

Comprehensive evaluation of wheat operation during COVID-19 outbreak in Pakistan.

Evaluación integral de la operación de trigo durante el brote de COVID-19 en Pakistán.

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ABSTRACT

The whole world is confronting under extreme danger from COVID-19 pandemic. Which spread rapidly including an agro-based developing state like Pakistan. Right now this year "Rabi" crop season has safely ended during this pandemic. Wheat-crop operations are depended on environmental conditions and different operational safety measures. Farmworkers are the key individuals, as they are exposed to various environmental, health, safety, biological, and respiratory hazards. Due to COVID-19, there are about more than three thousand (3000) mortalities and one hundred eight thousand (18, 0000) plus persons have been effected, however this number increases further rapidly. The key purpose of this review-study is to highlight the timely adopted safe strategies and their impacts on the yield of wheat along with farmworkers under some Standard Operational Procedures (SOPs) during wheat operations, enabling food security, self-sustainably and securing of farmers in the context of COVID-19. Various actions have been taken worldwide, but a developing state like Pakistan with minimum resources, has made well-organized planning and strategies to sustain the production of wheat with public awareness. We highlighting government efforts to-combat this fatal pandemic, where it has directly impacted the crop yield and also the economy of the state. Whereas, especially during this period, uplifting of economy through agriculture sector, needs to overcome the same management deficiencies from other sectors. Pakistani Government has adopted and implemented different key steps for fighting against COVID-19 include: i. Government command along with incentive approach, ii. Mutual coordination

among stakeholders, local governments, and farmers, iii. Continuous inspection setup, and iv. Provide adequate personal protective equipment (PPE).

Keywords: Wheat operation, Farmers' safety, Food security, COVID-19.

RESUMEN

El mundo entero se enfrenta al peligro extremo de la pandemia de COVID-19. Que se extendió rápidamente incluyendo un estado en desarrollo basado en la agricultura como Pakistán. En este momento, este año, la temporada de cultivos "Rabi" ha terminado sin problemas durante esta pandemia. Las operaciones de cultivo de trigo dependen de las condiciones ambientales y de diferentes medidas de seguridad operativa. Los trabajadores agrícolas son las personas clave, ya que están expuestos a diversos peligros ambientales, de salud, seguridad, biológicos y respiratorios. Debido a COVID-19, hay alrededor de tres mil (3000) muertes y se han efectuado más de ciento ochenta mil (18,000) personas, sin embargo, este número aumenta aún más rápidamente. El propósito clave de este estudio de revisión es resaltar las estrategias seguras adoptadas oportunamente y sus impactos en el rendimiento del trigo junto con los trabajadores agrícolas bajo algunos Procedimientos Operativos Estándar (SOP) durante las operaciones de trigo, lo que permite la seguridad alimentaria, la autosostenibilidad y la seguridad de los agricultores. en el contexto de COVID-19. Se han tomado varias acciones en todo el mundo, pero un estado en desarrollo como Pakistán con recursos mínimos, ha realizado una planificación y estrategias bien organizadas para sostener la producción de trigo con conciencia pública. Destacamos los esfuerzos del gobierno para combatir esta pandemia fatal, donde ha impactado directamente el rendimiento de los cultivos y también la economía del estado. Considerando que, especialmente durante este período, la mejora de la economía a través del sector agrícola, debe superar las mismas deficiencias de gestión de otros sectores. El gobierno de Pakistán ha adoptado e implementado diferentes pasos clave para luchar contra COVID-19, que incluyen: i. Mando del gobierno junto con enfoque de incentivos, ii. Coordinación mutua entre partes interesadas, gobiernos locales y agricultores, iii. Configuración de inspección continua, y iv. Proporcionar equipo de protección personal (EPP) adecuado.

Palabras clave: Explotación de trigo, Seguridad de los agricultores, Seguridad alimentaria, COVID-19.

INTRODUCTION

Reducing risks to food security from coronavirus (COVID-19) is one of the major challenge in 2020 and unconsciously panic is provoking in public. It is a new virus, and its novelty means that scientists are not sure yet how it acts because they have little history to go on (NHSRC, 2020). Wheat is the main food crop of Pakistan (Mahmood et al., 2019), which is usually cultivated across the country on an area of over 9 million hectares (FAO, 2013). In 2020, the production target of wheat grain is 27.03 million tons and its approximately support price is 1400 Rs (Pakistani Rupees) per 40 Kg (MNFSR, 2020). Wheat harvesting has already been started in Sindh province whereas in the Punjab and other provinces, it is about to start. Generally, the wheat is harvested manually (with sickles), semi-mechanized (with reapers followed by threshing) and fully mechanized ways (with combine harvesters). The Punjab which produces about 80 per cent of the crop, can be divided into three cropping zones; Cotton belt (Southern Punjab), Rice belt (Central Punjab), and rain-fed agriculture belt (Potohar). In cotton belt, large farmers prefer mechanized harvesting whereas small farmers rely on manual harvesting. Majority of farmers in rice belt rely reapers whereas most of the farmers in rain-fed areas go for manual harvesting (FAO, 2013). Harvesting operations of the 2020 "Rabi" wheat crop were started from the end of March in the southern province of Sindh, gathered from April in Punjab and now ended after mid of June.

After harvesting, the next step is its procurement by different provincial food-departments, and PASSCO-Pakistan Agricultural Storage and Services Corporation, a federal agency working in storage of agriculture products. Besides, flour mills and small millers (chakkis) too are allowed to procure directly from the farmers (PASSCO, 2020).

CURRENT SITUATION IN PAKISTAN

The ministry of health under Government of Pakistan reported that, the first time cases were confirmed on Feb 26, 2020 in Karachi and Islamabad cities at the same day. Owing to current outbreak of Covid-19 Figure 1, a foolproof strategy and protocols were planned by Government for the successful harvesting operation, and other developments for the safety wellbeing of farmworkers according to the international standards (EPA, 1997) (WHO, 2020). It is pertinent to mention that majority of the labour working in cities now tend to move to their hometowns. Even if small percentage of them is potential carrier, it can spread the pandemic in rural areas of the Punjab too. In this context, people living in villages and town

will become more vulnerable and sensitive to Coronavirus infections. Therefore, during the different stages of wheat operations, health of farmers was the top priority.

Generally, farmers are satisfied with the yield production due to the organized supervision of their local governments. The Punjab Food Department would be procuring 4.5 million tons of wheat, Sindh around 1.2 million tons, and PASSCO around 1.6 million tons. Around 9 to 10 million tons of wheat would be procured by flour mills while rest would be saved by farmers for their day-to-day consumption (Department, 2020) (PASSCO, 2020). Different our visits different procuring operations were still in-process, and during this season the whole production is about 26.1 Million Metric Tons in Pakistan which is better from the previous year (USDA, 2020).

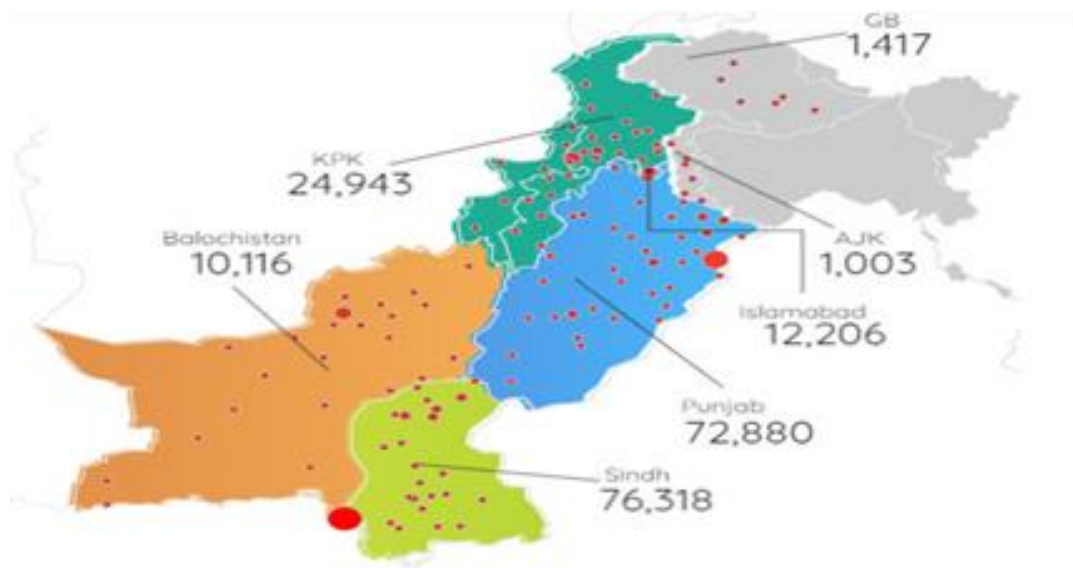


Figure 1. The Current COVID-19 Cases in Pakistan, June 2020 (NHSRC, 2020)

REVIEW FRAMEWORK AND METHOD

Research Review Framework:

In order to well-understand the present situation of wheat operation and their management in Pakistan, available policies, strategies, and operation were reviewed. However, there are various methods used for hazard management at workplaces (Iavicoli et al., 2017; Lay et al., 2017). Nevertheless, there is interest for creating approaches that incorporate crop safety practices and its related hazard mitigation in Pakistan. No previous literature is organized to tackle both environmental and physical risks at the same time during any pandemic. Subsequently, the wheat operational challenges in Pakistan were examined through interviews with relevant stakeholders under "Proposed Research Review Framework" guidelines.

Whole scenario was discussed and reviewed in all aspects related to wheat operation, safety measures, safety of workplace, and safety of farmworkers/labor along with other operation under the COVID-19 outbreak in Pakistan. The views of 35 stakeholders related to wheat operation were sought and interviewed. Both face to face and via phone interview were carried out according to described proposed research review framework in Figure 2. Therefore, some suggestions are given by stakeholders as in Appendix A.

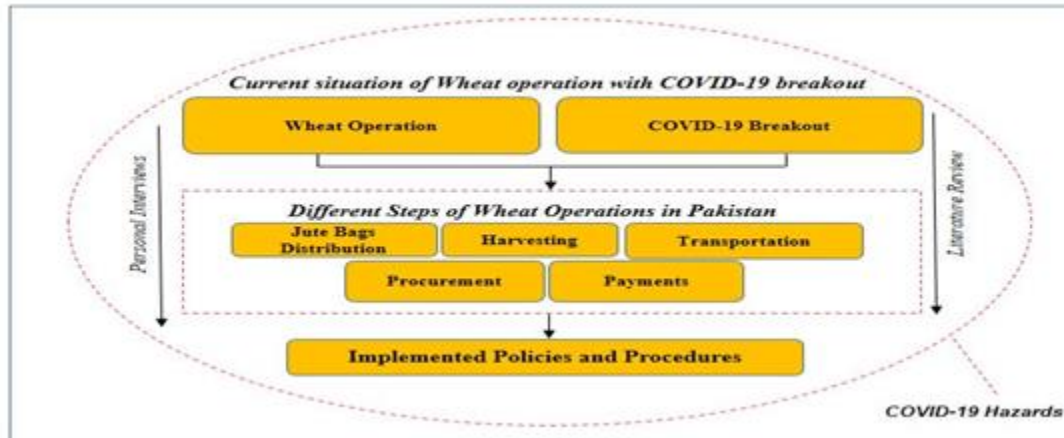


Figure 2. Research Review Framework

RESEARCH REVIEW METHOD

In this review study, literature reviews, personal-site visits and interviews were adopted to analyze the current wheat operation, production-yield, safety and farmworkers situation from different areas in Pakistan. While leading to review research, the most important point was to determine the necessary conditions for the accomplishment of the task (wheat operations) and, then demonstrate the potential factors condition influencing physical and environmental hazards due to COVID-19. It ought to be called attention to that the proposed approach needs to withstand to the assignment elements. However, the proposed research review approach was focused on the safety and wellbeing for the crop, workplace, workers and other operations during this pandemic period.

In order to well-understand the present situation of COVID-19, its impacts, precautions, and safety guidelines in Pakistan, available precautionary modes and measures are continually under observation (NHSRC, 2020). The proposed research review framework approach is presented here in Figure 2 where all implemented procedures to enable safety measures during COVID-19 are described. At initial stage where discussed about "Different steps of wheat operations" (PASSCO, 2020) that were adopted during operation and the second stage is about "Hazards in wheat operations" both are presented in the following sections. In Last stage we have discussed "Implemented Strategies and Procedures" approved by the government.

Most relevant to the wheat operation, three groups (A, B and C) of stakeholders were consulted and interviewed; such as (A) Agriculture Researchers (5-persons); (B) Farmers (10- persons); and (C) Farmworkers (20-persons). The selection of individuals for interview were based on their availability and situation of their workplace. Meanwhile, according to the

situation we conducted semi-structured interviews either face to face or via phone calls. In order to collect further complete information, interviewed questions and topics were not limited as in table 1. All highly matched frequency answers were used to identify the solution during wheat operation, like individual safety, safe workplace and other management barriers at various areas. The main questions and corresponding answers by different surveys are illustrated in the Appendix A.

Different stages of wheat operations

1. Jute bags (bar dana) distribution among farmers
2. Harvesting (manual and mechanical) and packing in the field
3. Transportation of wheat to procurement centers
4. Procurement (by Provincial Food Departments and PASSCO)
5. Payments (PASSCO, 2020)

HAZARDS IN WHEAT OPERATIONS

Farmworkers were directly exposed to various environmental, health, safety, biological, and respiratory hazards due to this pandemic. These hazards were related to some (directly and in-directly) interactions like jute bags distribution among farmers, harvesting, packing, transportation, receiving of payments and during fulfill other procedures. However, main thing was need to learnt about controls, precautions and effective solutions related to hazards (ILO, 2003).

We had personally visited and interviewed with different farmers and farmworkers, within various primary production district areas of Punjab like Multan, Bahawalnagar, Vehari and Khanewal. In Pakistan, the major production area is Punjab it covers (71.17 %) production of the country. They were anxious due to COVID-19 pandemic and the unconscious anxiety can directly impacted the crop yield and further this will impact the economy of the state.

IMPLEMENTED STRATEGIES AND PROCEDURES BY THE GOVERNMENT

Awareness Campaign and Dissemination of Protocols: In the light of above-mentioned stages of wheat operations inside different areas of Pakistan, following implemented results

are identified. Awareness among farmers, fieldworkers and general public in wheat command areas were very important. It was recommended that:

- The guidelines/Protocols were in pictorial form due to the high illiteracy among farm labourers particularly women workers.
- Pictorial charts of protocols were prominently displayed at all points of concentration.
- Local channels (e.g., mosques, numberdars, FM radios, local mobile messages, voice mails and calls in local languages) were used for the dissemination of protocols.
- Field staff of Provincial Agri. Extension Department were (24/7) in contact with the farmers.
- During COVID-19 outbreak, Pakistani government has developed strategies with their defined measures. After detection of early cases, social distancing, risk communication, tests, tracing and tracking of individuals, quarantine centers, self-isolation awareness and other main precautionary measures were adopted and enforced to avoid the rapid spread of COVID-19 (NIH, 2020).

SAFETY OF FARM-WORKERS

The safety of people, who work through the chain of activities during wheat operations, should be the top priority under (EPA, 1997).

- They prevented from Coronavirus infection while those caught up by the disease were provided medical help.
- Prevention included appropriate protective gear for farm labourers, operators of semi-automated reapers and combine harvesters, post-harvest ancillary workers, transporters, packers, and procurement officials.
- For each farm labourer, Agriculture Extension Department and for procurement related operations, relevant procurement agency, had supplied the protective clothing, masks, gloves, hand-washing arrangements.
- In addition, a safe distance among workers during all operations had been ensured. National Disaster Management Authority (NDMA) was assisting these agencies through the central pool.

Jute Bags (bar dana) & Polypropylene (PP) Bags distribution among farmers:

For procurement purposes, farmers needed to be arranged jute bags before harvesting so that they might store their harvest till it is sold. Where, Government provides these jute bags and PP bags against a security deposit of Rs 230 per bag and Rs 34 per bag respectively.

- In this year, these bags were supplied through local administrative governments at doorstep of farmers rather than asking all the farmers to rush to the procurement centers.
- To minimize the concentration of people at the banks, the online security deposit facility was introduced.
- For those who were not been able to use online services, mobile banking vans were arranged for them and they were depositing their security payment under COVID-19 protection guidelines.

Harvesting

- As the mechanical harvesting through combine harvesters and reapers involves less labour and less time. This awareness was promoted in the form of infographics and in local languages.
- Price guidelines was issued and enforced by the district administration. To make mechanical harvesting affordable, district administration was involved during whole operation to ensure that machine owners don't charge unreasonably high rents.
- It was noticed, that where there was no economy of scale involved, i.e. small holdings or from poor farmers, the government had bought unharvested wheat crop of multiple contiguous farms and get it harvested mechanically.

DISCUSSION AND RESULTS

In Pakistan, division of wheat areas with their specifications as described in Table 1, where the whole wheat cultivation area and its production is described. Punjab province is as primary area for wheat production in overall area of Pakistan, which gives 75% of the total production, provinces wise detail is given in the Table 1 and districts wise from Punjab Province is given in Table 2.

Table 1. Division of Wheat Areas in Pakistan-2016/17 (Agrochart, 2016)

Provinces	Area (MH) Million hectares	Percentage (%) Area
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Baluchistan	0.38	4.0
KPK	0.73	8.0
Sindh	1.15	12.5
Punjab	6.97	75.5
Total	9.23	100

Table 2. Wheat Yield (Kg per hectare) in Punjab Districts

Districts	Yield (Kg per hectare)
Multan	3000-3200
Khanewal	2500-2600
Vehari	2600-2700
Bahawalnagar	3200-3300
Bahawalpur	3200-3300

Table 3. Wheat Production Summary in Pakistan (USDA, 2020; WAP, 2020)

Period	Production (Million Metric Tons)
2018/2019	25.1
2019/2020	24.3
2020/2021	26.1

Generally, farmers are satisfied with the yield production due to the organized supervision of their local governments. During this year, the Punjab Food Department would be procuring 4.5 million tons of wheat, Sindh around 1.2 million tons, and PASSCO around 1.6 million tons. Around 9 to 10 million tons of wheat would be procured by flour mills while rest would be saved by farmers for their day-to-day consumption (Department, 2020) (PASSCO, 2020). During our visits different procuring operations were still in-process, and during this season the whole production is about 26.1 Million Metric Tons in Pakistan, also

detail in above Table 2 and Table 3 that is better production from the previous years (USDA, 2020).

Following guidelines/SOPs were given to harvester-drivers;

- a. They must disinfect the frequently touchable parts of their machinery like steering, knobs, gear handles, and break levers etc. with surface disinfectants before the start and close of their work on daily basis.
- b. Frequent change of drivers on same machine must be avoided.
- c. Drivers must have daily showers and cloth change after finishing their work.

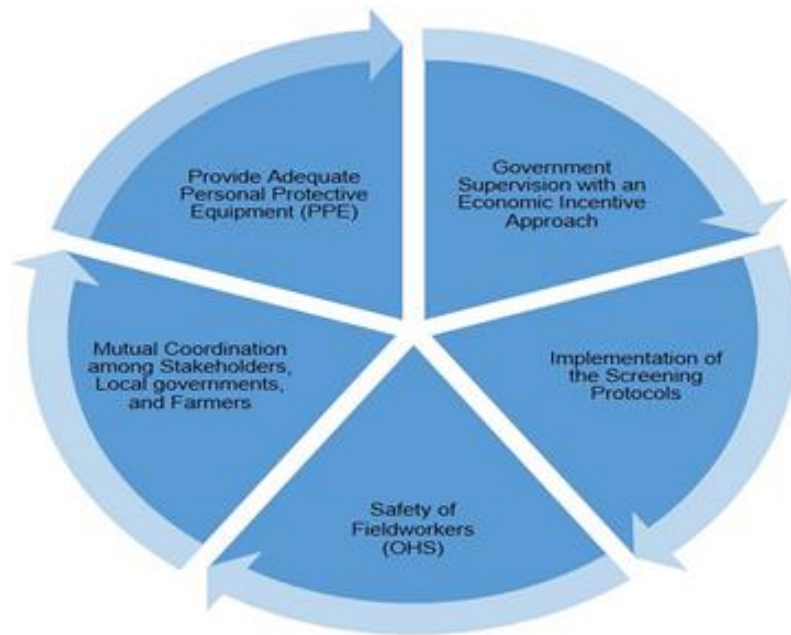


Figure 3. COVID-19 Safe Environmental Cycle

Special permits were issued for the movement of harvesting machinery and skilled labour involved in mandatory service across wheat production regions. During a complete or partial lockdown, farm machinery workshops and spare-part shops were remain opened for the timely completion of wheat harvesting. Now going forward from wheat agencies providing seed for cotton sowing is allowed to open their offices.

In Pakistan, wheat plan adopts multiple disciplinary approaches in order to develop good results, high yield, disease free and good quality wheat-grain varieties and improved sustain wheat-crop management practices. But now during this year another hurdle was there in the shape of COVID-19, due to effective policies, team work and efficient management our wheat production, safety of farmers were not disturbed and we have successfully adopted our production target in this year. After Global market analysis June 2020 by the Foreign Agricultural Service/USDA main purpose is to be highlight the above essential steps taken by

Pakistani Government for safety of farmworkers as well as the production yield of the wheat crop as shown in the above tables (Table 1, Table 2 and Table 3).

At Local level SOPs were disseminated in all nearest training camps with appropriate training staff assigned to handle them in emergency situation. Safe platform was provided by the Government for wheat operations, enabling food security, self-sustainably and securing of farmers during this pandemic with organized measures include. i. Government command along with incentive approach, ii. Mutual coordination among local governments, stakeholders and farmers, iii. Continuous inspection setup, and iv. Provide adequate personal protective equipment (PPE) as shown in Figure 3. COVID-19 awareness campaigns and camps, training centers, medical facilities were provided approximately in all areas, although number of beds could be increase depends on the capacity of patients. As in the Baluchistan and Sindh province, functional medical facilities were approximately provided in all districts. While, in the Punjab province it has 34-districts, there were 50 medical facilities were functional. As in Khyber Pakhtunkhwa there were 110 medical facilities were functional in 33-districts. In Azad Jammu Kashmir there were 15 functional medical facilities in 9 districts, and in Gilgit-Baltistan there were 21 medical facilities were provided in 10 districts (NHSRC, 2020).

RIGHTS AND RESPONSIBILITIES OF WORKERS

Working under corona safe environmental cycle Figure 3, their foremost rights were;

- Access to health care centers in their areas if they get ill.
- Continued supply of food and provision of other necessities of life (through Social Safety nets); and
- If gets ill and cannot work at the farm, he will be paid for their work promptly.

Similarly, responsibilities of farm owners were include:

- Farm workers would be educated on social distancing and personal hygiene during free seminars, trainings sessions and on awareness camps.
- Children, old age people and women will not be engaged in wheat harvesting.
- People suffering from cold, flu, sinus infection or allergy will not be involved in harvesting.
- At least one-meter distance among labourers will be kept during harvesting.
- Hand shaking and hugging will be prohibited.
- Farm workers will be asked to wash their hands frequently with soap.

- They will be bound to cover their mouth in case of sneezing or coughing.
- They will be taught not touch face, nose and eyes frequently.
- They will be provided drinking water by adding lemon in it to get vitamin C.
- They will use personal glasses/cups while drinking water and will not be allowed to share food with each other.
- Sanitizing of their harvesting equipment (sickle etc.) with surface disinfectants will be ensured.
- In case of cough, fever and sneezing, they should stay at home and inform the farm owner/contractor/other colleagues (as the case may be) so that they could be taken to the nearest testing Center or isolation facility.
- The Agriculture Extension Department should have a list of these centers with their addresses and phone numbers along with the local helplines.
- Agricultural Officers and Researchers must be appointed for observation and coordination with the local governments.

As conclusion, the implementation of the screening protocols of farm workers involved in wheat harvesting across provinces, districts and regions was provided urgently. Farm workers, operators, drivers, packers, etc., had already informed beforehand about their care protocols as well as their rights and responsibilities. The key-purpose of this review is to understand about the provided safe platform by the Pakistani-Government with minimum resources as a developing state, in wheat operations, enabling food security, self-sustainably and securing of farmers during this pandemic with organized measures include. i. Government command along with incentive approach, ii. Mutual coordination among local governments, stakeholders and farmers, iii. Continuous inspection setup, and iv. Provide adequate personal protective equipment (PPE) as in Figure 3.

Pakistan has done a great job during COVID-19 pandemic for the safety of wheat operation, wellbeing of farmers and for other fieldworkers. With the collaboration of all provinces, Government took this pandemic seriously and drafted Standard Operational Procedures-SOPs/guidelines at national level, implemented these SOPs in local languages for awareness. At local level in all nearest wheat operational areas local governments have provided different camps for awareness about COVID-19, free seminars, training sessions and SOPs/Protocols-guidelines were disseminated in all nearest training camps, doctors and paramedical staffs appointed with appropriate training staff assigned to handle emergency situation. Sanitizers and disinfectants were commercially not available in the market on

affordable prices by common farmers, the incentive packages were provided through local governments. Wheat harvesting labour were educated to use it for disinfecting their equipment (both mechanical & manual). Other alternate were also given, homemade sanitizer by using commercial rubbing alcohol, glycerin, liquid paraffin, etc. Mobile hand-washing stations (portable metal basins) were used, which were cheap and easily available in rural areas, provide adequate PPE materials (face-masks, gowns, gloves, hand-sanitizers, goggles, soap, cleaning supplies and water) in sufficient amount among farm labourers, were provided by the local administrative authorities during this wheat operations against COVID-19. In this regard Pakistan has saved his wheat procurement and achieved his wheat production target as 26.1 Million Metric Tons in this year Table 3 that is more production yield from the last year.

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Abbreviations

COVID-19	Coronavirus Disease 2019
OHS	Occupational health and safety
PPE	Personal protective equipment
PASSCO	Pakistan Agricultural Storage and Services Corporation
NDMA	National Disaster Management Authority
PP	Polypropylene
SOPs	Standard Operational Procedures

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Appendix A.

The basic main queries and their answers during interviews were following:

A- (5 Researchers from Agriculture Department)

Q1: Do you think the protocols against COVID-19 in Pakistan are affective and operational?
In no, why?

A1: Yes. Against COVID-19 the Government monitoring and treatment processes are quite effective. But, there was a mutual communication and cooperation among operational department were little bit-weak, while individually everyone was performing his/her duty in sufficient and well-organized way.

Q2: Is there any previous law for any pandemic in Pakistan?

A2: No. In the history of Pakistan there was not any special regulations or legislation for any pandemic at (National or Local level). Therefore, now there are few basic precautionary measures, standards/ SOPs provided and implemented by government side for the wellbeing and human safety.

Q3: Is this pandemic is effective the yield of wheat crop?

A3: As this is international pandemic, the fear is mentally disturbing our fieldworkers, but we are adopting safety measures. Slightly impacts have seen on the production of wheat, because the yield is disturbed due to this pandemic in this year. It will affect our food storage capacity for the future as well.

A- Farmers (10)

Q1: Is there any workshop-training seminars, guidelines given by local government that are leading to your safety from COVID-19?

A1: Yes, Government has provided training and guidance/SOPS before wheat operation.

Q2: What do think COVID-19 will affect your crop?

A2: No, we are satisfied our government is doing great work for us. And we don't think that this pandemic can effect on crops.

Q3: (Wheat price)-What price has been announced by the government?

A3: The price is less announced by the government, it is just about 1400Rs (rupees) for 40kg.

Q4: Is there any economic-incentive from the government side for you?

A4: No. The price of wheat is not sufficient for us. Cost of transpotation, bags and labor is also high and the profit income is less.

B- Farmworkers (20)

Q1: Do know about COVID-19? If no, Why?

A1: Yes. A pandemic virus and spread rapidly in all countries,

Q2: What are the problems or difficulties you are facing during wheat operation?

A2: COVID-19 is also a big-challenge, but hot weather was also problem for us, now in this year government providing us facilities like caps, masks, from trainings camps and different items for daily life use.

Q3: Are you satisfied, by the government facilities? If no, why?

A3: Yes. Government has provided us masks, gloves, water, free medical checkup etc.

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