KEY POINTS

- More than 400 farmers in Punjab, Pakistan, were surveyed on the impact of the nationwide lockdown in response to the coronavirus disease (COVID-19) pandemic and the locust invasion.
- Due to the COVID-19 pandemic, about one-third of farm households reported loss of earnings, and 22% of the surveyed households had family members return home from urban areas.
- The lockdown disrupted food supply chains of high-value agricultural products (vegetables, fruits, and milk) and farm inputs, but it had relatively less impact on the wheat harvest and marketing in Punjab.
- Locust invasions were observed in the mix-cropping zone of central Punjab, causing crop damage in the area.
- Government response is needed to offset the negative effects of COVID-19 and the locust attacks.

COVID-19 Impact on Farm Households in Punjab, Pakistan: Analysis of Data from a Cross-Sectional Survey¹

INTRODUCTION

Before the coronavirus disease (COVID-19) outbreak, Pakistan's gross domestic product (GDP) growth for 2019–2020 was projected at 3.2%, with agriculture contributing 2.9% (EAW 2020). However, the COVID-19 outbreak affected various channels of Pakistan's economy, slowing it down; consequently, the provisional growth of GDP for 2019–2020 has been reestimated at –0.4%, with agriculture as the only sector showing positive growth at 2.7% (Pakistan Bureau of Statistics 2020).

While the long-term consequences of the COVID-19 pandemic will become more apparent in the coming months, this brief presents the pandemic's initial impact on farm households in rural Punjab. Agriculture is central to Pakistan's economy, contributing over 19% of GDP (PBS 2020) and employing about 39% of the labor force (PBS 2018). Agriculture is the backbone of the rural populace, which constitutes 63% of the country's total population (PBS 2017), and supplies a large share of Pakistan's exports (Government of Punjab 2018).

This brief focuses on Punjab because it is the largest province in Pakistan in terms of population and contributes about 57% to the value of national agricultural production. The province produces more than 80% of the country's wheat and cotton, almost two-thirds of its sugarcane, and about half of its maize; and its horticultural output represents 67% of national production (Government of Punjab 2018).

¹ This study was carried out under the Asian Development Bank (ADB) technical assistance to the Punjab Agriculture Department, Pakistan for Enhancing Technology-Based Agriculture and Marketing in Rural Punjab (TA 9838-PAK). This brief was prepared by Takashi Yamano, senior economist, Economic Research and Regional Cooperation Department (ERCD), ADB; Noriko Sato, natural resources specialist, Central and West Asia Department (CWRD), ADB; and Babur Wasim Arif, economist (independent consultant). The brief also benefited from the contribution of ADB staff: Ahsan Tayyab, principal natural resources economist, CWRD; Asad Ali Zafar, senior project officer (Water Resources), CWRD; Jindra Nuella Samson, senior economics officer, ERCD; and Kristine Joy Villagrancia, operations assistant, CWRD. Kiyoshi Taniguchi, principal economist, CWRD, ADB; and Md. Abul Basher, natural resources and agriculture specialist, Sustainable Development and Climate Change Department, ADB provided technical reviews and comments. The following consultants provided support to the farm household survey: Shahid Ahmad, agriculture sector specialist; Sahibzada Mansoor Ali, agriculture value chain specialist; Umer Saeed, agriculture specialist; and Shakeel Ahmad, plant protection specialist (Centre for Agriculture and Bioscience International [CABI]). Telephone interviews were conducted by CABI staff members.

In May 2020, the Asian Development Bank (ADB) conducted a computer-assisted telephone survey of 668 farmers across 10 districts of Punjab Province and interviewed about 429 farmers. The survey collected information on how COVID-19-related measures and disruptions affected the harvesting and marketing of winter season (rabi) crops and livestock products, availability and price of inputs, and financial needs of farmers. The survey also sought to learn about the impact of the locust invasion although the areas selected in the survey are less prone to locust invasion than other areas.

About 33% of survey respondents indicated that their households experienced losses in wages and nonfarm earnings because of COVID-19, and 22% reported that at least one family member had returned home from urban and other areas. Farm households are burdened by increase in the number of household members and reduced cash income, which result in reduced nonfood expenditures (11.0%) and lower food consumption (9.8%).

Much of the wheat harvest and marketing was spared from COVID-19-related problems. However, vegetable and fruit growers were severely affected because they could not sell their produce owing to market closures and restricted movement of goods. Milk producers were also affected, as traders were unable or unwilling to buy milk from dairy producers. As many restaurants and markets shut down, the demand for milk collapsed, resulting in low milk prices.² The gravest concern for the forthcoming rice crop stems from the high prices of farm inputs, which may have a significant impact if not mitigated. Another concern is the locust invasion reported by farmers in Punjab's Okara and Pakpattan districts. Measures to contain the invasion and prevent further crop losses are urgently required.

The survey respondents identified actions they felt were necessary and listed them in order of priority: (i) ensure price stability for agricultural produce, (ii) ease loan repayment conditions or provide loan waivers, (iii) remove restrictions on marketing agricultural produce,³ and (iv) ensure the availability of agriculture inputs.

COVID-19 AND RESTRICTIONS ON FOOD SUPPLY CHAINS

In Pakistan, the first confirmed case of COVID-19 was reported on 26 February 2020 in Sindh Province. By 18 March 2020, COVID-19 cases were registered in all four provinces; the two autonomous territories; and the federal capital, Islamabad. The governments of Sindh and Balochistan announced province-wide lockdowns on 24 March 2020. The federal

government followed soon after, imposing on 1 April 2020 a nationwide lockdown, which lasted until 9 May 2020.

Developing economies such as Pakistan face the dual challenge of responding to the health crisis while mitigating widespread economic devastation. Unemployment is expected to rise, although estimates of the extent of it vary widely based on different scenarios and incoming data. The lockdown of April and May most acutely affected the informal sector—estimated to account for 72% of employment (World Bank 2020)—and daily wage earners. The United Nations Development Programme estimates that Punjab, along with Sindh, may experience the most damage in the form of increased poverty among vulnerable populations (UNDP 2020).

In late April 2020, the Government of Punjab estimated near-term economic losses to the provincial GDP due to the COVID-19 pandemic at between \$3 billion and \$5 billion, based on the data available at the time (Government of Punjab 2020). In a worst-case scenario, due to an extended lockdown of a few months, the government predicted losses of about \$20 billion. Small and medium-sized enterprises, particularly in the manufacturing hubs of Sialkot and Lahore, will be affected (UNDP 2020). Punjab will face limited export demand for its major sectors and incur unemployment losses of approximately \$2.2 billion, with job losses in the near term estimated at \$4 million–\$7 million (Government of Punjab 2020). The Pakistan Institute of Development Economics estimates that about 58% of Punjab's workforce is vulnerable to job loss (PIDE 2020).

The COVID-19-related nationwide lockdown has effectively halted most nonagricultural economic activities, with a potentially detrimental impact on food supply chains. Pakistan relies largely on interprovincial movement of food to balance supply and demand across the seasons and to take advantage of the different agroecological zones (FAO 2020). Wheat is a main commodity associated with food security through interprovincial trade. The International Rescue Committee (IRC) conducted in April 2020 a rapid needs assessment and noted that district government officials were concerned about food supply—a significant proportion of respondents at the community level reported food shortages at home as well as the unavailability of food items at markets (IRC 2020).⁴

The lockdown took place just as the wheat harvesting season and sowing of summer (kharif) crops began. Although the government exempted machinery service providers, input providers, markets, and other agriculture sector components from

² The largest market for milk comprises various entities such as marriage halls, hotels, restaurants, and sweets shops, but their demand for milk has plummeted as a consequence of the restricted movement of goods and businesses.

³ Every year, during wheat harvesting season, government impose ban on sale of wheat in districts other than where it is grown. The purpose of imposing ban is to procure wheat by government, and control price and smuggling of wheat. This year the ban was imposed on 19 March 2020. (PR No. 147. http://pid.gov.pk/site/press_detail/13352. 19 March 2020; and <https://www.dawn.com/news/1542292>). This ban was left on June 10, 2020 (PR No. 328. http://www.finance.gov.pk/press_releases.html. and PR No. 79 http://pid.gov.pk/site/press_detail/13893.)

⁴ The IRC survey was conducted remotely and covered 12 districts across the country. IRC interviewed 252 households, 54 “key informants” in communities, and 25 government officials.

COVID-19-related restrictions, disruptions such as higher rental charges, labor shortage, and farmers' limited access to markets were nonetheless reported (FAO 2020). Other reports also suggested anecdotal evidence of farmers facing severe difficulties getting their produce to the market during April and May (Jamal 2020; Action Against Hunger 2020). Pakistan farmers sell their produce primarily to wholesale markets (Siddiq and Basher 2019), but reports suggested that mobility restrictions prevented some from taking their crops to the market (Latif and Niazi 2020).

Food crops in Pakistan are classified primarily into two groups: cereals (wheat, rice, maize, etc.) and fresh produce (vegetables and fruit). While cereal production is fairly well mechanized, the production of fresh produce relies largely on labor and is more likely to be disrupted by labor shortages. Because fresh produce is highly perishable, a disruption in its distribution to the market can cause huge losses for farmers. For the same reason, the livestock sector, which constitutes a 60.6% share of agriculture and 11.7% of the overall economy, is also vulnerable to restriction of movement (PBS 2020).

SAMPLED FARMERS

Punjab Province has five cropping zones: (i) rice–wheat, (ii) mixed cropping, (iii) cotton–wheat, (iv) rain fed or arid, and (v) low intensity (Ahmad et al. 2019). In 2017, ADB conducted a survey of 350 farmers in eight districts in the rice–wheat zone.⁵ Phone numbers were collected from only 256 of the respondents. Similarly, a list of 369 farmers from four districts—two (Hafizabad and Sheikhupura) in the rice–wheat zone (RWZ) and two (Okara and Pakpattan) in the mixed cropping zone (MCZ)—and their contact details were compiled as part of ADB project activities through farmer listing or with the help of the agriculture extension services of the Punjab Agriculture Department. In addition to the initial 625 farmers contacted, 43 farmers' names and contact details were collected, bringing the total to 668 farmers contacted from 10 districts of Punjab. The study team successfully completed computer-assisted telephone interviews with 429 farmers (Table 1).⁶ The response rate of MCZ farmers was considerably lower than that of the RWZ farmers.

Table 1: Interviews Conducted and Response Rate

Zone	Interviews Targeted (Number)	Interviews Completed (Number)	Response Rate (%)
Rice–wheat zone	559	381	68.2
Mixed cropping zone	109	48	44.0
Total	668	429	64.2

Note: The rice–wheat zone includes Gujranwala, Gujrat, Mandi Bahudin, Nankana Sahib, Narowal, Sialkot, Hafizabad, and Sheikhupura districts; the mixed cropping zone includes Okara and Pakpattan districts.

Source: Authors' calculations based on survey data.

SURVEY RESULTS AND DISCUSSION

This section summarizes the survey findings. Where helpful, comparisons were made between respondents from the RWZ and those from the MCZ. Because the size of the MCZ sample is considerably smaller than the RWZ, any comparisons are indicative.⁷

COVID-19 Impact on Households

Respondents were asked about their household experiences in the context of the COVID-19 pandemic (Figure 1). One-third (33.3%) of farm households experienced losses in wages and nonfarm earnings, 22.6% reported that at least one family member had returned home from urban and other areas, 11.2% reported reduced nonfood expenditures, and 9.8% reported lower food consumption. These percentages are slightly higher in the RWZ than in the MCZ.

COVID-19 Impact on Crops

Crops grown during the 2019 rabi season. Wheat is the predominant crop grown during the rabi season in Punjab, and it is produced by 96.7% of respondents. Berseem, a fodder crop for livestock,⁸ is the second most frequently grown crop, as 49.9% of respondents had indicated; 12.8% grew maize, which is used widely for poultry feed; 11.7% raised vegetables; 5.1% grew fruit; and 6.1% planted miscellaneous other crops.

COVID-19 impact on the wheat harvest. Most respondents (97.3%) reported having completed harvesting their wheat—for the majority, the harvesting period started on the last week of April and ended on the second week of May.⁹ Of those who had completed

⁵ The survey was conducted under the ADB Technical Assistance to the Punjab Agriculture Department, Pakistan for Punjab Basmati Rice Value Chain (TA 8578-PAK).

⁶ Of the 668 target farmers, 80 farmers had their phones switched off or did not answer despite several (at least five) attempts to call on different days. The contact numbers of 118 farmers were incorrect or the person contacted was not a farmer and not the same person listed. Another 41 farmers refused to participate in the survey.

⁷ RWZ respondents account for about 89% of total respondents. As their main products are not perishables and they are able to defer the sale for a better price, the impact of COVID-19 will be less pronounced on them than on fruit, vegetable, and milk producers. This is likely to underestimate the overall impact of COVID-19 in the survey.

⁸ The scientific name for berseem is *Trifolium alexandrinum*, a clover.

⁹ Only five respondents reported not having completed their wheat harvest at the time of the survey but said that they would complete harvesting by the fourth week of May. Six more respondents could not harvest their wheat crop due mostly to waterlogging resulting from excessive rains. About 83.9% of respondents felt that their harvests were delayed relative to previous years, mostly because of late rain.

Figure 1: Farm Households' Experience during COVID-19
(% of total respondents)

Source: Authors' calculations based on survey data.

their harvest at the time of the survey, 74.6% reported that they were able to market their wheat without difficulty.¹⁰ Most of those who did not sell wheat kept the produce for self-consumption: 16.7% in the RWZ and 43.5% in the MCZ (Figure 2). Only a few respondents had difficulty selling their wheat.

Asked to identify their major wheat crop buyers, 40.1% of respondents cited the government as their primary buyer; the remaining 59.9% sold their harvest in the open market. By area, the proportion of sales in the open market in the RWZ was 61.2% versus 44.0% in the MCZ. Respondents who sold in the open market reported an average price of PRs1,367 (\$8.1) per 40 kilograms (maund) of wheat.

COVID-19 impact on vegetable and fruit harvests. A total of 65 respondents had grown vegetables or fruit in the previous rabi season. Of those, 29.2% stated they had completed their entire harvest for the season, and a further 53.8% reported having completed at least one harvest.¹¹ Unlike the wheat farmers, large proportions of vegetable and fruit farmers reported difficulties in marketing their produce (Figure 2). In the RWZ, over 24.4% of vegetable and fruit growers found the offered prices too low, 23.4% could not visit markets, and 8% could not find traders to sell their produce. In the MCZ, all of those who did not sell their produce found the offered prices too low. Most of these respondents stated COVID-19 as the main reason for these problems.

COVID-19 Impact on Dairy Marketing

Of the 145 respondents who reported having livestock for milk production and selling milk in the market, about two-third

(65.5%) reported that they had been unable to market or faced difficulty marketing their milk daily in the past few months. RWZ respondents who were unable to sell or faced difficulty selling their milk cited as obstacles the unavailability of traders (46.5%) and the inability to transport their products to markets and cities (12.4%), while MCZ respondents cited the unavailability of traders (56.3%) and the inability to transport their products to markets and cities (18.8%) (Figure 2). When asked whether the COVID-19 pandemic was a contributing factor, 98.8% of the respondents answered affirmatively. Furthermore, 75.2% of all respondents reported that the price of milk had decreased due to the COVID-19 pandemic.

COVID-19 Impact on Farm Inputs

The 429 respondents to the phone survey were asked a series of questions about the impact of COVID-19 on their farm inputs and the availability of labor and machines for the next sowing. They were also asked to assess their personal financial capacity after the onset of the pandemic and its subsequent economic impact.

More than 27.0% of respondents reported facing disruptions related to COVID-19 when purchasing or receiving farm inputs for the next cycle of sowing; 45.0% said they did not encounter any disruption; and the rest (28.0%) were unsure. Respondents indicated disruptions in the supply of the following farm inputs: the purchase and delivery of seed, according to 81.2% of respondents; fertilizer, 23.9%; pesticides, 19.7%; and diesel fuel, 17.1%. Comparing the

¹⁰ The government's food department supported the farmers by buying their wheat at PRs1,400 (\$8.3) per 40 kilograms, which is higher than the prices offered by local traders. The government also exempted agriculture businesses from lockdown restrictions. However, disruptions were still reported in some places.

¹¹ A small proportion of RWZ respondents reported that they would harvest in the near future; only two respondents said they would not be able to harvest, largely or completely because of rain damage. Almost half of harvesting was completed by the second week of April, with another surge in the second week of May. Most of those who have yet to complete their harvests and the majority of respondents who have yet to start harvesting stated that they would be able to do so after the fourth week of May.

Figure 2: Farmers' Reasons for Difficulty Selling or Not Selling Agricultural Produce in the Rice-Wheat and Mixed Cropping Zones of Punjab, Pakistan

two zones, MCZ respondents faced considerably more disruptions to the input of pesticides and diesel fuel, whereas RWZ farmers had difficulty obtaining seed.

Overall, 55.2% of respondents reported an increase in the cost of farm inputs because of COVID-19, 29.4% reported no increase, and the rest (15.4%) were unsure. The majority (90.7%) said that the cost of seed had increased, 31.2% and 35.9% noted higher prices for fertilizer and pesticides, respectively (Figure 3, Overall). A few respondents having to pay more for diesel fuel, machinery, and miscellaneous inputs.

Regarding labor availability, most respondents (74.4%) stated they did not have problems finding workers for the next crop cycle, a few respondents (8.6%) did have a problem, and 17.0% were not sure. Similarly, most respondents (76.5%) reported not having difficulty finding machines for preparing land or sowing crops.

About 62% of total respondents reported financial difficulties in recent months. When asked whether this was because of the COVID-19 pandemic, 56.8% of them agreed that it was. Furthermore, most respondents (88.7%) who faced financial difficulties indicated the purchase of inputs as their primary concern, while a minority cited liabilities, including loans from banks (18.5%) and nonbank lenders (11.3%).

Locust Swarms

The outbreak of locust swarms originated from Saudi Arabia (Bissada 2020). Undetected, they moved to Iran and Yemen, and swept from Iran to Pakistan. The locusts hit Khyber Pakhtunkhwa and Balochistan provinces in Pakistan first and then moved to Sindh and southern Punjab. The Food and Agricultural Organization of the United Nations estimated that, without effective measures, locust infestations would cause up to PRs688.5 billion (\$4.1 billion) damage of kharif crops and PRs705.8 billion (\$4.2 billion)

of rabi crops, assuming 25.0% damage to crops (Dowlatchahi, Ahmed, and Cressman 2020). A locust infestation of such magnitude has not occurred in Pakistan for more than 25 years and, with outdated infrastructure, the government is ill-equipped to fight the attacks. The federal government declared a national locust emergency early in 2020, allowing multiple government agencies to collaborate for the effort. While the locust threat to agriculture is not larger than that posed by COVID-19, their simultaneous occurrence will have a compounding effect with grave results. Thus, the survey sought to determine the impact of the locust invasion, which has inevitably added to concerns about food security and whether the government had provided farmers with early warning about the swarms.

When asked about the invasion of the locust swarms in their area, only a few RWZ respondents (5.5%) reported locust swarms, but more than half of MCZ respondents (52.1%) reported swarms in their area (Figure 4). With regard to early warning notices and information on the locust swarms hitting the region, a minority of RWZ respondents (31.8%) reported having received from the government or an alternative source early warning about the locusts. In the MCZ, 54.2% of respondents had received early warning or information, which is in line with the many reported observations of locust swarms in the area.

RWZ respondents who were aware of and/or had received notification about the locust swarms were equally split in citing their sources—broadcast news channels (37.2%), the provincial Agriculture Department (35.5%), and local sources at the community level (32.2%), with a few respondents citing local government and the district administration as well. The majority of MCZ respondents (69.2%) cited the provincial Agriculture Department as their source. Respondents in either zone did not cite the Provincial Disaster Management Authority as a source of information on the locust swarm.

Figure 3: Farm Input Price Increases Attributed to COVID-19
(% of total respondents)

Source: Authors' calculations based on survey data.

Figure 4: Locust Swarms Reported by Farmers in Punjab, Pakistan
(% of respondents reporting)

Source: Authors' calculations based on survey data.

Farmers' Preferred Policy Measures

Respondents were asked to suggest and rank in order of preference the following series of policy measures which they felt government should take:

- ease loan repayment conditions or waive loans,
- ensure price stability for agricultural produce,
- provide other policy measures,
- remove restrictions on marketing agricultural produce in districts other than where they are grown (footnote 3), and
- ensure the availability of agriculture inputs.

The largest number (75.3%) cited ensuring price stability for agricultural produce, followed by 66.9% of respondents who stated easing of loan repayment conditions or waiving loans. The need of ensuring the availability of agriculture inputs and removing restrictions on marketing of agriculture produce in districts other than the farmers' home district were identified by 54.3% of respondents.

In addition, a priority index was developed to identify the farmers' preferred policy measures. The index is based on the proportion of total respondents who identified a policy measure

for government action and the priority order or rank given by respondents to the suggested policy measure. Table 2 summarizes the survey results and ranks the measures accordingly, with 1 as the top priority.

CONCLUSION

The survey of farmers in Punjab revealed that wheat harvesting and marketing was spared the negative effects of the restricted movement of goods imposed because of COVID-19, except in the southern districts. Restrictions on movement of goods upset the marketing of highly perishable products, such as vegetables, fruits, and milk as they are difficult to store, unlike grains. Disruptions in the food supply chain result directly in income losses for producers and increased food prices, and therefore need to be kept at a minimum under the COVID-19-induced movement restrictions.

The rising input prices raise grave concerns about the forthcoming rice growing season. The results in this brief show that farmers have lost cash earnings during the COVID-19 pandemic. Coupled with the higher input prices, farmers may not be able to buy the inputs they need for rice production. Because rice is a major staple crop for domestic consumers and an important export product, increased input prices may cause significant problems for Pakistan's economy.

At the same time, locust swarms were reported in the two surveyed districts, with more severe cases observed in Balochistan and Sindh Provinces than in Punjab. The swarms have resulted in production losses for farmers who are already suffering the effects of the COVID-19 pandemic.¹² Immediate prevention and mitigation measures are required, in addition to midterm measures to prevent a future resurgence.

Table 2: Prioritization of Suggested Policy Measures

Suggested Policy Measure	Identification Rate (%)	Priority Index Value	Priority Rank
Ensure price stability for agricultural produce	75.3	2.9	1
Ease loan repayment conditions or waive loans	66.9	2.6	2
Remove restrictions on marketing agricultural produce in other districts	54.3	2.3	3
Ensure availability of agriculture inputs	54.3	2.1	4
Other policy measures	2.1	0.0	5

Source: Authors' calculations based on survey data.

¹² Another ADB survey was conducted in Sindh Province in June 2020 to measure the impact of COVID-19 and locust swarms. The results were not yet compiled at the time of writing this brief.

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Note:

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Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
Tel +63 2 8632 4444
Fax +63 2 8636 2444

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pubsmarketing@adb.org