

RESEARCH ARTICLE

Impact of COVID-19 in Agricultural System, Value Chain, and Food Security

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Received: 30-04-2020; Revised: 26-05-2020; Accepted: 15-06-2020

ABSTRACT

Novel coronavirus diseases (COVID-19) outbreak is a global pandemic. More than 208 countries of the world were affected by this virus. The majority of Indian economy depends on agriculture. COVID-19 directly affects on the human population, but it is indirectly impact on agriculture production, storage, marketing, farm income, as well as GDP of India. Farmers were face lots of problems during the lockdown period. A study was conducted on the impact of COVID-19 in the agricultural system, value chain, and food security in Terai region of India. Data were collected through phone calls and different secondary reports. It was found from the study that COVID-19 adversely affects the agricultural system, value chain, and food security and different measure may be taken for sustained agricultural production.

Key words: Agricultural system, coronavirus diseases, food security, pandemic, value chain

INTRODUCTION

India is an agrarian country. More than 70% of Indian population depends on agriculture. Farmers are the most valuable human resources India. The WHO (2020) announces novel coronavirus diseases (COVID-19) outbreak a pandemic.^[1] This virus changes the world as well as Indian economy.^[2] More than 208 countries are already affected by this virus. Some country highly affected and some of the countries starts affected. AS per data of Worldometer (April 21, 2020) 2.49 million COVID-19 global cases were recorded where 170,561 people lost their life.^[3] Vaccination and medicine are still under the research lab.^[4,5] Health and family welfare department, Government of West Bengal, NCDC, ICMR, WHO, ICAR, and other organization is trying to decrease the virus infestation and minimize the human life loss. Government of India declared lockdown of the whole country from March 22, 2020, to combat

the virus. Human life may be safe by this method. COVID-19 directly affects human populations and indirectly affects the agriculture production system in India. According to FAO (2020), COVID-19 is impacting global food systems, disrupting regional agricultural value chains, and posing risks to household food security.^[6] It was observed from different newspaper that farmers of Terai region face lots of problem during lockdown period. The problems were marketing, labor shortage, drought, and others.

On the basis of the problem a mobile phone-based survey was conducted through registered farmers under Farm Science Centre, Uttar Banga Krishi Viswavidyalaya in the District of Cooch Behar, West Bengal, India, to know the farmers perception on the impact of COVID-19 in agricultural system, value chain, and food security. The study was conducted from April 2, 2020, to April 22, 2020.

Ministry of Agriculture, Government of India, ICAR, ICMR, NCDC, and Government of West Bengal taken several initiatives on control of COVID-19 and sustained agricultural system, value chain, and food security. The followings are

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some innovations that were developed for farming peoples in India.

Agri transport call center

Department of Agriculture, Government of India has started an All India Agri transport Call Centre (Call center number 18001804200 and 14488) for coordination between states for interstate movements of perishable-vegetables and fruits, Agri inputs such as seeds, pesticides, and fertilizers.

Aarogya Setu mobile app

Aarogya Setu is a mobile application developed by the Government of India to connect essential health services with the people of India. ICAR circulated Aarogya Setu to the farmers through different Farm Science Centre, Newspaper, Social Media, TV program, Mobile phone, Mkisan, and website.

e-Farm advisory

ICAR developed e-farm advisory for the farmers during the lockdown period. The advisory send to the farmers through different Farm Science Centre, regional newspaper, TV Channel, Social media (Facebook and WhatsApp), Mkisan, SMS, Phone call and updating in ICAR website, and FSC portal.

FSC-start-up linkage

Farm Science Centre, Cooch Behar under Uttar Banga Krishi Viswavidyalaya and Kisankarts Agro Management Private Limited (Government of India recognized agriculture start-up) developed a model of Farm to Home delivery system of fresh vegetables, fruits, and others food grain during the lockdown period. Farmers were getting remunerative prices by this linkage.

NGO-farm linkage

Different NGO (Satmile Satish Club, Z Academic Society) in Cooch Behar District started to collect vegetables from the farm and delivers to the urban and semi-urban area through online and door to door.

MATERIALS AND METHODS

The study was conducted in Cooch Behar District of West Bengal. A random sampling method was used in this study. Farmers were contacted through mobile phones and responses were recorded in the interview schedule. Farmers who are using a mobile phone were taken as a respondent. A total number of the respondent selected as a sample was 100. The study was conducted from April 2 to April 22, 2020. Descriptive statistics such as frequency and percentage, mean, median, mode, range, and Coefficient of variation were used in the study.

RESULTS AND DISCUSSION

It was found from the study [Table 1] that the majority of the farmers' perceptions were strongly agree with the statements of "Market price of vegetables crops was low" (100%), "Proper farm sanitation should be followed" (100%), "Labor shortage was observed during harvesting of Rabi crops and sowing of Pre Kharif" (82%), "PM-KISAN scheme may be start for help the farmers" (82%), "Problem of getting adequate amount agriculture input from input dealer" (72%), "Post Office linkage model may help the farmers to get the input and other services" (67%), "Regular visit of veterinary and human health monitoring team may help to combat the situation" (65%), "Problem of getting adequate sanitizing materials" (65%), and "Farm mechanization is needed for increasing agricultural production" (54%). It is shown in Table 1 that the majority of the farmers were agree with the statements of "e-training and e-extension activity may help the farmers for learning of new of agricultural knowledge from their home" (26%), "Farm mechanization is needed for increasing agricultural production" (23%), "Kisan Call Centre may help the farmers to get all supporting information from their home" (22%), "Mobile-based agro-advisory may help in farm production" (22%), and "Online input sale may be started by agriculture input dealer" (22%). It was clear from the study [Table 1] that the majority of the farmers were undecided with the statement, "Farm mechanization is needed for increasing agricultural production" (20%). It was also exposed from the study that the majority of the farmers disagree with the statement

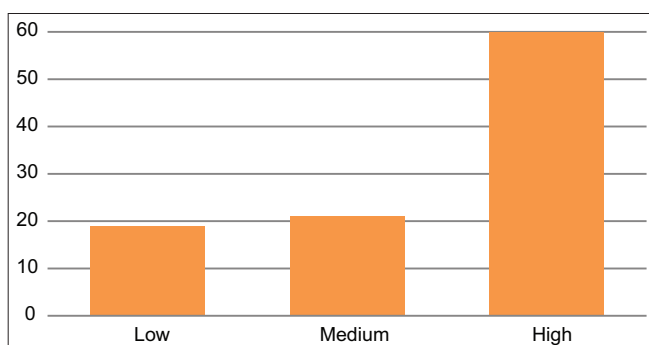
Table 1: Perception farmers on impact of COVID-19 in agricultural system, value chain, and food security ($n=100$)

Statements	Percentage				
	SA	A	UD	DA	SDA
COVID-19 reduced the agriculture production	0	0	0	28	72
Farm mechanization is needed for increasing agricultural production	54	23	20	03	0
Labor shortage was observed during harvesting of Rabi crops and sowing of Pre Kharif crops	82	18	0	0	0
PM-KISAN scheme may be start to help the farmers	82	18	0	0	0
e-training and e-extension activity may help the farmers for learning of new of agricultural knowledge and skill from their home	33	26	9	20	12
Post Office linkage model may help the farmers to get the input and other services	67	18	5	10	0
Kisan Call Centre may help the farmers to get all supporting information from their home	28	22	10	20	20
Mobile based agro-advisory may help in farm production	78	22	0	0	0
SHG meeting, Farmers Club Meeting may be conducted through WhatsApp	43	17	10	15	15
Online input sale may be started by agriculture input dealer	38	22	10	15	15
Online money transaction may be started in every sectors	32	15	10	20	23
Proper farm sanitation should be followed	100	0	0	0	0
Regular visit of veterinary and human health monitoring team may help to combat the situation	65	15	5	15	0
Market price of vegetables crops was low	100	0	0	0	0
Problem of getting adequate amount agriculture input from input dealer	72	10	5	10	3
Problem of getting adequate sanitizing materials	65	20	0	15	0

*SA: Strongly agree, A: Agree, UD: Undecided, DA: Disagree, SDA: Strongly disagree

Table 2: Distribution of the respondents according to their perception on impact of COVID-19 in agricultural system, value chain, and food security ($n=100$)

Score	Percentage	Statistics
Low	19	Range=38–77
Medium	21	Mean=63.92
High	60	SD=12.68
		CV=19.83

**Figure 1:** Distribution of the respondents according to their perception of the impact of COVID-19 in the agricultural system, value chain, and food security

of “COVID-19 reduced the agriculture production” (28%) and strongly disagree with the statement of “COVID-19 reduced the agriculture production” (72%), and “Online Transaction may be started in every sectors” (23%).

It was found from the study [Table 2 and Figure 1] that respondents were under high level of perception (60%) on impact of COVID-19 in

agricultural system, value chain, and food security, followed by medium (21%) and low level (19%). The mean score of total distribution was 63.92 and standard deviation was 12.68. The coefficient of variation value within the distribution was 19.83% which signifies very high consistency level of the distribution for the variables.

CONCLUSION

It may be concluded from the above study that farmers’ perception was high on the impact of COVID-19 in the agricultural system, value chain, and food security. It may be due to high awareness on COVID-19, high demand for sanitizing materials, farmers were well aware of benefit of the PM-KISAN scheme. Farmers of Terai region faces lots of problem on the marketing of vegetable crops, seed availability and other inputs, transportation, and communication problem with a different organization. The majority of Rabi crops already harvested, so till the study time, no impact was observed on agriculture production. Labor shortage may be overcome by Farm Mechanization. Social distance may be maintained by the distribution of inputs through Indian Post Office; information may receive and share using e-resources and mobile phones. Regular visits of the medical team may

be needed for testing and control the spread of virus. The study was lined with the note given by Anonymous.^[7]

Recommendation

It may recommend from the above study that farm sanitizing materials may be adequately supply, interstate food export may be started for food security, seed, and others farm inputs may be supply to the farmers through Indian post office, PM-KISAN maybe start in West Bengal. E-training may be initiated for knowledge and skill development of the farmers. Awareness generation on online money transactions and marketing may be initiated in the farm sector.

Limitation and scope of the study

The major limitation of the study was that farmers who were using a mobile phone were taken as a respondent. It may not give accurate results. Socio-economic variables of the farmers were not taken. Hence, there may be a large scale study that was needed for sustained agricultural system India. However, this study may help the Policymakers, Scientists, Agriculture, and Health department to

take some emergent measures during and after the lockdown period.

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