

Coping to Covid-19 in Uttar Pradesh, India: Evidence from NSSO 76th Round Data

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Abstract

This paper aims at identifying key determinants, which influence and motivates households to wash hand on a regular basis with soap and water before taking meal and after open defecation in urban Uttar Pradesh using household-level 76th round NSSO data (July-December 2018). Binary logistic regression model results show households those are having access to safe and sufficient water throughout the year are also more likely to wash their hands compare to those households that don't have access to water. Therefore, increasing investment in WASH services would act as an important mechanism to mitigate the secondary effects of Covid-19 in communities.

Keywords

Hand-Wash, NSSO, Binary Logistic Regression, Covid-19, Uttar Pradesh

1. Introduction

During the last 50 years, the world has seen four major outbreaks namely Ebola (1976), SARS (2003), H1NI (2009), and now Covid-19 (2019). The World Health Organization (2020) identifies Covid-19 as highly communicable virus compared to Ebola and HINI viruses. It was observed that within a month, Covid-19 has become pandemic from epidemic. Since the first case of Covid-19 was reported in financial hub of China viz., Wuhan (31st December 2019), there are 1.24 million deaths are reported due to covid-19 till now (11th November 2020) (WHO, 2020: pp. 1-25). It shows susceptibility of human population to any viral diseases. It also highlights the preparedness of global community against future pandemics. In India, due to failure of appropriate health measures by Government of India, Covid-19 spread across all states. At the beginning of 2020, Co-

vid-19 cases were limited within few urban pockets of India. However, due to late implementation of various measures by Government such as travel advisory issued to Ports and International Airports, testing of covid-19 to foreign travelers, lack of contact tracing, slow sample testing of Covid-19, inadequate appropriate measures to retain reverse migration, it spread to rural pockets too. This has also been seen in the pre and post-lockdown periods. In India, cases are slowly increasing during pre-lockdown period (February-March, 2020), moderately increased during lockdown period (April-July, 2020), and sharply increased during post-lockdown period (August to till now). During pre-lockdown period, Covid-19 cases were only 1257, during lockdown period cases were 16,38,870, while post-lockdown period 90,04,365 cases were reported. This shows transitional shift in the number of Covid-19 cases and effectiveness of lockdown measures. <https://www.mygov.in/covid-19>

Though lockdown measures are helped in the lowering of the graph of Covid-19 cases, the economic cost of lockdown was unprecedented and huge. The Gross Domestic Product (GDP) of Indian economy has contracted to negative growth up to 23.9% in the April-June quarter of 2020 fiscal year (MOSPI, 2020: pp. 15-23). This is the worst decline ever recorded as India started compiling GDP statistics on a quarterly basis since 1996. The main reason for dramatic decline in GDP is unplanned lockdown measure. Due to lockdown, private consumption was declined 27% from 59%, while private investment fell by 74% in 2020. Lockdown was severely affected to unorganized sector's worker. All top employment providing section including construction report sharp decline, due to this, unemployment rate rose 6.7% on 15 March to 26% on 19 April, 2020. A joint report published by International Labor Organization and Asian Development Bank (2020) predicted that if corrective measures will not take then India would go into recession (Singh, 2020d: pp. 17-34; Singh, 2018: pp. 1-16).

In Uttar Pradesh, Covid-19 has severely affected the population both in terms of life and livelihood. With inadequate health infrastructure (only 18 medical colleges over 204.20 million population) highlights the susceptibility of population. More than 75% of population in Uttar Pradesh is residing in rural areas without safe drinking water and sanitation facilities, which is highly vulnerable to Covid-19 pandemic. Covid-19 cases were reported a transitional shift from urban pockets to rural areas during post-lockdown period (Table 1). Uttar Pradesh is divided into four economic regions namely Western, Central, Eastern

Table 1. Compositional shift of Covid-19 from urban to rural uttar pradesh.

Period/Region	Western	Central	Eastern	Bundelkhand	Uttar Pradesh
Pre-Lockdown	30	18	9	8	65
Lockdown	67,977	48,222	49,268	6921	172,388
Post-Lockdown	192,079	200,513	189,914	20,951	603,457

Source: <https://www.mygov.in/covid-19> Note: data was collected from 1st April to 5th October, 2020.

and Bundelkhand. According to the [Census \(2011\)](#), population living in Western and Central region is relatively urbanized compared to Eastern and Bundelkhand regions. In this connection, [Table 1](#) shows that Covid-19 cases in pre and during lockdown period are mostly reported in urban pockets, while during post-lockdown period Covid-19 cases are highly reported in rural areas. During pre-lockdown period, highest Covid-19 cases were reported in the highly urbanized (38.07% of population living in urban areas) western region (mostly in Gautam Budha Nagar district), while least cases were reported in the highly rural and backward region namely Bundelkhand (only 19.55% of population living in urban pockets). Further, during lockdown period, Covid-19 cases have increased dramatically in all the regions. For example, in western region, cases increases from 30 to 67,977. Furthermore, due to failure of government measures and inadequate food supply, migrated people are started return to their home places viz., rural areas. Hence, in the highly ruralized region (Bundelkhand region) Covid-19 cases are increased 603,457 from 172,388 during 1st April to 5th October 2020.

The inter-region analysis shows that in the western region highest cases were reported in the Gaziabad district (28,206), while least cases were reported in the Hathras district (1957). In the central region, highest cases were reported in the Lucknow district (103,904), while least cases were reported in the Kashganj district. Further, in the eastern region, highest cases were reported in the Prayagraj district (37,820), while least in Balrampur district (2711).

In order to cope with Covid-19, WHO has recommended several adaptation and coping measures to control the spread of Covid-19 such as use of subsidiary medicines, social distancing, hand wash, sanitization of workplace, and etc. Further, after carefully review of previous studies ([Jamie, 2020: pp. 1-5](#); [Singh, 2020c: pp. 1-4](#)), it was found that previous studies are mostly investigated hand washing practices in the urban areas, schools ([Koo et al., 2020: pp. 678-688](#)), hospitals ([Jamie, 2020: pp. 1-5](#)) and workplace ([Singh, 2020c: pp. 1-4](#)), while no study has assessed the determinants of hand-washing in urban Uttar Pradesh using latest NSSO data. Thus, we take an opportune to examine urban health infrastructure, behavioral aspect of washing hands, its determinants and linked with the feasibility of to prevent spread of Covid-19 in urban Uttar Pradesh. Hence, the study uses household level secondary data collected from nationally representative National Sample Survey Office (NSSO) of 76th round, which was conducted during July-December 2018. Here it is important to mention that NSSO data was collected earlier from the Covid-19 emergences, but due to data was scientifically and representatively collected household-level information, therefore, easily capable to replicate the coping response of urban population to deal with any future health crisis.

Paper designs into four section. Emergence of Covid-19 and its impact on human health were discussed in Section 1. Section 2 provides information about study area, data sources, and estimation method, while results are presented in

Section 3. Concluding remarks and policy recommendations are given in the last section.

2. Materials and Methods

2.1. Study Area and Data Sources

Uttar Pradesh is the most populous state of India and located 26.85° North and 80.95° East. The state is divided into 18 divisions and 75 districts. It covered around 243,290 square kilometers of geographical area, and has 19, 98, 12, 341 population (Census, 2011: pp. 12-20). Nearly 22.27% of population in Uttar Pradesh live in urban areas. Population density of Uttar Pradesh is 828 person per square kilometer, while literacy rate is 71.10% (Singh, 2019: pp. 1-14).

As far as demographical features are concerned, Uttar Pradesh was reported 25.9 birth and 6.7 death rate per 1000 (Singh & Sanatan, 2018a: pp. 1-14; Singh & Sanatan, 2018b: pp. 23-46; Singh, 2020a: pp. 1-23). Further, infant mortality rate was 41 per 1000 (Singh & Sanatan, 2020: pp. 110-129). Health infrastructure is relatively poor compared to India. Uttar Pradesh has only 18 Government medical colleges (one medical college on 1, 11, 00685 population) (Singh, 2013: pp. 1-11).

The present study uses 76th round of National Sample Survey data collected by the National Statistical Office (NSO) of Ministry of Statistics and Programme Implementation (MOSPI), Government of India. NSO carried out a survey on “Drinking Water, Sanitation, Hygiene and Housing Condition” during July-December 2018 covering 1, 06, 837 households at all India level and 12,423 samples were collected from Uttar Pradesh. Further, out of 12,423 samples, 67% and 33% were collected from rural and urban areas respectively. As this study assessing the urban health infrastructure, therefore, our study was restricted to urban data viz., 4073 samples.

2.2. Estimation Method

In order to capture determinants of hand wash practices (which is main coping strategy suggested by WHO to cope with Covid-19), 76th NSSO round enquired whether household members regularly wash their hand before taking meal and wash their hand after defecation, binary logistic regression was employed (Singh, 2020b: pp. 1-13). The coping strategy (hand wash) is the dichotomous dependent variable (Y) of this model having binary value of one (1) if the household adapts hand wash as a coping strategy to covid-19, and zero (0) if otherwise (Singh, 2020a: pp. 1-23). The model also assumes that use of coping strategy is a log-linear function of the exogenous variables X_1, X_2 of the term, which is as follows.

$$L_i = \ln \frac{P_i}{1 - P_i} = Z_i = B_0 + B_1 X_1 + B_2 X_2 + \dots + B_n X_n$$

where, L = logit model, P = is the probability of using coping strategy. Denote as

$$P = \frac{1}{1 + e^{-z}} = \frac{e^z}{1 + e^z}$$

where,

$$Z = B_0 + B_1X_1 + B_2X_2 + \dots B_nX_n$$

Therefore, the probability of not using coping strategies is:

$$1 - P = \frac{1}{1 + e^{-z}} \frac{P}{1 - P} = \frac{1 + e^z}{1 + e^{-z}}$$

Now, $P/(1 - P)$ is simply the odds ratio in favour of using coping strategy i.e. the ratio of the probability that household will clean their hands to cushion the Covid-19 to the probability that he/she will not. Various representative socio-economic factors such as caste, number of family members in households, highest educational qualification of male and female members in the family, occupational status, religion, land size and land tenurial system are hypothesized as determinants of hand-washing (coping strategy to Covid 19) in the urban Uttar Pradesh. Description of variables that have been used for binary logistic regression are analysed (**Table 2**).

Table 2. Description of the dependent and explanatory variables.

Dependent variable	Mean	Description
Households wash their hand before taking meal and after defecation	0.98	Categorical (Yes = 1, No = 0)
Households having more than one room (social distancing)	0.92	Categorical (Yes = 1, No = 0)
Explanatory variables		
Households belongs to the Hindu religion	0.83	Categorical (Yes = 1, No = 0)
Households belongs to the SC/STs community	1.75	Categorical (Yes = 1, No = 0)
Age	26.49	Continuous
Marital status	0.95	Categorical (Married = 1, No = 0)
Educational status	0.63	Categorical (literate = 1, Illiterate = 0)
Exclusive access of Latrine	0.94	Categorical (Yes = 1, No = 0)
Access of safe drinking water	0.98	Categorical (Yes = 1, No = 0)
Access of sufficient water throughout the year	0.96	Categorical (Yes = 1, No = 0)
Access of all seasonal house	0.83	Categorical (Yes = 1, No = 0)
Access of Electricity	0.82	Categorical (Yes = 1, No = 0)
Access of close drainage system	0.29	Categorical (Yes = 1, No = 0)
Households disposing waste	0.003	Categorical (Yes = 1, No = 0)
Households experiencing floods	0.07	Categorical (Yes = 1, No = 0)
Households faced mosquitoes problem	0.99	Categorical (Yes = 1, No = 0)
Households having ventilation in the house	0.85	Categorical (Yes = 1, No = 0)

Source: Unit-level data of 76th round, NSSO, 2018.

Description of dependent and independent variables indicates that the majority of the population is year having 26.49 mean age (**Table 2**). Results also revealed that about 98% of households wash their hand before taking a meal and after defecation, and about 92% of households having more than one room. More than 80% of the population belongs to the Hindu religion. About 21.81% of the population in urban Uttar Pradesh belongs to the backward population (SC/STs community). Further, about 51.82% are males and 48.17% of the population in urban Uttar Pradesh. About 98% of the population has used latrine on a regular basis, and about 86.96% of the population having exclusive access to a latrine. Furthermore, more than 50% of the urban population in Uttar Pradesh has perceived that it has good ventilation in the rooms. Likewise, nearly 40% of the population responded that they are faced with severe health issues from mosquitoes. Nearly 5% of the population have faced floods during the rainy season from monsoon, while 2.29% of the population have faced flooding from rivers and canals. Similarly, only 44.64% of houses are connected with underground drainage systems. Interestingly, <90% of urban population having electricity connection.

3. Results and Discussion

3.1. Socioeconomic Characteristics of Sample Household

Socioeconomic characteristics are reflections of society's risk aversion behaviour. **Table 3** depicts that 78.43% of sample respondents in Uttar Pradesh belong to the Hindu religion, while the corresponding figure is 76.47% in India (**Census, 2011**). As far as social group is concerned, more than half of the population in Uttar Pradesh belongs to other backward community (OBC). Regional statistics of social group reveal that OBC population is higher in eastern region, while lower in central region. Nearly 1% of population is belongs to scheduled tribes caste. More than 50% of populations in Uttar Pradesh are unmarried, while it is highest 55.48% in western region. Male literacy rate is relatively higher and female literacy rate is relatively lower in Uttar Pradesh. Regional analysis reveals that male literacy is higher in Bundelkhand region (i.e., 62.84), while lower in central region (i.e., 57.54%). On the contrary, female literacy rate is relatively higher in central region (37.26%), while lower in Bundelkhand region (i.e., 37.26%). Nearly 90% of farmers are marginal having < 2 hectare land in Uttar Pradesh. Regional analysis reveals that marginal farmers were highest in eastern region (91.65%), while lowest in Bundelkhand region (73.61%). The mean age of sample households in Uttar Pradesh was 26.49 years. Annual consumption expenditure also is relatively higher in Uttar Pradesh (Rs. 9662.65).

As far as access to basic amenities is concerned, 96.03% of households getting sufficient water throughout the year in Uttar Pradesh. 59.01 & 45.15% of households having exclusive access of latrine and bathroom, while 15.67% of households faced water logging during rainy season in Uttar Pradesh. Nearly 24% of

households are regularly washed their hands with soap, while nearly 45% of households having availability of soap/detergent near to bathroom/latrine. About 28.35% of houses are connected with underground drainage, more than 80% of households having access of all seasonal road. Only 29.92% of households having good ventilation in the house, and still 30.64% of household using unclean fuel for cooking in Uttar Pradesh (Table 3).

Table 3. Socioeconomic features of sample households.

Indicators	Western	Central	Bundelkhand	Eastern	Uttar Pradesh
Religion					
Hindu	72.15	82.29	80.94	90.30	78.43
Islamic	26.25	16.44	16.47	8.19	19.61
Others	1.60	1.27	2.29	1.51	1.96
Social Group					
Scheduled Tribes	1.12	0.35	0.39	1.36	1.06
Scheduled Caste	19.28	25.66	25.88	25.26	23.25
Other Backward Caste	52.76	47.11	53.14	59.86	54.83
Others	26.84	26.88	20.59	13.32	20.85
Marital Status					
Never Married	55.88	49.87	47.46	51.43	51.43
Married	44.06	45.13	48.46	44.20	44.20
Widowed	3.93	4.77	4.32	4.21	4.21
Divorced/separated	0.14	0.23	0.06	0.16	0.16
Literacy Rate					
Male	57.65	57.54	62.84	60.83	59.22
Female	42.37	42.86	37.26	39.20	40.81
Land Size					
Marginal	88.76	88.36	73.61	91.65	89.11
Small	6.29	8.19	18.26	5.93	7.08
Semi-Medium	3.77	2.25	7.29	1.59	2.83
Medium	0.80	0.38	0.82	0.46	0.46
Large	0.38	0.57	0.03	0.36	0.36
Mean Age (Years)	26.33	27.72	28.59	26.70	27.34
Mean Annual Consumption Expenditure (Rs.)	12992.31	8710.33	12233.18	11118.42	11263.53
HHs getting sufficient water throughout the year	97.02	96.52	89.27	95.81	96.03
HHs having exclusive access of latrine	72.72	60.74	53.72	47.02	59.01
HHs faced water logging within premises	13.66	15.37	15.96	17.32	15.67
HHs having exclusive access of Bathroom	60.04	46.66	36.58	32.63	45.15
HHs having availability of Soap/detergent near to bathroom/latrine	28.36	30.54	24.06	19.55	24.80
HHs regularly washed their hands with soap	89.66	90.02	82.01	86.56	87.13
HHs having electricity connection	35.70	34.77	23.26	30.26	28.35
HHs have connected with underground drainage system	95.08	93.43	79.46	89.81	87.99
HHs have access of all seasonal road (%)	33.29	34.36	24.93	32.47	29.92
HHs having good ventilation in the house	49.21	34.17	25.95	31.04	30.64
HHs using unclean fuel for cooking	28.36	30.54	19.55	24.06	24.80

Source: Unit-level Data of 76th round, NSSO, 2018. Note: figures are in percentage.

Regional analysis reveals that households in western region getting relatively sufficient water compare to Bundelkhand region. Households in eastern region is relatively having lower access of latrine and bathroom compare to western region. Further, households in eastern region is relatively highest faced water logging in rainy season compare to western region. Similarly statistics also observed in the case of households having availability of soap/detergent near to bathroom/latrine. **Table 3** also depicts that households in the eastern region is relatively least washed their hands with soap compare to central region. Further, it was observed that nearly 82% (lowest) of households in Bundelkhand region having electricity connection compare to central region (90.02%). Furthermore, households living in the western region is relatively having better drainage, access of all seasonal roads, ventilation, and less using unclean fuel for cooking compare to households living in Bundelkhand region.

3.2. Determinants of Hand Washing

Covid-19 is severely affecting worldwide, and in the absence of effective vaccine, preventive measure such as hand washing is one of prominent factor to protect from the pandemic. This study observes various factors that either restrict or motivate urban households to wash hand before taking food and after defecation. In urban Uttar Pradesh, caste, religion, education, asses to basic amenities, and experiences of epidemic such as malaria are vital factors that motivates households to clear their hand regularly. Binary logistic regression examines the probability of households that adopt a suitable coping strategy (hand washing) as a preventive measure of Covid-19. The decision of households is captured with values (1, 0). One (1) denotes that households who adopted to Covid-19, while zero (0) denotes households who did not adopt to Covid-19. The estimated results of logit model predicted that about 94% of responses are correct (**Table 4**). The result fits at 1% (Prob > chi2) level of significance as indicated by LR chi-square, which confirms that variables captured in this model is valid. It further confirms that determinants of willingness of households perfectly adopting hand washing as coping strategy in dealing with Covid-19 in the study area.

Table 4 depicts that owners from literate and unmarried households belong to the Hindu community are more likely to clean their hand than those of their counterparts. The odd ratio statistics show that educated households are 4.65 times likely higher wash their hands than illiterate households. Access to safe and sufficient water throughout the year is the prerequisite condition for hand washing. In this connection, results confirm that households those are having asses to safe and sufficient water throughout the year are more likely to wash their hands compare to those households don't have access of water. Further, households having access to all season house and electricity also help to the households to wash their hand on regular basis. Results also confirm that households connected to mainstream drainage and sewage system are aware of

Table 4. Determinants of hand wash.

Independent Variables	Coefficient	Odd Ratio
Households belongs to the Hindu religion	0.5926*	0.95
Households belongs to the SC/STs	-0.0739**	1.26
Age	0.0046**	2.13
Marital status	-0.0276 ^{NS}	3.26
Educational status	0.4923*	4.65
Access to latrine	0.9064*	2.05
Access to safe drinking water	0.5208**	3.25
Access to sufficient water throughout the year	0.1524*	2.24
Access to all seasonal house	0.8064*	0.29
Access to Electricity	0.5301*	0.92
Access to close drainage system	0.3932*	1.35
Households disposing waste	0.3679*	2.58
Households experiencing floods	1.8967*	3.24
Households faced mosquitoes problem	-0.0851*	2.64
Households having ventilation in the house	-.4019*	0.24
Constant	2.3028*	0.57
Number of Observation		8,073
LR chi2 (13)		388.65
Prob > chi2		0.0000
Pseudo R2		0.9424
Log likelihood		-4392.7

Source: Unit-level Data of 76th round, NSSO, 2018. Note *, **, and *** indicate 1, 5, 10 percent level of significance, respectively, and NS indicates non-significant.

hygiene conditions, hence, more likely to wash their hands compare to households do not these facilities. Moreover, households experiencing floods and mosquitoes in the rainy season face challenges of epidemic. Therefore, they are more likely to wash their hands to avoid infection from pandemic like Covid-19 too. Lastly, proper ventilation provides clean and safe air to the households' members and helps in dealing to seasonal diseases.

In totality, the odd ratio statistics reveal that an educated households who is getting sufficient water and having past experiences of health disease are more likely to wash their hands than others.

4. Conclusion and Policy Recommendation

The paper provides an overall understanding of coping method of hand washing of households in urban Uttar Pradesh. Data collected from national Covid-19 portal show that during post-lockdown period Covid-19 cases have shifted from

urban pockets to urban areas in Uttar Pradesh. Socioeconomic statistics of sample households reveal that more than 70% of households are educated and belong to the Hindu religion. Regional statistics of access to basic amenities reveal that households belong to the Bundelkhand region having least access, while households belong to the western region having better access. The results of unit level data of 76th round of NSSO reveal that education and access to basic amenities are key factors that motivate households to wash their hands on a regular basis to cope with Covid-19. Results of this study have larger implication to strengthen urban health policy. Further, it suggests that development of urban health infrastructure (hospitals and primary health care centres) is a prerequisite for macro level behavioural change and development of awareness to control pandemics like Covid-19. Preventive measure such as hand washing on regular basis is a cheap and effective adaptable strategy to cope with Covid-19. In India, Kerala model reflects that households are strongly practicing hand washing on a regular basis coupled with a robust healthcare system that helped them in dealing with Covid-19. As far as policy implications are concerned, WASH components especially hand-washing with water and soap apply regularly will serve as a barrier for further transmission of Covid-19. The study suggests an increase in investment in WASH services, which would act as an important mechanism for mitigating secondary effects of Covid-19 in communities during recovery phase. Covid-19 pandemic highlights that our existing health infrastructure is very poor to deal with the next pandemic. In the Government hospitals in national capital after 8 months of pandemic, we still facing Bed crisis for Covid-19 patients. This shows how much we learn the past 8 months and our willingness to deal with the future pandemic. This study strongly recommends that government should potentially invest in the urban health infrastructure, increase appointment of trained doctors per thousand population, and provide ultra-modern health tools and technology to cope with future pandemic. Uttar Pradesh has only 18 Government medical colleges (one medical college on 1, 11, 00685 population). It means only one medical college is available for 616,704 people. Currently, we have district-level disaster plan, while we need village-level disaster plan to curb spread of current and future pandemic. Therefore, policymakers should use Covid-19 experiences to prepare better disaster plans at village level.

The condition of Covid-19 showed various weaknesses in the management of the successful running of towns in these health crises. The effect of socioeconomic conditions such as occupational poverty, overloading, homelessness, on the one hand, may have contributed to the original development of the pandemic; nevertheless, the effects of this pandemic may have played much more than equivalent roles. Instead of promoting exponential population expansion, the focus remains on minimizing the complexities of urban planning. Preparing to limit infectious infections at the grass root level is easier than seeking a vaccine for pandemics that are life-threatening after propagation. The management and surveillance of diseases must be multidisciplinary. It shall contain social and en-

vironmental principles, as well as medical and epidemiological research.

As far as limitations of this study are a concern, it must be noted that research is not entirely definitive in the certain areas, such as urban design and environmental causes, and new and related results can appear in the coming months in view of the emerging pandemic. In order to update the results of this initial analysis, more assessments are required in the coming months as well as to provide information on existing under-graduated topics such as the long-term socioeconomic and environmental implications and how the pandemic could change population behavior and urban governance. Such type of study is particularly important because the full socioeconomic impacts of the pandemic may take some more time to appear. Future papers should also involve analysis of temporal evolution of the evidence related to different issues discussed in this study to explore possible lines of convergence and divergence.

Finally, the need for serious thinking on the importance of cities and how they are managed are highlighted in this crisis. It is hopeful that, after the significant effect of the pandemic on towns, planners and communities, support for transformational actions would be more effective in tackling other major challenges, including climate change, which arise over cities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Census (2021). *District Handbook*. Office of the Registrar General & Census Commissioner of India, Ministry of Home Affairs, Government of India.
- ILO & ADB (2020). *Tackling the COVID-19 Youth Employment Crisis in Asia and the Pacific* (pp. 1-44). International Labour Organization and Asian Development Bank.
- Jamie, A. (2020). Hand Washing Practices among Health Case Workers in Jugal Hospital, Haras, Ethiopia, 2020: In the Era of Corona Virus: Observational Study. *Journal of Antivirals & Antiretrovirals*, 12, 1-5.
- Koo, J. R., Cook, A. R., Park, M., Sun, Y., Sun, H., & Lim, J. T. (2020). Interventions to Mitigate Early Spread of SARS-CoV-2 in Singapore a Modelling Study. *Lancet Infectious Diseases*, 20, 678-688. [https://doi.org/10.1016/S1473-3099\(20\)30162-6](https://doi.org/10.1016/S1473-3099(20)30162-6)
- MOSPI (2019). *Drinking Water, Sanitation, Hygiene and Housing Condition in India* (pp. 1-284). New Delhi: Ministry of Statistics & Programme Implementation. National Statistical Officer, Government of India.
- Singh, S. (2013). MGNREGA: 100 Days Employment Guarantee in Bundelkhand Region (M.P.). *International Journal of Management and Development Studies*, 2, 1-10.
- Singh, S. (2018). Performance of Indian Agriculture: A State-Level Analysis. *Social Science Researcher*, 4, 1-16.
- Singh, S. (2019). Determinants of Agriculture Production in Uttar Pradesh, India: A Regional Analysis. *Research Review International Journal of Multidisciplinary*, 4, 1-14.
- Singh, S. (2020a). Bridging the Gap between Biophysical and Social Vulnerability in Rural India: A Community Livelihood Vulnerability Approach. *Area Development and Poli-*

- cy, 5, 390-411. <https://doi.org/10.1080/23792949.2020.1734473>
- Singh, S. (2020b). Farmers' Perception of Climate Change and Adaptation Decisions: A Micro-Level Evidence from Bundelkhand Region, India. *Ecological Indicators*, 116, Article ID: 106475. <https://doi.org/10.1016/j.ecolind.2020.106475>
- Singh, S. (2020c). Data on Social and Health Vulnerability in Rural India: A Case of Covid-19. *Data in Brief*, 31, Article ID: 106020. <https://doi.org/10.1016/j.dib.2020.106020>
- Singh, S. (2020d). Agriculture Development in India: A State-Level Analysis. *South Asian Journal of Social Studies and Economics*, 6, 17-34. <https://doi.org/10.9734/sajsse/2020/v6i230162>
- Singh, S., & Sanatan, N. (2018a). Planned Adaptation Strategies and Climate Variability: Evidences from NSSO Households Level Data. *Research Review International Journal of Multidisciplinary*, 3, 1-14.
- Singh, S., & Sanatan, N. (2018b). Application of Indicators for Identifying Climate Vulnerable Areas in Sub-Tropical Regions of India. *Asian Journal of Multidimensional Research*, 7, 23-46.
- Singh, S., & Sanatan, N. (2020). Development of Sustainable Livelihood Security Index for Different Agro-Climatic Zones of Uttar Pradesh. *Journal of Rural Development*, 39, 110-129. <https://doi.org/10.25175/jrd/2020/v39/i1/125991>
- WHO (2020). *Advice on the Use of Masks, Hand Washing in the Context of Covid-19: Interim Guidance*, 5 June 2020. <https://apps.who.int/iris/handle/10665/332293>