

TERMS OF REFERENCE FOR CONSULTANTS

I. BACKGROUND

1. The implementation of the knowledge and support technical assistance (TA) will require 70 person-months of national consultants through two packages of firms for: (i) food security information upgrading (34 person-months) and (ii) pest management and climate adaptive agriculture (36 person-months). The TA will also require 20 person-months of international and 12 person-months of national individual consultants. The Asian Development Bank (ADB) will recruit and engage all consultants following ADB's Procurement Policy (2017, as amended from time to time), and its associated project administration instructions and/or staff instructions. Following the ADB's Emergency Procurement Guidance on Responding to COVID 19,¹ a single source selection method with biodata technical proposal will be used for the engagement of the firms.

II. FOOD SECURITY INFORMATION UPGRADING PACKAGE (FIRM)

A. Scope of Work

2. The firm will be responsible for implementing output 1 of the TA: Technology-based data collection practices. The firm will (i) conduct a survey across four provinces to collect sample data on the impacts of COVID-19 and locust attack on farm households including gender-specific data using computer-assisted personal interviewing (CAPI);² (ii) design and demonstrate the architecture crop reporting practices of village-level data using information and communication technology (ICT); and (iii) prepare a model for remote sensing crop assessment, and perform enumerated data validation in sample geographic area. The team will be responsible for the following tasks:

- (i) review related literature, available data, and existing similar studies from other countries that may help in designing the surveys to assess the impacts of COVID-19 and locust on rural farm households including gender specific data; examine the type and numbers of farming machines available with the service providers, costs and returns on their services; identify the constraint on their business expansion and opportunities available; and asses their training needs;
- (ii) consult with concerned stakeholders including government line departments, policy think-tanks and academia to understand the issues of farm households comprising gender aspects and service providers in a broader context. Such consultation will help in finalizing the scope of the surveys;
- (iii) develop data collection tools in English, translate and back translate data collection tools in local languages, and develop Android or Windows-based data collection application through CAPI;
- (iv) prepare or acquire the sampling frame of households including gender aspects and services providers from concerned government departments (such as Pakistan Bureau of Statistics) for selecting the samples for the survey;
- (v) develop the design and methodology of both surveys across four provinces of Pakistan in consultation with the ADB TA Team, and recruit all field support staff for data collection including field enumerators and supervisors, conduct training session

¹ Procurement, Portfolio, and financial Management Department's (i) Emergency Procurement Guidance on Responding to COVID 19 dated 24 March 2020 and (ii) Updated Emergency Procurement Guidance on Responding to the Coronavirus Disease 2019 (COVID-19) dated 6 April 2020.

² The survey will also be designed to collect data of the impact of COVID-19 and locust attack on rural women.

- to train enumerators on questionnaire and using CAPI, and undertake the surveys in four provinces;
- (vi) consult with the international survey economist and the national climate adaptive agriculture specialist, who will be recruited through individual source under this TA, regarding items (i)–(v) and obtain their reviews and advice; analyze any challenges, lessons learned, modifications to data collection protocols and any remediation required; and prepare a detailed survey finding report that will include rigorous analysis including gender specific aspect on the impacts of COVID-19 and locust attack and policy measures as recommendations including for long-term sustainable food security;
 - (vii) discuss with provincial crop reporting services (CRS) teams to understand and identify the issues in the existing crop reporting practices; and identify the opportunities and areas for improvement in the existing practices with the focus on responding to emergencies such as COVID-19 and locust attacks;
 - (viii) review the present system, ongoing and planned initiatives, conduct need assessment for strengthening ICT-based crop reporting data collection, and identify software and hardware requirements;
 - (ix) recruit an IT company to develop ICT-based unified data collection application that is well-integrated with the National Food Security Information and Nutrition System of the Ministry of National Food Security and Research (MNFSR);
 - (x) prepare system architecture and a training manual of standardized ICT-based data reporting and train staff of provincial crop reporting services from four provinces on using ICT-based unified data collection application; and conduct demonstration in four provinces;
 - (xi) consult with the international survey economist and national climate adaptive agriculture specialist, who will be recruited through individual source under this TA, regarding items (vii)–(x) and obtain their review and advice; conduct analysis detailing lessons learned, gaps identified in CRS existing methodology, and how the new ICT-based data reporting practices will address these gaps; and prepare a detailed survey finding report that will include rigorous analysis on the impacts of COVID-19 and locust attack and policy measures as recommendations including for a long-term sustainable food security;
 - (xii) work with the MNFSR through the Pakistan Agricultural Research Council and provincial CRS teams to conduct crop assessment demonstrations using remote-sensing technology to complement and supplement the existing CRS system;
 - (xiii) collect sample field crop data on four provinces, generate remote-sensing based crop area and yield maps, and analyze the results of both techniques;
 - (xiv) consult with the international survey economist and national climate adaptive agriculture specialist, who will be recruited through individual source under this TA, regarding items (xii)–(xiii) and obtain their review and advice; and prepare a report presenting the methodology and accuracy of remote sensing, its potential for crop area and yield estimation and challenges to adopt it as policy decision support tool in responding to emergencies such as the COVID-19 pandemic and locust attack and policy measures as recommendations including for a long-term sustainable food security;
 - (xv) disseminate information through workshop / seminar to the relevant stakeholders;
 - (xvi) prepare procurement documents and procure goods and services as required;
 - (xvii) administer provisional sum expenditure for survey/study and goods and services procurement as required, and maintain accounting as appropriate; and
 - (xviii) undertake any other tasks agreed by ADB and the firm during the assignment.

B. Key Expertise Required and Outline Terms of Reference

3. Indicative experts and person-months requirements are in Table 1 below, while the required inputs of the experts will be proposed in the consultant's technical proposal. The assignment will be for 18 months, expected from January 2021 to June 2022. The outline of terms of reference for key experts are in paras. 4–12.

Table 1: Indicative Experts Required and Person-Months

	Position	Experts required		Indicative inputs (person-months)
		Source	Number	
Key				
1	Agricultural Economist / Team Leader	National	1	6
2	Remote-Sensing Specialist	National	1	4
3	Gender Specialist	National	1	2
4	Data System Development Specialist	National	1	4
Subtotal			4	16
Non-Key				
1	Statistician/Survey Coordinator	National	1	6
2	Crop Reporting Coordinator for Balochistan	National	1	3
3	Crop Reporting Coordinator for KP	National	1	3
4	Crop Reporting Coordinator for Punjab	National	1	3
5	Crop Reporting Coordinator for Sindh	National	1	3
Subtotal			5	18
TOTAL			9	34

4. **Agricultural Economist/Team Leader.** The specialist should have a master's degree in agricultural economics or related discipline, with at least 12 years of work experience in planning, implementing, monitoring, and evaluating agriculture sector development studies or projects, financed by international development partners. The specialist should also have updated knowledge of the country's food security and agriculture data collection and monitoring systems (e.g. crop reporting services and agriculture market information system) The specialist should have the experience of leading a team of consultants and the knowledge of designing and managing the surveys and studies. The specialist as Team Leader is responsible for all activities and deliverables, and also responsible for managing provisional sum expenses for surveys, studies, training activities, and procurement.

5. **Remote-Sensing Specialist.** The specialist should have a bachelor's degree, preferably a master's degree, in remote-sensing, GIS, computer engineering, or related discipline, with at least 5 years of work experience in the projects of remote sensing with the use of satellite data in a GIS environment, or relevant experience. The specialist should have experience in land use, crop area, and crop yield assessment projects in Pakistan using the standard software of ERDAS Imagine, ArcGIS, Python programming, Google Earth Engine, etc. The specialist should have project experience financed by international development partners. The specialist will closely work with the MNFSR and provincial agriculture departments, provide them with technical support to improve their capacity to use remote sensing technology, and demonstrate remote sensing models applicable to be used for crop area and yield estimation.

6. **Gender Specialist.** The specialist should have a bachelor's degree, preferably a master's degree, in sociology, gender studies, or related discipline, with at least 7 years of work experience in gender research and analysis, or similar experience, including those financed by international

development partners. Experience in working on gender issues in agriculture or rural development is highly advantageous. The specialist should have strong skills in data collection and analytical work. The specialist will be responsible for integrating gender specific aspects in survey designs, questionnaire preparation, data collection, and analytical work.

7. **Data System Development Specialist.** The specialist should have a bachelor's degree in economics, or related discipline, with at least 7 years of work experience in various economic surveys conducting data processing, or similar experience. The specialist should have data system development and processing skills in various projects financed by international development partners. The specialist should also have experience in agriculture projects. The specialist will be responsible for designing CAPI based CSPro application for android tables and data processing of surveys.

8. **Statistician/Survey Coordinator.** The specialist should have a bachelor's degree in statistics, economics, or related discipline, with at least 7 years of work experience in various economic surveys including field data collection, or similar experience. The specialist should have the latest knowledge and skills to support quantitative surveys in various projects financed by international development partners. The specialist should also have experience in agriculture projects. The specialist will be responsible for planning survey field work, training, data management, and various coordination with survey stakeholders.

9. **Crop Reporting Coordinator for Balochistan.** The specialist should have a bachelor's degree or equivalent in statistics, economics or related discipline, with at least 5 years of province specific experience of crop reporting, or similar experience. Preference will be given to those candidates who have experience of directly working with provincial crop reporting services. The specialist should be proficient in Balochi and/or Pashtu language(s), and a resident at or near Quetta, Balochistan. The specialist will be responsible for coordination with the provincial crop reporting services team and other stakeholders including farmers, and implementation field activities for surveys and training in Balochistan.

10. **Crop Reporting Coordinator for Khyber Pakhtunkhwa.** The specialist should have a bachelor's degree or equivalent in statistics, economics or related discipline, with at least 5 years of province specific experience of crop reporting, or similar experience. Preference will be given to those candidates who have experience of directly working with provincial crop reporting services. The specialist should be proficient in Pashtu language, and a resident at or near Peshawar, Khyber Pakhtunkhwa. The specialist will be responsible for coordination with the provincial crop reporting services team and other stakeholders including farmers, and implementation field activities for surveys and training in Khyber Pakhtunkhwa.

11. **Crop Reporting Coordinator for Punjab.** The specialist should have a bachelor's degree or equivalent in statistics, economics or related discipline, with at least 5 years of province specific experience of crop reporting, or similar experience. Preference will be given to those candidates who have experience of directly working with provincial crop reporting services. The specialist should be proficient in Punjabi language, and a resident at or near Lahore, Punjab. The specialist will be responsible for coordination with the provincial crop reporting services team and other stakeholders including farmers, and implementation field activities for surveys and training in Punjab.

12. **Crop Reporting Coordinator for Sindh.** The specialist should have a bachelor's degree or equivalent in statistics, economics or related discipline, with at least 5 years of province specific experience of crop reporting, or similar experience. Preference will be given to those candidates

who have experience of directly working with provincial crop reporting services. The specialist should be proficient in Sindh language(s), and a resident at or near Hyderabad, Sindh. The specialist will be responsible for coordinating with the provincial crop reporting services team and other stakeholders including farmers, and implementation field activities for surveys and training in Sindh.

C. Deliverables

13. The firm will prepare and submit the following:
- (i) Inception report;
 - (ii) Report on farm household survey including gender specific aspect of the impact of COVID-19 and locust attack;
 - (iii) Report on the survey of agricultural service providers under COVID-19 and locust outbreak;
 - (iv) Report on upgrading of crop reporting services data collection practices and building capacity for sustainable food security;
 - (v) Report on crop area and yield estimation for crops using remote sensing technology and its potential for sustainable food security; and
 - (vi) Draft and final report.

III. PEST MANAGEMENT AND CLIMATE ADAPTIVE AGRICULTURE PACKAGE (FIRM)

D. Scope of work

14. ADB will recruit a firm to implement the activities for outputs 2 and 3 of the TA. These include: (i) demonstration of technologies for safe, economical, and environment-friendly management of locust and other pests; (ii) master trainers' training on integrated pest management practices; (iii) master trainers' training on community-based sustainable crop protection; and (iv) demonstration and/or development of good practices of climate adaptive crop protection. The firm will be responsible for the following tasks:

- (i) consult the MNFSR's Department of Plant Protection (DPP), all four provincial agriculture departments, research centers, and relevant industries, assess potential advanced technologies (e.g. GIS/remote-sensing, drones, various biopesticides and/or modernized low risk pesticides) that will be feasible and applicable to Pakistan to combat COVID-19 and locust and other pest attacks, and select at least three technologies, in full consultation with the international pest management specialist who will be recruited through individual source under this TA;
- (ii) prepare the demonstration activity plan of the selected technologies and appropriate activity arrangements with research centers, in case needed, as required, and conduct the demonstration activity, disseminate its results to relevant stakeholders through workshops and trainings;
- (iii) consult with the international pest management specialist on items (i)–(ii), and prepare a technical report documenting items (i)–(ii) and analytical assessments;
- (iv) conduct overall desk review on the current implementation status of the management of locust and other pest in Pakistan including the applicable policy, strategies, laws, regulations and registration, most of which have not been updated for more than 1 or 2 decades, and identify gaps in meeting the current challenges, requirements, as well as the international standards/best practices;
- (v) consult the MNFSR's DPP, all four provincial agriculture departments, research

- centers, and relevant industries, and develop an integrated pest management plan applying international best practices as well as applicability to Pakistan's ecology/ecosystem and other important aspects including referring to the pest management section of ADB's Safeguard Policy Statement (SPS) (2009);
- (vi) prepare a training plan for master trainers including implementation details to meet the TA target of participants (at least 10% of which are women) in collaboration with the MNFSR's DPP and all four provincial agriculture departments, prepare training materials, and conduct training activities for master trainers to disseminate the integrated pest management practices developed, in consideration of the extent of the respective offices' knowledge and capacity;
 - (vii) consult with the international pest management specialist on items (iv)–(vi), and prepare a report documenting items (iv)–(vi) with analytical assessments, which will include rigorous analysis on the impacts of COVID-19 as well as locust and other pest attacks, and policy measures as recommendations including for long-term sustainable food security;
 - (viii) review and assess the current practices of farmers' crop protection practices in the locust prone areas in all four provinces in consultation with farmers and local nongovernment organizations (NGOs), and select and/or develop feasible and practical best good practices to address the existing issues and challenges in crop protection;
 - (ix) prepare a training plan for master trainers including implementation details to meet the TA target of participants of farmers and rural women (at least 10% of the total participants), and local NGOs staff, and prepare training materials in collaboration of all four provincial agriculture department and local NGOs;
 - (x) consult the international agriculture sector specialist (farming technology and mechanization) who will be recruited through individual source under this TA, on items (viii) and (ix) as needed, and prepare a report documenting items (viii) and (ix) with analytical assessments, which will include rigorous analysis on the impacts of COVID-19 as well as locust and other pest attacks, and policy measures as recommendations including for long-term sustainable food security;
 - (xi) have detailed consultation with leading research centers in Pakistan about potential technologies and practices of climate adaptive seed developments and crop production, and select at least three for demonstration and/or development;
 - (xii) prepare the implementation plan of developing and/or demonstrating the selected technologies and practices with appropriate activity arrangements with the research centers as required, conduct the activity in close collaboration with the research centers, and prepare training materials as needed;
 - (xiii) consult with the international agriculture sector specialist and the national agronomist (climate resilient agriculture) who will be recruited through individual source under this TA on items (xi)–(xii), and prepare a report documenting items (x) and (xii) with analytical assessments, which will include rigorous analysis on the impacts of COVID-19 and locust and other pest attack and policy measures as recommendations including for a long-term sustainable food security;
 - (xiv) prepare a rapid environmental assessment at inception stage before its demonstration and training activities starts, and ensure that no potential adverse environmental impacts resulted from those activities, following ADB's SPS (2009);
 - (xv) engage a women community training expert (technical support staff) in each province for training activities for women in rural communities;
 - (xvi) disseminate information through workshop/seminar to the relevant stakeholders;
 - (xvii) prepare procurement documents and procure goods and services as required;
 - (xviii) administer provisional sum expenditure for survey/study and goods and services

procurement as required, and maintain accounting as appropriate; and
 (xix) undertake any other tasks jointly agreed by ADB and the firm during the assignment.

E. Key Expertise Required and Outline of Terms of Reference

15. Indicative experts and person-months requirements are in Table 2 below, while the required inputs of the experts will be proposed in the consultant's technical proposal. The assignment will be for 22 months, expected from January 2021 to October 2022. The outline of terms of reference for key experts are in paras. 16–24.

Table 2: Experts Required and Indicative Person-Months

	Position	Experts required		Indicative inputs (person-months)
		Source	Number	
Key				
1	Pest Management Specialist / Team Leader	National	1	7
2	Crop Protection Specialist/Coordinator	National	1	12
3	Seed Development Research Specialist	National	1	3
4	Environment Specialist	National	1	1
5	Gender Specialist	National	1	1
Subtotal			5	24
Non-Key				
1	Crop Protection Training Coordinator for Balochistan	National	1	3
2	Crop Protection Training Coordinator for Khyber Pakhtunkhwa	National	1	3
3	Crop Protection Training Coordinator for Punjab	National	1	3
4	Crop Protection Training Coordinator for Sindh	National	1	3
Subtotal			4	12
TOTAL			9	36

16. **Pest Management Specialist/Team Leader.** The specialist should have a bachelor's degree, preferably a master's degree, in entomology, pest management or related discipline, with at least 12 years of work experience in crop protection, climate resilient/adaptive agriculture, or similar work including research and training activities. The specialist should have good experience of team leader's role for projects financed by international development partners. The specialist as Team Leader is responsible for all activities and deliverables, and also responsible for managing provisional sum expenses for surveys, studies and training activities, and procurement.

17. **Plant Protection Specialist/Coordinator.** The specialist should have a bachelor's degree, preferably a master's degree, in agronomy, entomology, or related discipline, with at least 5 years of work experience in plant protection and crop protection including research and training activities, or similar work. The specialist should have field experience. The specialist should have experience in projects financed by international development partners. The specialist will be responsible for planning, implementing, monitoring, and coordinating training activities with the government staff, farmers and local NGOs through the provincial training coordinators (paras. 21-24).

18. **Seed Development Research Specialist.** The specialist should have a master's degree in agriculture, biology or other natural sciences relevant to plant breeding, plant pathology, or other similar discipline, with at least 12 years of experience in seed development, plant breeding, or similar work, including climate adaptive seed development. The specialist should have experience of agricultural research work including laboratory and field, and be familiar with the

up-to-date research knowledge and research protocol for both national and international. The specialist should also have up to date knowledge of the specifications of seed development research equipment. The specialist will be responsible for coordinating relevant research institutes to design, plan, and implement research and/or demonstration activities as required. The specialist will also prepare specifications of required equipment and undertake procurement.

19. **Environment Specialist.** The specialist should have a bachelor's degree, preferably a master's degree, in environmental science, engineering, or related discipline, with at least 7 years of work experience in the field of environmental management, or similar experience. The specialist should be familiar with ADB's SPS (2009) or the similar environmental policy guidelines of international development partners. The specialist should also be familiar with the country's up-to-date environmental safeguard regulations. The specialist should have project experience financed by international development partners. The specialist will be responsible for undertaking rapid environmental assessment on planned demonstration and training activities and prepare a report. The specialist will also be responsible to provide technical inputs on integrated pest management activities following ADB's SPS 2009.

20. **Gender Specialist.** The specialist should have a bachelor's degree, preferably a master's degree, in sociology, gender studies, or related discipline, with at least 7 years of work experience in gender empowerment activity design and implementation, or similar experience, including those financed by international development partners. Experience in working on gender issues in the sector is highly advantageous. The specialist should have strong skills in data collection and analytical work. The specialist will be responsible for integrated gender-related aspects in training and demonstration activities and monitor and report the indicated gender participation target of the activities.

21. **Crop Protection Training Coordinator for Balochistan.** The specialist should have at least bachelor's degree or equivalent in agriculture, agriculture engineering, or related discipline, with at least 5 years of work experience in crop protection field services including training activities, or similar experience. The specialist should have project experience in Balochistan and should be familiar with crop protection practices and works with farmers in Balochistan. The specialist should be proficient in Balochi and/or Pashto language(s) and should be a resident at or near Quetta, Balochistan. The specialist will be responsible for coordination with the provincial crop protection team and other stakeholders including farmers, and implementation field activities for surveys and training in Balochistan.

22. **Crop Protection Training Coordinator for Khyber Pakhtunkhwa.** The specialist should have at least bachelor's degree or equivalent in agriculture, agriculture engineering, or related discipline, with at least 5 years of work experience in crop protection field services including training activities, or similar experience. The specialist should have project experience in Khyber Pakhtunkhwa and should be familiar with crop protection practices and works with farmers in Khyber Pakhtunkhwa. The specialist should be proficient in Pashto language and should be a resident at or near Peshawar, Khyber Pakhtunkhwa. The specialist will be responsible for coordination with the provincial crop protection team and other stakeholders including farmers, and implementation field activities for surveys and training in Khyber Pakhtunkhwa.

23. **Crop Protection Training Coordinator for Punjab.** The specialist should have at least bachelor's degree or equivalent in agriculture, agriculture engineering, or related discipline, with at least 5 years of work experience in crop protection field services including training activities, or similar experience. The specialist should have project experience in Punjab and should be familiar with crop protection practices and works with farmers in Punjab. The specialist should be

proficient in Punjabi language and should be a resident at or near Lahore, Punjab. The specialist will be responsible for coordination with the provincial crop protection team and other stakeholders including farmers, and implementation field activities for surveys and training in Punjab.

24. **Crop Protection Training Coordinator for Sindh.** The specialist should have at least bachelor's degree or equivalent in agriculture, agriculture engineering, or related discipline, with at least 5 years of work experience in crop protection field services including training activities, or similar experience. The specialist should have project experience in Sindh and should be familiar with crop protection practices and works with farmers in Sindh. The specialist should be proficient in Sindh language and should be a resident at or near Hyderabad, Sindh. The specialist will be responsible for coordination with the provincial crop protection team and other stakeholders including farmers, and implementation field activities for surveys and training in Sindh.

F. Deliverables

25. The firm will prepare and submit the following:

- (i) Inception Report
- (ii) Report on technologies for safe, economical, and environment-friendly management of locust and other pests in response to the impact of COVID-19 and locust attack;
- (iii) Report on integrated pest management practices in response to the impact of COVID-19 and locust attack;
- (iv) Report on community-based sustainable crop protection including gender specific aspect in response to the impact of COVID-19 and locust attack;
- (v) Report on good practices of climate adaptive crop protection in response to the impact of COVID-19 and locust attack; and
- (vi) Draft and final report.

IV. INDIVIDUAL CONSULTANTS

26. The following individual consultants will be recruited from international and national sources to (i) support the activities and preparation of deliverables by firm consultants (for the abovementioned packages) through specialized technical and advisory inputs under outputs 1–3; (ii) provide technical and advisory inputs for a diagnostic assessment led by the ADB project team under output 4; (iii) coordinate relevant stakeholders, especially the government offices for required inputs from them including the existing data and information; and (iv) prepare knowledge products.

27. **Food Security Specialist (Policy and Institution) (international 2 person-months).** The specialist should have a bachelor's degree, preferably a master's degree, in economics, finance, or related disciplines, with minimum 12 years of work experience in agriculture, food security, or related sectors. The specialist should have experience working with ADB and/or other development partners such as the World Bank for investment projects. The specialist should also have good experience working closely with the federal and provincial governments of Pakistan and be familiar with the governments' latest agriculture and food security, and climate change policy and strategy, and decision-making procedures. The specialist will;

- (i) review existing documents of national food security policy, provincial agriculture policies, and other documents related to food and agriculture sector's strategy including commodity operation both at federal and provincial levels, and identify

- (ii) gaps and challenges in terms of response to the damages and impacts of COVID-19 and locust attack, and also a long-term sustainable food security in Pakistan; consult with the food security and agriculture stakeholders including the federal and provincial governments, relevant association and industries, NGOs, international and national development partners, and others in terms of response to the damages and impacts of COVID-19 and locust attack, and also for a long-term sustainable food security;
- (iii) provide the MNFSR with technical advisory inputs on the MNFSR's food security information system upgrading for improvement;
- (iv) provide the provincial agriculture departments with technical advisory on provincial food security assessments;
- (v) participate in consultation meetings with various stakeholders for a diagnostic assessment study on food security and agriculture led by the ADB project team, provide technical inputs; and prepare and submit an assessment report on food security policy and institution;
- (vi) provide technical inputs to the government's commodity operation review committee;
- (vii) provide technical inputs for knowledge products (report and/or virtual mode); and
- (viii) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

28. Climate Adaptive Pest Management Specialist (international, 2 person-months). The specialist should have a master's degree, preferably doctoral degree in entomology, agriculture, plant protection, or related discipline, with at least 12 years of work experience in research and operations of surveillance and control of locust and other pest, integrated pest management, or similar experience. The specialist should have experience for development projects in developing countries including Pakistan, and be familiar with constraints in knowledge and system in those countries. The specialist will:

- (i) review the existing documents of the federal and provincial governments' policies, regulations and laws of pest management and food security and identify gaps and challenges in terms of response to the impact of locust attack, and also a long-term sustainable food security;
- (ii) provide the MNFSR's DPP and provincial agriculture departments with web-based technical training sessions to improve its existing capacity by introducing up-to-date knowledge and technologies on international best practices on locust and pest management;
- (iii) assist the DPP and provincial agriculture departments in reviewing their policies, regulations and laws of pest management and provide technical inputs to enable their contents to meet the international standards and latest requirements of pest management;
- (iv) provide the firm consultant for the pest management and climate adaptive agriculture package with technical and advisory inputs on its activities and reports;
- (v) participate in consultation meetings with various stakeholders for a diagnostic assessment study on food security and agriculture led by the ADB project team, provide technical inputs; and prepare and submit an assessment report on enhancement of integrated pest management and food security;
- (vi) provide technical inputs for knowledge products (report and/or virtual mode); and
- (vii) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

29. **Agricultural Economist (international, 2 person-months).** The specialist should have a bachelor's degree, preferably a master's degree, in agriculture economics, or related discipline, with at least 12 years of work experience in agriculture-related investment projects financed by key international development partners such as ADB and the World Bank. The specialist should be familiar with integrated sector assessment approach covering agriculture, irrigated agriculture, food security, climate change, and value chain. The specialist's project experience in Pakistan is required. The specialist will:

- (i) review the existing documents of national food security policy, provincial agriculture policies, and other documents related to food and agriculture sector's strategy, and identify gaps and challenges in terms of response to the damages and impacts of COVID-19 and locust attack, as well as long-term sustainable food security;
- (ii) consult with food security stakeholders, including the federal and provincial governments, relevant association and industries, NGOs, international and national development partners on the response to the damages and impacts of COVID-19 and locust attack, as well as for long-term sustainable food security;
- (iii) provide the MNFSR and provincial agriculture department with technical advisory inputs on agriculture sector development and climate resilient agriculture/climate smart agriculture in response to the impact of COVID-19 and locust attack, as well as for long-term sustainable food security;
- (iv) participate in consultation meetings with various stakeholders for a diagnostic assessment study led by the ADB project team; provide technical inputs; and prepare and submit an assessment report on agriculture sector performance and development;
- (v) provide technical inputs for knowledge products (report and/or virtual mode); and
- (vi) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

30. **Survey Economist (international, 4 person-months).** The specialist should have a master's degree in economics, or related discipline, with at least 10 years of work experience in economic surveys (quantitative), project impact evaluation, or similar experience. Experience of an impact evaluation and/or farm household survey in Pakistan financed by ADB is advantage. The specialist should have the up-to-date knowledge of the economic survey methodologies, designing of surveys and implementation practices and analysis using advanced technology such as ICT and remote sensing. The specialist will:

- (i) review the existing data and information of food security and agriculture, and identify gaps and challenges in data set in terms of response to the impact of COVID-19 and locust attack, as well as long-term sustainable food security;
- (ii) consult with the MNFSR and provincial agriculture departments on data collection practices and identify gaps and challenges in terms of reliability and timeliness;
- (iii) assist the firm consultant for the food security information upgrading package in implementing the activities of TA output 1: *technology-based data collection practices demonstrated*, through providing technical and advisory inputs and guidance to complete the tasks and ensure that quality of survey will meet required standards in terms of methodology and procedures;
- (iv) further assist the firm consultant to implement the following: (a) conduct a survey across four provinces to collect data on the impacts of COVID-19 and locust attack on farm households through CAPI and agriculture service providers; (b) demonstrate ICT-based crop reporting practices for collecting village-level data;

- (v) and (c) undertake remote sensing crop assessment to verify enumerated data; review the consultant's reports and provide technical comments and suggestions to improve their quality;
- (vii) participate in consultation meetings with various stakeholders for a diagnostic assessment study; provide technical inputs led by the ADB project team; and prepare and submit an assessment report on food security data and information system enhancement;
- (viii) provide technical inputs for knowledge products (report and/or virtual mode); and
- (ix) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

31. **Agriculture Research Specialist (international, 3 person-months).** The specialist should have a master's degree, preferably, a doctoral degree in agronomy, agriculture, or related discipline, with at least 12 years of work experience in agriculture research and studies projects, focusing on farming technologies and mechanization, or similar experience. The specialist should have the up-to-date research knowledge and research protocol for both national and international. The specialist should also have experience in projects financed by international development partners, and his/or her experience in Pakistan is required. The specialist will:

- (i) review the existing agriculture and food security research system and practices, and identify gaps and challenges in terms of response to the impact of COVID-19 and locust attack, as well as long-term sustainable food security;
- (ii) consult with federal and provincial research institutions on the impact of COVID-19 and locust attack, and gather and analyze information of their activities conducted in response to the impact of COVID-19 and locust attack, as well as for long-term sustainable food security;
- (iii) participate in consultation meetings with various stakeholders for a diagnostic assessment study led by the ADB project team; provide technical inputs; and prepare and submit an assessment report on agriculture and food security research system and its enhancement;
- (iv) provide technical inputs for knowledge products (report and/or virtual mode); and
- (v) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

32. **Agriculture Market and Value Chain Specialist (international, 2 person-months).** The specialist should have a bachelor's degree, preferably a master's degree, in finance, economics, or related discipline, with at least 12 years of work experience in agriculture finance, agriculture value chain, or similar experience. The specialist should also have experience in projects financed by international development partners, and his/or her experience in Pakistan is required. The specialist will;

- (i) review the existing agriculture value chain system and practices, and identify gaps and challenges in terms of response to the impact of COVID-19 and locust attack, as well as long-term sustainable food security;
- (ii) participate in consultation meetings with various stakeholders for a diagnostic assessment study led by the ADB project team; provide technical inputs, especially on development of warehouse receipt financing, crop insurance business, and commodity market and value chain; and prepare and submit an assessment report on financial inclusion in agriculture and value chain enhancement;
- (iii) provide technical inputs for knowledge products (report and/or virtual mode); and
- (iv) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

assignment.

33. **Commodity Market Specialist (international, 1 person-month).** The specialist should have a bachelor's degree, preferably a master's degree in economics, finance, business, agricultural economics, or related discipline, with at least 10 years of work experience in commodity market analysis and development of policy briefs and associated relevant reports in the agriculture sector or relevant experience. The specialist should have experience of working in commodity market, commodity trading, or relevant area. The specialist will:

- (i) review the current commodity market operations in Pakistan, including systems and prices structure;
- (i) conduct commodity analysis including farmgate, wholesale, and retail price trends of prioritized essential food commodities; food consumption patterns, demand analysis, and forecasts, food production, trade, distribution patterns, trends, and forecasts;
- (ii) conduct review on food security policy (stored stock volume, location, costs, storage type, and efficiency of food stocks by federal and provincial governments) and provide associated policy-level inputs;
- (iii) provide technical inputs to the government's commodity operation review committee; and
- (iv) any other assignment jointly agreed between the TA Project Officer and the specialist.

34. **Remote Sensing Specialist (International, 3 person-months).** The specialist should have a bachelor's degree, preferably a master's degree in remote-sensing, GIS, computer engineering, or related discipline, with at least 10 years of work experience in the projects of remote sensing with the use of satellite data in a GIS environment, or relevant experience. The specialist should have experience in land use, crop area, and crop yield assessment projects, preferably in South Asia using the standard software of ERDAS Imagine, ArcGIS, Python programming, Google Earth Engine, etc. The specialist should have project experience financed by international development partners. The specialist will;

- (i) review and evaluate the methodology used by the provincial crop reporting services directorates for the assessment of crop area and yield and identify the strengths and limitations of the existing system of data collection and reporting;
- (ii) prepare a model for using satellite imageries from sentinel 1 and 2 data and landsat 8 data sources from the public domain and identify the crop area for specific crops and estimate crop yields using the crop growth models (i.e. DSSAT or related model) using remote sensing techniques;
- (iii) compare the estimated data from the remote sensing techniques with the field validated data of crop area and crop yield and estimate the level of accuracy and undertake an activity for further fine-tuning;
- (iv) provide technical support to the MNFSR, prepare training manual for the installation and use of model for estimation of crop area and crop yields using the remote sensing techniques, as a guideline for the staff of the CRS;
- (v) Prepare a report along with the model and database developed using the remote sensing and GIS techniques, and submit it the TA Project Officer;
- (v) any other assignment jointly agreed between the TA Project Officer and the specialist.

35. **Knowledge Management Specialist (international, 1 person-months).** The specialist

should have a bachelor's degree in relevant discipline, and preferably in natural science, with at least 12 years of work experience in developing knowledge products, including ADB knowledge products. The specialist should be familiar with the ADB's corporate strategy and how to develop knowledge products incorporating ADB's operational priorities. The specialist should also be familiar with the ADB editing requirements. The specialist's experience of projects in Pakistan is required. The specialist will:

- (i) review knowledge products and draft reports prepared by TA consultants; compile, adapt, and edit the above reports following ADB style guide; query discrepancies and repetition (both technical and presentational);
- (ii) ensure coherence in style within the draft in accordance with ADB editorial style; ensure accuracy of illustrations and their placement; and edit captions for consistency;
- (iii) provide substantial comments and inputs on documents as appropriate; and
- (iv) any other assignment jointly agreed between the TA Project Officer and the specialist.

36. Food Security Specialist/Coordinator (national, 4 person-months). The specialist should have a bachelor's degree, preferably a master's degree, in agriculture or related discipline, with at least 10 years' experience in project coordination for investment projects and research in agriculture sector. The specialist should be familiar with the institutional systems of the country's food security and agriculture. Experience of work with the MNFSR is advantage. The specialist should be a resident in Islamabad, Pakistan. The specialist will:

- (i) provide coordination role for the TA activities, especially for the implementation of a diagnostic assessment study that will be conducted jointly by the ADB TA Team and the MNFSR through the Food Security Commissioner's Office;
- (ii) assist the Food Security Commissioner in coordinating various consultation meetings with broader groups of stakeholders;
- (iii) coordinate with various offices under the MNFSR and collect their inputs and information for the diagnostic assessment study in a timely manner;
- (iv) participate in consultation meeting of a diagnostic assessment led by the ADB project team and ensure involvement of all concerned stakeholders of food security and agriculture in the diagnostic assessment process and gathering opinions, views and policy recommendations from them; and
- (v) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

37. Climate Adaptive Agriculture Specialist (national, 6 person-months). The specialist should have a master's degree, preferably a doctoral degree, in agronomy, or related discipline, with at least 5 years' experience in climate adaptive agriculture research and field practices, or similar experience. The specialist should have the up-to-date agronomic knowledge and research experience of climate change mitigation and adaptation in crop production in Pakistan. The specialist should also have experience in planning and implementing various surveys and studies on food security and livelihood such as a farm household survey and impact evaluation in which the data, information and analysis of climate adaptive agriculture should be incorporated. The specialist will:

- (i) review the existing data and information of food security and agriculture, and identify gaps and challenges in data set in terms of response to the impact of COVID-19 and locust attack, as well as long-term sustainable food security;

- (ii) consult with the MNFSR and provincial agriculture departments on data collection practices and identify gaps and challenges in terms of reliability and timeliness;
- (iii) assist the firm consultant for the food security information upgrading package in implementing the activities of TA output 1: *technology-based data collection practices demonstrated*, through providing technical and advisory inputs and guidance to complete the tasks and ensure that quality of survey will meet required standards in terms of methodology and procedures;
- (iv) further assist the firm consultant to implement to (a) conduct a survey across four provinces to collect data on the impacts of COVID-19 and locust attack on farm households through CAPI and agriculture service providers; (b) demonstrate ICT-based crop reporting practices for collecting village-level data; and (c) undertake remote sensing crop assessment to verify enumerated data;
- (v) assist the firm consultant for the pest management and climate adaptive agriculture package in implementing the activities of TA output 3: *climate adaptive crop production development and demonstration*, through providing technical and advisory inputs and guidance to complete the tasks with required quality;
- (vi) further assist the firm to implement (c) master trainers' training on community-based sustainable crop protection; and (d) demonstration and/or development of good practices of climate adaptive crop protection;
- (vii) provide technical inputs for knowledge products (report and/or virtual mode); and
- (viii) undertake any other tasks jointly agreed by ADB TA Officer and the firm during the assignment.

38. Agriculture and Commodity Market Specialist (national, 2 person-months). The specialist should have bachelor's degree, preferably master's degree in economics, finance, business, agricultural economics, or related discipline, with at least 10 years of work experience in commodity operations, policy and regulatory oversight, market analysis and associated relevant experience in the commodities sector. The specialist should have experience of working in agriculture finance, commodity market, commodity trading, commodity analysis or relevant area. The specialist will:

- (ii) review the current commodity market operations in Pakistan including systems and prices structure;
- (vi) conduct commodity analysis including farmgate, wholesale, and retail price trends of prioritized essential food commodities; food consumption patterns, demand analysis, and forecasts, food production, trade, distribution patterns, trends, and forecasts;
- (vii) conduct review on food security policy (stored stock volume, location, costs, storage type, and efficiency of food stocks by federal and provincial governments) and provide associated policy-level inputs;
- (viii) work closely with the government's commodity operation review committee and provide technical inputs; and
- (ix) undertake any other assignment jointly agreed between the TA Project Officer and the specialist.

V. COUNTERPART SUPPORT

39. The government will provide counterpart support in the form of counterpart staff, data and information access, secretarial assistance, coordination, and domestic transportation for counterpart staff, and other in-kind contributions.