.org/topics/covid-19/ (accessed September 2, 2020).

IPES-Food. 2020. *COVID-19 and the Crisis in Food Systems: Symptoms, Causes, and Potential Solutions*. Communiqué.

Jambor, A., Czine, P., Balogh, P. 2020. The impact of the coronavirus on agriculture: first evidence based on global newspapers. Sustainability 12:4535.

Kansiime, M. K., Tambo, J. A., Mugambi, I., Bundi, M., Kara, A., Owuor, C. 2021. COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World development*, *137*, 105199. https://doi.org/10.1016/j.worlddev.2020.105199

Laborde, D., Martin, W., Vos, R. 2020. Poverty and food insecurity could grow dramatically as COVID-19 spreads. Blog published by the International Food Policy Research Institute (IFPRI). https://www.ifpri.org/blog/poverty-and-food-insecurity-could-grow-dramatically-covid-19-spreads.

Pu, M., Zhong, Y. 2020. Rising concerns over agricultural production as COVID-19 spreads: lessons from China. Global Food Sec., 26

Purdy, C. 202). The stability of the global food system relies on immigrants. Quartz. Available at https://qz.com/1844194/covid-19-exposes-how-the-global-food-system-relies-on-immigrants/

Ramakumar R. 2020. Agriculture and the Covid-19 pandemic: An analysis with special reference to India. Rev. Agrar. Stud., 10 (1) (2020)

Rawal, V., Kumar, M., Verma, A., Pais, J., 2020. COVID-19 lockdown: Impact on agriculture and rural economy. *SSER Monogr*. Retrieved from http://archive.indianstatistics.org/sserwp/sserwp2003.pdf. New Delhi: Society for Social and Economic Research, 22/3.

Roberton, T. , Carter, E.D. , Chou, V.B. , Stegmuller, A.R. , Jackson, B.D. , Tam, Y. , Sawadogo, L.T. , Walker, N. 2020. Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study. *Lancet Glob Health*, https://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(20)30229-1.pdf

Sengupta, S., Jha, M.K. 2020. Social Policy COVID 19 and impoverished migrants: Challenges and prospects in Locked Down India. The International Journal of Community and Social Development 2(2).

Sumner, A., Hoy, C., Ortiz-Juarez, E. 2020. Estimates of the Impact of COVID-19 on Global Poverty. UNU-WIDER Working Paper 2020/43.

Torero M. 2020. Without food, there can be no exit from the pandemic. *Nature*. 580:588–589.

World Bank, 2020. Assessing the economic impact of COVID-19 and policy responses in sub-Saharan Africa. Africa's Pulse. World Bank Group; Washington, DC: