Original Research

EAST AFRICAN JOURNAL OF PASTORALISM

Volume 2 Issue 1

Effects of COVID 19 Pandemic on Agricultural Production and Food Security in Gursum Woreda of Somali Region, Ethiopia

Abdulkarim Mohammed Ali[a,*], Abdulwahab Mohammed Ali[b], Hassan Mohammed Jeerar[c] and Ayanle Igge[d]

[a] Department of Food Science and Nutrition,College of Dry-land Agriculture, Jigjiga University

[b] Department of Sociology, College of Social Science and Humanity, Jigjiga University

[c]Department of Food Science and Nutrition, College of Dry-land Agriculture, Jigjiga University,

[d] Department of Rural Development and Agricultural Extension, College of Dry-land Agriculture, Jigjiga University,

ABSTRACT

The study was conducted in Gursum Woreda of Somali Regional state of Ethiopia with objective of assessing the effect of covid 19 pandemic on agricultural production and on food security. Structured questionnaire and key informant interview were used in the data collection. Data were collected in two rounds where Jigjiga University's Midcareer students participated as data collectors. The collected data were analyzed using SPSS 20 version software. The findings from the research shows that, poor farming system, shortage of land, high level of problem with different inputs such as fertilizer and improved seed were the main challenges to the agricultural production system of the district. On the other hands, the measure taken to limit the spread of Covid 19 by government like movement restriction worsen the conditions by inhibiting availability and accessibility of those inputs and creating labor shortage along the different farming stage. There were also challenges with respect to contact with extension workers, market access, and credit service compatible with farmers' religion. Food security of the study area is highly affected because of availability (42.5%) and accessibility (34.6%) and others' problems (22.6%) to food supply chain. In addition to these, pre- and post-harvest loss, lack of market access, low productivity per hectare are also the main contributing factors for food security problem. In general, pre-existing problem and Covid 19 pandemic related measures ultimately affect the production system of Gursum district which in another word affect the food security status of the study area. Therefore, government and other stakeholders should design and come up with better options to improve the food security status and ultimately the livelihood of the community highly affected by Covid 19 pandemic.

Keywords: Accessibility, Availability, Agricultural production, Covid 19 pandemic, Food Security

1. Introduction

As the COVID-19 disease spread rapidly to all over the globe by the novel corona virus SARS-nCoV-2, many countries around the world have declared state of health emergency. On 11 March 2020, the World Health Organization (WHO) declared the rapidly spreading disease as a pandemic and called on countries to plan preparatory and response actions in line with the Global Strategic Preparedness and Response Plan (WHO, 2020; Vasavada, 2020). WHO explained that a pandemic caused by a corona virus has not been seen before, and this disease is the first pandemic caused by the corona virus. WHO indicated that this outbreak is not just a public health crisis, but it is a crisis that will touch every sector (WHO, 2020).

The COVID-19 pandemic forced countries in Africa to undertake strong measures ranging from total lock downs, partial lock downs, to stay-at-home orders (SAHO) (Arndt et al., 2020). Depending on the implementation of different measures and related policies to ease the effects of COVID-19 on a national basis, households may experience varying levels of concern for food and nutrition security, especially where urban–rural partnerships become severed (Sukhwani et al., 2020). Sub-Saharan Africa (SSA), including Ethiopia, are unlikely to escape the direct and indirect effects of the pandemic and attendant global crisis.

Almost one-fifth of Africa's population (256 million) is undernourished, and the number of hungry people is increasing (WHO, 2019). Africa's population is predicted to double by 2050 and food demand to triple (United Nations 2020a, b, c). The COVID-19 pandemic could double the number of acute crisis-level hungry people, increasing from 113 million to 265 million, including 73 million people in acute hunger crisis mode (GNAFC, 2020). The pandemic

*Corresponding author:Abdulkarim Mohammed Ali: adnanbdu302@gmail.com

Article Information:
Received: 11 April 2021
Revised: 26 June 2021
Accepted: 14 July 2021
Available Online: 23 August 2021
How to Cite this Article:
Ali AM, Ali AM, Jeerar HM & Igge A (2021): Effects of COVID 19 Pandemic on Agricultural Production and Food Security in Gursum Woreda of Somali Region, Ethiopia. East African Journal of Pastoralism, 2(1):10-16.

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has exacerbated agricultural production, food supply problems, with the transport and processing of food reducing the availability of basic food items (Arndt et al., 2020; Béné, 2020; Devereux et al., 2020).

The poor and most vulnerable are often key players in these disrupted sectors, as they are engaged in tasks such as planting and harvest, transport, processing, in-country trading and distribution to and from local markets (Chiwona-Karltun et al., 1998; Lambert et al., 2020). In addition, internal and cross-border mobility restrictions have caused economic and food accessibility challenges, given that remittances in 2018 accounted for US$46 billion compared to US$32 billion foreign direct investment in sub-Saharan Africa. Reduced remittances (which in 2018 accounted for US$46 billion compared to US$32 billion foreign direct investment in sub-Saharan Africa), restrictions in mobility and decline in employment formally and informally have curtailed the well-being and food security situation of households during the pandemic (Lambert et al., 2020).

The impacts of the wide array of lock down measures are yet to be fully investigated (Kosnik and Bellas, 2020), especially in Africa where agriculture is the backbone of the economy, livelihoods and household food security (Lawson-Lartego and Cohen, 2020). The coronavirus disease 2019 (COVID-19) pandemic may reverse years of progress made in reducing poverty and improving food security worldwide, its impacts having disrupted food systems throughout the world. The World Bank projects that COVID-19 will push more than 100 million additional people into extreme poverty in 2021, representing the first increase in extreme poverty worldwide since 1998 (World-Bank, 2021). Therefore, the main aim of the study is to assess the effect of Covid 19 on agricultural production and food security in Gursum district of Somali Regional State in Ethiopia.

2. Materials and Methods

2.1. Study Area

The study was carried out in Gursum Woreda. Gursum is one of the Woredas in the Somali Region of Ethiopia. Part of the Fafan Zone, Gursum is bordered on the south by Babille, on the west by the Oromia Region, on the north by Ajersagora, on the east by Jigjiga, and on the southeast by Kebri Beyah. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Woreda has a total population of 27,510, of whom 14,815 are men and 12,695 women. While 2,970 or 10.8% are urban inhabitants, a further 2,028 or 7.37% are pastoralists. 98.79% of the population said they were Muslim.

2.2. Study Population and Study Design

The study populations were all house hold get involved in agricultural production system in selected district with potential agricultural production. Community based cross-sectional design was conducted using structured questionnaire. All population lives in selected district with a minimum of 6 months residence considered as inclusion criteria while all population in selected district with less than 6-month resident and those with mental illnesses, communication problems or other severe conditions interfering the interview considered as exclusion criteria.

2.3. Sample Size Determination

The sample size for the study was estimated by using the formula of sample size determination using single population proportion by assuming the prevalence 50% as this research is new to the district and there is no such research done in similar place to take prevalence value, At 95% confidence level and 5% margin of error and 10% none response rate,

$$n = \frac{(Z_{1-\frac{\alpha}{2}})^2 * P * (1-P)}{d^2} \quad (1)$$

Where: n= Total sample size that was included in this study, d= marginal error = 0.05, P= prevalence rate = 0.5, Z1-P value of 0.5 was used since there is no information reported before in such study in the area. Therefore, the final samples included in this study was calculated as follows:

$$n = \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2} = 384 \quad (2)$$

384 + 5% non-response rate = 404

2.4. Sampling Method

Gursum district was purposively selected due to its high potential for agriculture among other districts in Fafan Zone. From the 15 kebeles of Gursum district three kebeles namely Dhagahle (with 350Households), Dufeeyska (with 250 Households) and Golahajo (with 220Households) were selected again purposively for their being along the river and their potential for small scale irrigation. Then, number of samples from each kebeles were proportionally allocated so that 173, 123 and 108 representative samples were taken from the three kebeles selected. Finally, each household was selected using simple random method or lottery method.

2.5. Data Collection and Analysis

Data was collected from farmers in selected Kebeles. structured questionnaire and 7 Key informants' interview (KII) were used as data collection tool. Therefore, mixed methods where in both quantitative and qualitative method of data collection were used. To minimize inter observer variation of data collectors and increase their performance in data collection activities, one day training was given on the aim of the research, content of the questionnaire, and how to conduct questionnaire interview. Collected data were checked every day by supervisors and principal investigator for its quality and coding.

Descriptive statistical analysis was conducted using SPSS software version 20. Tables frequencies and percentage were used to present descriptive result. The result supported with the data obtained from KII and observation

too. To ensure the quality of data, data collectors were trained and the questionnaire was translated to Somali language and then back to English for consistency. The questionnaire was pretested in 5% of the sample size in a some near Kebele other than the selected ones, but similar to the study participant. Data were collected by Jigjiga University Midcareer program students and a research team were assigned as supervisor in each Kebeles where data were collected from. Key informant interview (KII) was conducted through telephone interview since of all office were shut down by the time because of covid 19 pandemic.

3. Results

Different data related to this research are depicted in the coming tables and description of data provided following each table. In this research, 98.51 percent (398 out of the total sample size which is 404) of the respondent were participated during the data collection.

3.1. Socio-Demographic Data

The socio-demographic data of the respondents are shown in table 1. According to table 1, 85.9% were male and majority of the respondents in the age range of 41-50years. As in most part of Somali community 92.5% of the sample's households were heads by husbands. When it comes to occupation, 94.5% of respondent's occupation was agriculture where most of their income is in between 3000-4000ETB per month. Majority of respondents were Muslims in religion and above 8 people (34.2%) live in the household.

3.2. Input Condition

Input condition in relation to fertilizer and its challenges is depicted in table 2 below. Accordingly, 69.1% of respondents didn't use fertilizers because of being too expensive and availability problem. When it comes to manure, more than 82% of respondents didn't use it because mainly unavailability/inaccessible and not convinced of its benefit. Furthermore, 92.7% fertilizer users respondents believed that, the above-mentioned inputs price was also increased mainly because of less supply, hard currency problem and to some extent because of availability and accessibility problem in relation to measures taken during covid 19.

3.3. Extension Contact

Extension service-related issue is depicted in table 3. Almost all of respondents have not been consulted by development agents since the outbreak. About 99.2% of the respondents did not visit or attend any demonstrations or field days since the outbreak. In similar fashion, none of these respondents visited research stations or site and as well have not got vocational training in agriculture. Almost no special service or help have been given either from government or non-government organizations or other bodies since outbreak except few which is mainly in-kind service mostly labor one.

Table 1: Socio-demographic data

Variable		Frequency	Percent
Gender		342	85.9
	Female	56	14.1
Age	20-30	30	7.5
	31-40	100	25.1
	41-50	152	38.2
	51-60	96	24.1
	Above 60	20	5
Marital status	Married	381	95.7
	Single	12	3
	Divorced	5	1.3
	Widowed	0	0
Head of the HH	Husband	360	92.5
	Wife	29	7.4
Religion	Islam	389	97.7
	Christian	9	2.3
Educational Status	Never attended education	202	50.8
	Informal education	56	14.1
	Basic education	81	20.4
	Secondary education	38	9.5
	Vocational-technical college	18	4.5
	University	3	0.8
Occupation	Agriculture	376	94.5
	Industry	10	2.5
	Government office	3	0.8
	Commerce	9	2.3
Monthly Income	Below 2000	101	25.4
	2001-3000	104	26.1
	3001-4000	125	31.4
	4001-5000	43	10.8
	Above 5000	25	6.3

Source: Survey result, 2020

3.4. Access to Market

Respondents access to market is depicted in table 4. More than half of them buy agricultural inputs from traders which is 54.8% while others get from retailers. The price of these inputs was not the same to that of last year and 75.4% of respondents have believed that the price was not fair as compared to last year. 74.7% of the respondents said that they sold their products at near market while others sold their products at farm get. 87.2% of the respondents says there was huge transportation problems because of high transportation cost, sometime no transportation service, no favorable road and long distance to the nearby market.

3.5. Access to Credit

Table 5 below shows respondents access to credit service. 98% of the respondents can't afford input purchasing from own saving especially since covid 19 and 99.5% of the respondent said they didn't get any credit service from any institutions. No one of the respondents took improved seed, fertilizer, herbicides on credit in this raining season. No credit service (79.4%) and high interest rate (10.6%) and others are the main reasons for not getting such credit service and the major problems they faced were inaccessibility of credit agents and lack of low cost or interest free credit service.

Table 2: Input Condition

Variable		Frequency	Percent
Utility of fertilizer in general	Yes	123	30.9
	No	275	69.1
If no, why? N=275	Not Available	12	4.4
	Too expensive	263	95.6
Utility of manure	Yes	72	17.3
	No	326	82.7
If no, why?	Not available/accessible	171	52.5
	Too Expensive	7	2.1
	Not convinced of benefit	143	43.9
	never heard of it	5	1.5
Utility of improved varieties	Yes	85	21.4
	No	313	78.6
If no, why?	Not available	18	5.8
	Too Expensive	275	87.9
	Not convinced of benefit	14	4.5
	Never heard of it	6	1.9
Utility of row planting	Yes	106	26.6
	No	292	73.4
If no, why?	Not available	0	0.0
	Too Expensive	100	34.2
	Not convinced of benefit	145	49.7
	Never heard of it	47	16.1
price perception on the above-mentioned fertilizer and crops types in this rain season,	Increased	115	92.7
	Decreased	6	4.8
	Same	3	2.4
Reason for price increment for the above-mentioned items	Less supply	87	70.2
	currency problem	28	22.6
	Availability	6	4.8
	Accessibility	3	2.4
Input price increment in relation to Covid-19 pandemics?	Yes	377	94.7
	No	21	5.3
If yes how?	Less supply	143	37.9
	Currency problem	29	7.7
	Availability	79	21.0
	Accessibility	126	33.4

Source: Survey result, 2020

Table 3: Extension Contact

Variables		Frequency	Percent
Consultation service from development agent since the outbreak of Covid-19 pandemics	Yes	4	1.0
	No	394	99.0
Visits or attending any demonstration, field days farmers' days	Yes	3	0.8
	No	395	99.2
Visits or attending any demonstration, field days farmers' days since the outbreak of Covid-19 pandemics	Yes	0	0.0
	No	398	100.0
Visit research stations or research sites since the outbreak of Covid-19 pandemics in this rain season	Yes	0	0.0
	No	398	100.0
Chance of having vocational training in agriculture since the outbreak of Covid-19 pandemics	Yes	0	0.0
	No	398	100.0
Receiving special service or help from government or NGOs for your farm since the covid 19 outbreak.	Yes	2	0.5
	No	396	99.5
If yes for the above question, what are kind of service or help you have got from government	In kind	2	100
	Others	0	0.0
If in-kind help, what types of help you have got?	Labor help	2	100.0
	Others	0	0.0

Source: Survey result, 2020

3.6. Food Security Aspect

The food security related data are shown in table 6 below. 63.8% of the respondents said their farm output was not enough for both home consumption and other purposes specifically 55.3% them said even it was not enough for home consumption only. To fulfill the gaps for home consumption and other purposes, they used alternative option such as engagement in other business, food aid from relatives/Government and NGOs and others option. Availability (42.5%), accessibility (34.9%) and other reasons are the main problem for the food security in the study area. 97.7% of the respondents believed that covid 19 have great impact on their food security. 69.1% of the respondents have experience of such outbreak or other natural disaster and they overcome the challenges by using different income generating options, external aid and other options.

4. Discussion

4.1. Input Issue

Input to the agriculture production is still the main challenges to farmer. Inputs such as fertilizer, improved seed and its utilities become very challenges. This might be the fact that, availability, accessibility, being expensive especially which is expected due to covid 19 pandemic. The pandemic related challenges to bean production in east Africa shows, the highest proportion of surveyed farmers in Kenya (44 percent) and Burundi (33.3 percent) mentioned that they faced challenges in accessing agricultural credit, 36 percent in Madagascar, half in Uganda, and 57 percent in Tanzania reported difficulties in accessing farm inputs and labor for bean production respectively (Eileen Bogweh and Lutomia, 2021). This may also be due to currency problem in the country for which the exchange rate is currently boosted which means 1$ is exchanged to more than 60ETB especially in black market as most of these community use such market.

Table 4: Access to market

Variables		Frequency	Percent
Source of agricultural inputs in this rain season	Trader	218	54.8
	Retailers	106	26.6
	Others	74	18.6
Price similarity of those inputs in relation the last year	Yes	97	24.4
	No	301	75.6
Storage condition of your last year product	Yes	243	61.1
	No	155	38.9
Selling condition of your last year product	Yes	313	78.6
	No	85	21.4
Place to sell your product	At farm get	93	25.3
	At near market	275	74.7
Presence of challenge with transportation problem	Yes	347	87.2
	No	51	12.8
If yes, what do you think is the problem?	High transportation cost	304	87.6
	No transport vehicle	28	8.1
	No favorable road	6	1.7
	Long distance to nearby market	9	2.6
Decision on price of what you selling	Individuals	88	22.1
	Firm	16	4.0
	Brokers	286	71.9
	By middle men	8	2.0
If individuals or price firm is a price taker, why	Access to market information	277	69.6
	Less government involvement	44	11.1
	Less market competition	77	19.3
Presence of association and group	Yes	42	10.6
	No	356	89.4
If yes, do you have any market regulations? (42)	Yes	18	42.9
	No	24	57.1
Expensiveness of improved seed	Yes	380	95.5
	No	18	4.5
Expensiveness of improved fertilizer	Yes	376	94.5
	No	22	5.5

Table 5: Access to Credit

Variables		Frequency	Percent
Afford-ability of input purchase since covid 19	Yes	8	2.0
	No	390	98.0
Access to credit service since covid 19	Yes	2	0.5
	No	396	99.5
Getting for credit service for improved seed, fertilizer, herbicides	Yes	0	0.0
	No	398	100.0
If no, why?	High interest rate	42	10.6
	No money for down payment	9	2.3
	No Money for payment	31	7.8
	No credit service	316	79.4
major problems you faced to get input on credit	Inaccessibility of credit agent	392	98.5
	lack of low-cost credit	6	1.5

Table 6: Food Security

Variables		Frequency	Percent
Farm output being enough for both home consumption and other purpose	Yes	144	36.2
	No	254	63.8
What about home consumption only? Is it enough?	Yes	178	44.7
	No	220	55.3
If No, how do you fulfill how do you cover your home food consumption?	Food aid from relatives or G/NGOs	56	25.5
	Engaging in other incoming	87	39.5
	Others	77	35.0
Reasons for food insecurity	Availability	169	42.5
	Accessible	139	34.9
	others	359	22.6
Do you believe that, Covid 19 will have effect on your food security status?	Yes	90	97.7
	No	9	2.3
experience of such outbreak or other natural disaster before	Yes	275	69.1
	No	123	30.9
If yes, how do you overcome such disaster?	Using different income generating option	33	12.0
	External Aid	43	15.6
	Both	193	70.2
	Others	6	2.2

Not only due to covid 19 related problem, but also their other challenges with input and utilities of different technologies such as not convinced with the benefit of these technologies mentioned in table 2, or some of these technologies not yet reach them. Challenges in getting hired labor can be attributed to fear of infection with virus population and following the social distancing government order to reduce the spread of the pandemic. In support of this research, finding from most of farmers in Kenya which already planted their crops but unable to get input needed to weed them and spray pesticides later (Nchanji et al., 2021). They also reported seed unavailability (6 percent) and difficulties accessing the market (3 percent).

"As the pandemic forced some nations to taken different measures especially lockdown, availability of mostly imported inputs such as fertilizers and improved seed decreased. The demand for the improved seeds and other input on the other hand increased which make the price of these inputs four time as compared of the price before covid pandemic. Because of this, most of the farmer have forced either for partial farming, or using non-improved seed or engaged in some other options." KII#1

4.2. Extension and Access to Market and Credit Issue

There is a huge problem when it comes to extension service. Almost there is no contact service between farmers and development agents as indicated in table 3. In a similar way, farmars didn't visit and attend any field day, research centers and any vocational trainings especially since the covid 19 pandemic. Almost none of these farmers has got any special service in response to the impact of the pandemic from any organization. this might be the fact that; government workers were ordered to work from home as part lockdown measurement or movement restrictions during pandemic. On the other hand, these development agents are not active as it were before and need a little bit motivation.

"Even before the pandemic, the contact of farmer with development agents are too weak. As part of movement restriction even those who work in farmer training center (FTC) were ordered to stay at home. Due to this, farmers were in problem when it comes extension service. As a regional agriculture office to minimize loss in production and productivities, we have implemented extra production which is more than 11,000 hectares in five zones of the region such as Sitti, Afdher, Liban, Dawa, and Shabele. We have also provided improved seeds, fertilizers, technical support where more 11,600-household benefited from the service. Urban agriculture was also implemented in Fafan and Jerar Zones where 100 households are benefited by implementing drip irrigation technologies. we also plow more than 3190 hectares of land for internally displaced people (IDPs). By this we got good results." KII#2

Access to market either to buy different farm inputs or to sell their farm products is also affected during the pandemic as indicated in table 4. This might be the fact that, the partial and full lock down measure taken by government and neighbors countries make movement restrictions which make it lack proper transportation service, high cost of transportation, low level of urban people purchasing power, high exchange rate, long chain in selling their products, low level of government interference and some other reasons. As indicated in table 5, there is high level of problem with access to credit service. This might be due to the fact that, almost no credit service in the area, if in case available, it might be with interest which might be high interest rate. This issue is against norm of Islamic religion as most of the community in the study area are Muslim community. Similar study done in East Africa indicates, less restrictive containment measures in Tanzania and Burundi, nearly a-fifth of bean farmers in both countries reported that they encountered difficulties in accessing seed. Equal proportions (7 percent) of the surveyed farmers in Tanzania also reported that they experienced challenges accessing agricultural credit. Additionally, Tanzanian farmers said they experienced transportation difficulties. In Burundi, labor shortages (29 percent) and access to other inputs (13 percent) were the most identified bean production difficulties associated with the pandemic (Eileen Bogweh and Lutomia, 2021).

"There is no especial credit service for farmer which is specific to them. Unless they get credit by other means such as trade, there is no credit service which is specific to farmer. When it comes to market access, there is huge problem. Because of movement restriction during the pandemic, access to market also restricted. In order to solve this, we as agriculture office buy farmers product (we bought up to 1000 quintals of different products) and provide to disaster prevention and preparedness office (DPPO)." KII#3

4.3. Food Security

As indicated in table 6, data related to food security are depicted. There is fear of food security problem in the area due covid 19 pandemics and other previously existing problem as these limit the availability, accessibility of the food. Poor agricultural practice, less farming land, low productivities, pre and post-harvest loss, lack of different technologies, poor infrastructure and some other reasons are the very problem in the area. In addition to this, high price for different inputs, lack of market access, long chain in marketing are some additional reasons for food security problem. All these and others directly or indirectly affect the food security of farmer in the area. This might be due to the fact that, measure taken to contain the covid 19 pandemic such as movement restriction directly affects the main pillars of food security especially availability and accessibility of food product to the people. Study shows that, restrictions on movement may have had the largest early negative impact on food security (Béné, 2020; Resnick, 2020). (Devereux et al., 2020; Béné, 2020) suggest disruptions to food systems from the pandemic both related to the food production side (production and processing) and demand side (economic and physical access to food) could negatively affect food security. Some other research also shows informal markets may be more disrupted than formal markets, and of particular concern on the demand side is the way that value chains function within countries (Resnick, 2020). From a consumer perspective, reduced income may lead to less purchasing power for food, particularly among the vulnerable.

"Production and productivity are significantly decreased by 50% which in turn decreased availability of enough food product in market. This comes up with huge gaps in demand and supply side of food which in other words affect one pillar of food security "availability". This farming season, impact of desert locust, shortage of rain and other factors may also come with production and productivity decrement. As price increased, loss of jobs and some other problem that come with pandemic also affect people purchasing power of food product. In addition to this, movement restriction makes accessibility of food product very hard. Because of the above mentioned and other reasons, food security status of the district is under risk." KII#4

5. Conclusion

From the study we conclude that, there are already existing challenges of farming system of the study area which covid 19 pandemic exacerbating more on the problem.

We also found that, not only due pandemic challenges, the area is practicing such a poor farming system let it be crop or animal production from its very beginning. In addition to this, lack of intensive technologies that help farming system, lack of contact to extension workers, availability, accessibility and afford ability of different farm inputs such as improved seed, fertilizers and others. Access to credit service is also another major challenges in the area especially access to credit which is compatible with their need from culture and religious point is the main problem. Respondents believed that, all these problems contribute to poor output from farm and ultimately result in food insecurity. On the other hands, covid 19 pandemics along with the different measures taken by the government and neighborhoods such lock down, movement restrictions worsen the condition than ever. Therefore, government in collaboration with different stockholders should solve each of the challenges by designing different strategies relevant with the condition on the ground.

Acknowledgments

Our deepest gratitude goes to Almighty Allah for successful completion of this research work. We would like to express our deepest and special note of gratitude to JJU-DRPTT for funding the project study.

Conflict of Interest

The author declares that they don't have conflict of interest.

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