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Report No: PAD3959

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT

IN THE AMOUNT OF SDR 18.3 MILLION
(US$25.0 MILLION EQUIVALENT)

TO THE

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

FOR A

YEMEN DESERT LOCUST RESPONSE PROJECT

JUNE 1, 2020

Agriculture And Food Global Practice
Middle East And North Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2020)

Currency Unit =	SDR
SDR 0.728183 =	US$1
US$ 1.373279 =	SDR 1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Ferid Belhaj
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ABBREVIATIONS AND ACRONYMS

4WD	Four-wheel drive
ARDU	Agriculture and Rural Development Unit
CBO	Community-based organization
CBY	Central Bank of Yemen
CDLCC	Central Desert Locust Control Center
CfW	Cash for Work
COVID-19	Coronavirus Disease 2019
DALOs	Damages and Losses
DLCC	Desert Locust Control Center
DLERS	Desert locust
DPP	Directorate of Plan Protection (under MAI)
ECRP	Emergency Crisis Response Project
ESCP	Environmental and Social Commitment Plan
ESMF	Environmental and Social Management Framework
ESF	Environmental and Social Framework
FAO	Food and Agriculture Organization of the United Nations
FCV	Fragility, Conflict and Violence
FEWS-NET	Famine Early Warning System Network
FM	Financial Management
FMFA	Financial Management Framework Agreement
GBV	Gender-based violence
GDP	Gross domestic product
GHG	Greenhouse gas
GHOA	Greater Horn of Africa
GPS	Global positioning system
GRM	Grievance redress mechanism
GRS	Grievance Redress System
ha	Hectares
IDA	International Development Association
IFC	International Finance Corporation
IFR	Interim Financial Report
IP	Implementing partner
IPF	Investment Project Financing (instrument)
LOA	Letter of Agreement
LMP	Labor Management Plan
MAI	Ministry of Agriculture and Irrigation
M&E	Monitoring and evaluation
MPA	Multiphase Programmatic Approach
MTR	Mid-Term Review
NGO	Non-governmental organization
NPMS	National Pest Management Strategy
OCHA	UN Office for the Coordination of Humanitarian Affairs
PDO	Project Development Objective

PCU	Project Coordination Unit
POA	Plan of Action
POM	Project Operational Manual
PPE	Personal Protective Equipment
PPSD	Project Procurement Strategy for Development
PT	Project Team
RPCU	Regional Project Coordination Unit
SAPREP	Smallholder Agriculture Restoration and Enhancement Project
SFD	Social Fund for Development
SMEPS	Small and Medium Enterprise Promotion Service
STEP	Systematic Tracking of Exchanges in Procurement
SWF	Social Welfare Fund
TOC	Theory of Change
TOR	Terms of reference
TOT	Training-of-trainers
TPM	Third-party monitoring
TPMA	Third-party monitoring agency
ULV	Ultra-low volume (sprayer)
UN	United Nations
UNDP	United Nations Development Programme
YHRP	Yemen Humanitarian Response Plan
WB	World Bank
WFP	World Food Programme

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name
Yemen, Republic of	Yemen Desert Locust Response Project

Project ID	Financing Instrument	Environmental and Social Risk Classification	Process
P174170	Investment Project Financing	Substantial	Urgent Need or Capacity Constraints (FCC)

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[✓] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[✓] Conflict
[ ] Deferred Drawdown	[✓] Responding to Natural or Man-made Disaster
[✓] Alternate Procurement Arrangements (APA)	[ ] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
12-Jun-2020	29-Dec-2023

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objectives are to control the desert locust outbreak, support livelihoods in locust-affected areas and strengthen Yemen's preparedness for future locust infestations.

Components

Component Name	Cost (US$, millions)
Surveillance and Control Measures	10.10
Livelihood Protection and Rehabilitation	4.75
Coordination and Early Warning Preparedness	5.60
Project Management and Knowledge Management	4.54

Organizations

Borrower:	Food and Agriculture Organization (FAO)
Implementing Agency:	Food and Agriculture Organization (FAO)

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	25.00
Total Financing	25.00
of which IBRD/IDA	25.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	25.00
IDA Grant	25.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Yemen, Republic of	0.00	25.00	0.00	25.00
National PBA	0.00	8.33	0.00	8.33

Regional	0.00	16.67	0.00	16.67
Total	**0.00**	**25.00**	**0.00**	**25.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2020	2021	2022	2023	2024
Annual	0.00	14.80	7.30	2.70	0.20
Cumulative	0.00	14.80	22.10	24.80	25.00

INSTITUTIONAL DATA

Practice Area (Lead)

Agriculture and Food

Contributing Practice Areas

Social Protection & Jobs

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	High
2. Macroeconomic	High
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	High
7. Environment and Social	Substantial
8. Stakeholders	Substantial
9. Other	High
10. Overall	High

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[✓] Yes [ ] No

Have these been approved by Bank management?

[✓] Yes [ ] No

Is approval for any policy waiver sought from the Board?

[✓] Yes [ ] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

Schedule 2, Section I.B 1(a): Project Operational Manual

The Recipient shall, not later than three (3) months after the Effective Date, prepare, in accordance with terms of reference acceptable to the Association, and furnish to the Association an operational manual for the Project, in form and substance acceptable to the Association, containing, inter alia, detailed arrangements and procedures for: (i) implementation arrangements; (ii) administrative aspects; (iii) procurement; (iv) implementation of environmental and social instruments referred to in the ESCP; (v) financial management and accounting; (vi) monitoring and evaluation; and (vii) eligibility criteria and procedures for provision of farmers packets and kits under Part 2.B of the Project; and (viii) any such other technical, administrative, fiduciary or coordination arrangements as may be necessary to ensure effective Project implementation.

Conditions

Type	Description
Disbursement	No withdrawal shall be made under Category (1) unless and until the Recipient has implemented the applicable material measures and actions – including preparing, carrying out consultation on, adopting and publicly disclosing relevant environmental and social assessment/management plans and instruments – set forth in the Environmental and Social Commitment Plan relating to disbursement of Financing for Part 1 of the Project.
Type	Description
Disbursement	No withdrawal shall be made under Category (2), until and unless the Recipient has: (i) prepared and adopted the CfW Transfer Manual under terms and conditions acceptable to the Association and in accordance with the provisions of Section I.B.3 of Schedule 2 to this Agreement; and (ii) implemented the applicable material measures and actions – including preparing, carrying out consultation on, adopting and publicly disclosing relevant environmental and social assessment/management plans and instruments – set forth in the Environmental and Social Commitment Plan relating to disbursement of Financing for Part 2.A of the Project;
Type	Description
Disbursement	No withdrawal shall be made under Category (3) unless and until the Recipient has implemented the applicable material measures and actions – including preparing, carrying out consultation on, adopting and publicly disclosing relevant environmental and social assessment/management plans and instruments – set forth in the Environmental and Social Commitment Plan relating to disbursement of Financing for Part 3.A of the Project.

I. STRATEGIC CONTEXT

A. Country Context

1. **Violent conflict, now in its sixth year, has crippled Yemen's economy and created an unprecedented humanitarian crisis.** Hydrocarbon exports, the main source of government revenue and foreign exchange, came to a virtual halt in 2015 due to repeated sabotage of vital infrastructure and increased insecurity. The resulting wide-scale suspension of basic public services and civil service salary payments, rapid depreciation of the currency, and shortages of imported goods weakened the non-hydrocarbon sector and left many Yemenis without a regular income. External assistance, which financed imports of food and other necessities and helped stabilize the economy in 2019, was largely depleted by early 2020.

2. **In the absence of fresh external assistance and a stable source of foreign exchange, Yemen faces significant risks of a renewed collapse of its currency and dire economic and humanitarian consequences.** Given Yemen's high dependence on imports, these circumstances would induce an immediate increase in the prices of imported food and other necessities. The complete ban on the use of the new edition of banknotes in Sana'a in December 2019 has deepened divisions in the financial sector and economic distortion, causing exchange rates to diverge between northern and southern Yemen. While the exchange rate of the rial has stabilized in the North due to the shortage of old banknotes, the currency has depreciated sharply in the South as the parallel market was awash with new banknotes that are now illegal in the North. Yemen imports 80 percent of its food. The latest data confirm a sharp fall in the volume of food imports since October 2019, raising serious concerns about Yemen's food security. Any disruptions in global food supply chains resulting from the COVID-19 pandemic could further exacerbate food insecurity through reductions in food imports and high prices arising from shortages.

3. **The dramatic deterioration of conditions in Yemen has translated into a significant worsening of poverty.** More than 50 percent of Yemenis between the ages of 18 and 24 are unemployed (UNDP 2017). It is estimated that around 80 percent of the population (around 24 million) lives below the poverty line (World Bank 2019). In addition to monetary poverty, up to 80 percent of households experience many overlapping monetary and non-monetary deprivations (World Food Programme 2020). The *Global Report on Food Crises 2020* concluded that "the combined effects of conflict, macroeconomic crisis, climate-related shocks and crop pests, including fall armyworm and desert locusts, were likely to ensure that Yemen remained the world's worst food crisis" in the immediate future.[1]

4. **Yemen's food security crisis is described as one of the world's largest man-made food security crisis, driven by constrained food production, food supply and distribution and people's diminishing purchasing power.** The 2019 International Food Policy Research Institute Global Hunger Index (GHI) ranks Yemen 116 out of 117 counties. Currently, over 20 million people are food insecure while a staggering 10 million people are at risk of famine. An estimated 4.3 million people have fled their homes since the start of the conflict, of which 3.3 million remain displaced. Hunger, food insecurity and malnutrition are the most pressing and overwhelming challenges faced by the country at present, at a scale that is not being fully met by national authorities and the international development and humanitarian communities.

[1] World Food Programme (2020), *The Global Report on Food Crises 2020*, available at *www.fsinplatform.org/sites/default/files/resources/files/GRFC_2020_ONLINE_200420.pdf.*

5. **Vulnerability to climate change and infestations of swarming locusts are exacerbating Yemen's dire food insecurity, creating a crisis within a crisis.** Yemen is highly vulnerable to climate change, which significantly threatens food security and intensifies the development of locust swarms. Climate change has triggered the strongest alterations in water temperature in the Indian Ocean in 60 years. Warmer seas create more extreme rainfall as well as stronger and more frequent cyclones, providing ideal conditions for locusts to hatch, breed, and disperse widely.

6. **Yemen's regional importance in terms of locust infestations cannot be overstated.** Yemen is one of the key desert locust breeding grounds, where swarms develop in several locations throughout the year and then disperse across the country and region, negatively affecting the food security and livelihoods of tens of millions of people across East Africa, the Middle East, and South Asia. As of mid-March 2020, 23 countries from Yemen to Pakistan to Tanzania have been affected, with risk of new outbreaks in the Sahel in June/July, and possibly North Africa by October (FAO). The situation is extremely alarming and deteriorating rapidly, with widespread breeding in the region progress and new swarms starting to form, representing an unprecedented threat to food security. A small swarm (1 km^2) can comprise as many as 80 million locusts and can consume the same amount of food in one day as 35,000 people. It is, therefore, crucial to take urgent actions towards the locust control soonest in Yemen, to minimize the continued exponential growth in the swarms, which impact a much larger region, including Africa and Asia.

7. **Delayed action increases costs down the road.** The World Food Programme (WFP) estimated in February 2020 that the failure to mount a timely response to stop the locusts would result in higher costs for humanitarian response in the long run— as much as US$1 billion, and far more in restoration costs than if the international community acts with the utmost urgency. During the 2003-05 locust plague, early warning systems alerted countries and the international community at the onset of the outbreak. The response was slow, and desert locust swarms invaded eleven countries in West Africa, severely disrupting agricultural production in many areas already suffering from food security. Costs climbed significantly, from US$1 million to US$100 million in the first 14 months. Ultimately, it cost US$450 million to end the 2003-2005 plague, which caused an estimated US$2.5 billion in crop damages.

B. Sectoral and Institutional Context

8. **The agriculture sector has suffered disproportionately from the ongoing civil war, yet increasingly it is the main source of income for Yemenis**. Agriculture—including fisheries and livestock—is the backbone of Yemeni livelihoods and the most important non-oil sector of the economy, even as its contribution to gross domestic product (GDP) has decreased during this period of severe economic disruption. The share of agriculture in GDP contracted from 10.3 percent in 2010 to 4.03 percent in 2018,[2] while the shares of industry and services increased over the same period, revealing the disproportionately high price paid by the sector during the conflict. The agriculture and food sector has played an important role in preserving and restoring the incomes of the people of Yemen—the share of the population dependent on agricultural employment rose from 29.3 percent in 2014 to 36.6 percent in 2019—and it is expected to play a leading role in post-conflict recovery and reconstruction.[3]

[2] *https://www.theglobaleconomy.com/Yemen/share_of_agriculture/*
[3] *https://www.theglobaleconomy.com/Yemen/Employment_in_agriculture/*

9. **Agriculture (including livestock) is the main source of employment for rural women in Yemen.** Fifty-nine percent of rural women work in agriculture, although they face many constraints, including limited access to land ownership, finance, markets, livelihood activities, and information, aside from legal and cultural restrictions on economic independence. The ongoing violent conflict has resulted in economic slowdown, destruction of jobs and livelihoods, massive displacement, and a heightened food security crisis, with specific and pronounced effects on women who are also perceived as primary care providers. Even before 2015, Yemen faced significant challenges regarding women's access to education, health, productive employment and food security (WB 2014). While men face a higher direct burden of war through fighting and battle deaths, women are disproportionately affected by the indirect and often lasting effects of conflict (WDR 2011, Buvinic et al. 2012, Justino 2018), which have likely exacerbated existing gender-based deprivations and development shortfalls. In particular, Yemen has been facing a declining female labor force participation rate for many years; while women's labor force participation was estimated at 29 percent in 1996 (WB 1998[4]), it had declined to about 6 percent by 2014 (ILO 2018[5]). In contrast, the labor force participation rate of men was 66 percent, reflecting a considerable gender gap. The ongoing conflict and the consequent contraction of the Yemeni economy, successive shocks, heightened security concerns and mobility restrictions on women is likely to have further reduced women's participation in the labor force (Tandon et al., 2018).

10. **Locust infestations are expected to significantly damage crops and pastures, generating serious losses for agricultural producers and worsening food insecurity in Yemen.** The direct effects of locust swarms include the destruction of standing crops, agricultural land, and fodder, leading to crop and animal losses, reducing incomes, increasing the financial burdens on farmers and livestock owners, and heightening food security concerns. The indirect effects of infestations operate through local scarcities of key agricultural and livestock products caused by the crisis, leading in turn to higher consumer prices and more serious shortages, which harm the local economy in affected areas. The expected damages and losses (DALOs) for the 2020 agricultural season are estimated at US$222 million, including US$14 million of production losses in staple crops, US$108 million of production losses in animals, and US$100 million of damages to livestock assets. The swarms growing rapidly at present will start traveling later in the spring and into the summer and fall, so impacts on food security have not yet been felt on a large scale except in Lahj, Abyan, Marab, and Hodeidah Governorates, where the crops of most farmers have been affected. Recent zucchini, green chili, and tomato shortages have stemmed partly from locust attacks in areas of Lahj and Hodeidah Governorates where these crops are grown in the off-season. In many other governorates, the planting season has not started, and impacts will be felt later.

11. **Desert locust breeding grounds are widespread in Yemen, but the conflict has diminished the capacity to respond to emerging swarms.** Spring and summer breeding of desert locusts occurs in the eastern interior desert regions in the governorates of Al Jawf, Marib, Shabwa, Hadramout Valley, and Al Mahra from April to September and mid-October. Winter locust reproduction occurs from September to April on the coastal plains of the Gulf of Aden and the Arabian Sea, from Bab al-Mandab (Taiz Governorate in the far West) to Hoff (Al Mahra Governorate in the far East, bordering on Oman). Locusts also breed in the governorates of Aden, Lahj, Abyan, Shabwa coast, Hadramout coast, and Al Mahra coast, as well as on the coastal plains of the Red Sea from Zabid (the western part of Hodeidah Governorate) to Midi (the northwestern part of Hajja Governorate) and the governorates of Hodeidah and Hajjah (Western Highlands). Around 60 percent of breeding areas are in southern

[4] *World Bank,* Female Labor Force Participation – Population Reference Bureau, 1998 Women of Our World*, as cited in: World Bank,* Yemen: Comprehensive Development Review.
[5] ILO 2008: Rethinking Yemen's economy. Accessed online at *https://devchampions.org/uploads/publications/files/Rethinking_Yemens_Economy_policy_brief_8.pdf*

Yemen and 40 percent are in northern areas. The current conflict exacerbated the locust crisis by disabling an effective response when the new swarm formed at the end of 2018, unlike the response during the last two major outbreaks in 2007 and 2013, when Yemen effectively monitored and controlled the forming swarms.

12. **Yemen's locust response capacity is in dire need of rebuilding**. Before the conflict, Yemen had adequate capacity in terms of equipment and human power to control a locust crisis, and the country was a key part of the regional locust monitoring network. Monitoring continues to some extent, but capacity to respond is lacking, as vital equipment has been looted or lost in the five-year conflict, making robust monitoring and control virtually impossible. Aside from the loss of assets, the human capacity at the Directorate of Plant Protection (DPP) under the Ministry of Agriculture and Irrigation (MAI), which used to lead the national locust response, has been depleted. Most personnel with locust expertise in DPP have retired or are about to retire. The young graduates have insufficient experience in managing locust emergencies, so it is imperative to build their capacity and knowledge to create a new cohort of desert locust experts. The development of a more efficient, effective response to desert locust outbreaks in Yemen will also require support to: (i) introduce innovative technology to survey and control desert locusts; (ii) establish and equip a network of Desert Locust Control Centers (DLCCs); and (iii) implement an outreach and awareness campaign to inform farmers, herders, and communities in locust-affected areas about locust control operations and methods that mitigate the impact of desert locust outbreaks.

13. **Key safety net programs and institutions supported by the World Bank and development partners have been providing social assistance but do not fully meet the vast and growing needs of the population**. Unconditional Cash Transfers were provided through the Social Welfare Fund (SWF)—the largest safety net program in the country, covering over 1.5 million poor and vulnerable Yemeni households—which was suspended in 2015. In 2017, the World Bank (WB)–financed Emergency Crisis Response Project (ECRP) revived payments to SWF recipient households through the Emergency Cash Transfer program implemented by UNICEF. Unlike many other social protection programs and institutions that have collapsed during the conflict, the Yemen Social Fund for Development (SFD) has maintained its operational functionality and political neutrality, allowing it to implement key safety net programs, including Cash for Work, Cash for Social Services, and Nutrition-sensitive Conditional Cash Transfers under the ECRP and with the support of other development partners. Alongside these key development programs, a range of humanitarian agencies provide cash transfers, food vouchers, in-kind food transfers, and school feeding programs to different segments of the population. Even so, the combined reach of all of these programs remains limited in comparison to the scale of food insecurity and the vast needs for social protection (particularly social assistance) in the country.

14. **Projections of swarm development highlight major concerns.** Swarms are likely to continue breeding in Yemen's interior, and winter rains could foster further generations of breeding, each of which will multiply the population 20-fold. These swarms will continue to be a major threat during the months of spring and early summer of 2020, as well as later in the fall. Spring breeding will continue on the Red Sea and Gulf of Aden coasts, causing a further increase in locust numbers that will give rise to hopper groups, bands, adult groups, and swarms. Breeding will also occur in the interior in Wadi Hadhramaut and near Marib, where recent rainfall has been good. Forecasts also show favorable conditions (rainfall, green vegetation, soil moisture) for locusts to keep laying eggs in lowland sandy areas and for successive new-generation swarms to emerge. The growing tendency of swarms to spread to new areas is becoming a major concern. Intensive surveillance of locust breeding areas as well as effective ground control operations are urgently needed to detect and reduce locust populations, prevent more swarms from forming, and prevent them from spreading into crop and pasture areas, not only in Yemen but across the region. Unless sustained control operations are carried out, agricultural losses are likely to increase in Yemen.

C. Relevance to Higher Level Objectives

15. **The proposed project is well aligned with the World Bank Group's Yemen Country Engagement Note (CEN) for FY20–21 (Report No. 136046-RY).** It supports CEN's second objective of extending support to livelihoods, human capital, and basic economic recovery by helping to curtail DALOs to agricultural livelihoods stemming from the largest desert locust outbreak in recent years. The project will foster curbing the spread of desert locust swarms by implementing control measures, building a national monitoring and response capacity, and helping to restore the livelihoods of farmers in areas affected by locusts. Reflecting the emphasis in the CEN on full coordination with stakeholders and partners on the ground, the project will collaborate closely with national institutions such as the SFD (which is an off-budget fund) to ensure sound project implementation and knowledge transfer. Support to the DLCCs will improve national capacity for responding to future outbreaks of desert locusts and thus help to achieve the CEN objective of ''continued support for basic service delivery and institutional preservation."

16. **The proposed project is also well aligned with the *Yemen Strategic Vision 2025,* which describes the promising role of the agriculture sector in the economy and as the main source of food for people and animals**. The government's vision is to increase the productivity of agriculture, thereby enabling the sector to contribute substantially to overall national economic development, job creation, and food security. Additionally, the project is aligned with the objectives of the Plan of Action (POA) 2018–2020, particularly *Pillar one* (Emergency support to the most vulnerable rural and peri-urban households) and *Pillar two* (Support to the sustainable restoration and diversification of agricultural livelihoods and agri-food systems), and with the Yemen Humanitarian Response Plan (YHRP). The YHRP identifies food insecurity as the main challenge requiring immediate action and highlights the critical roles of agriculture and safety nets in attaining improved food security and livelihoods. The proposed project will contribute to these objectives by reducing the impacts of locusts on a fragile food security situation and by promoting climate-smart practices that add to the resilience of agriculture and livelihoods.

17. **The proposed project will also support the enlarged World Bank Group Strategy in Middle East and North Africa (MENA).** The project will contribute to three of the MENA strategy pillars; i) renewing the social contract, ii) regional cooperation, and iii) recovery and reconstruction. The proposed project activities will be improving the human capital development by fostering women's employment solutions through cash for work mechanism and by promoting restoration of livelihoods of the locust-affected households. The strengthening locust response capacity activities will promote regional cooperation through networking, communication and data and information sharing activities with other regional countries implementing similar locust response projects. The community capacity building and awareness-raising of all stakeholders would support strengthening of regional governance and accountability.

18. **The proposed project is part of the Bank's overall response to the desert locust crisis in Africa and MENA.** The project will closely collaborate with and support the *Emergency Desert Locust Response Program* (ELRP), approved by the Board Executive Directors of World Bank on May 20, 2020. The US$500 million ELRP (P173702) is using the Multiphase Programmatic Approach (MPA)[6]. The overall design of the Yemen Desert Locust Response Project uses the same approach, structure and technical design as the ELRP/MPA. The development objectives and the results framework are also closely aligned.

[6] The Program focuses on Eastern Africa and MENA. The first-mover countries under the Phase 1 of the ELRP/MPA are Djibouti, Ethiopia, Kenya, and Uganda.

19. **The close alignment with the ELRP/MPA will allow Yemen to benefit, and also to contribute to the MPA's objectives, in several ways.** Firstly, Yemen will contribute to a consistent management of regional risks (such as propagation of locust swarms between countries) for dealing with the emergency by providing reports on locust swarm data, movement, control efforts and other pertinent information. Secondly, Yemen will be able to benefit from the broader partnership platform for other bilateral and multilateral development partners that the ELRP/MPA provides as it facilitates close coordination with clients and all multilateral, donor and regional agencies active in this area. Thirdly, Yemen will benefit from the adaptive learning provided by the MPA, as an important feature of the ELRP/MPA is that it specifically targets the identification of lessons that will help other countries affected by locust infestations and inform future locust response operations. Key topics of program interest include cost and effectiveness of control interventions; ease of adapting existing safety nets to locust-oriented protection of livelihoods; improving the technical resilience of production; and improving stakeholder communication approaches.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

20. The Project Development Objectives (PDOs) are to control the desert locust outbreak, support livelihoods in locust-affected areas and strengthen Yemen's preparedness for future locust infestations.

21. In the context of Yemen, the outcome of: (i) a response to the locust infestation outbreak encompasses improved locust surveillance, monitoring, and control activities; (ii) livelihood support focuses on protection and restoration in the locust-affected areas; and (iii) strengthened national preparedness systems includes three main elements—establishing a network of DLCCs, establishing an early response system, and connecting Yemeni systems with regional networks to exchange information and data and improve coordination of the locust response.

PDO Level Indicators

22. **Progress toward the achievement of the PDO will be measured by the following outcome indicators**:

Outcome 1: Control of desert locust outbreak implemented:

- Share of affected pasture/rangeland restored to productivity (percent)
- Share of affected agricultural land restored to productivity (percent)

Outcome 2: Livelihoods in locust affected areas supported

- Affected households (number) supported by social safety nets, of which females (percent) are the direct recipients of benefits
- Share of locust-affected farmers (including crop farmers, livestock owners and beekeepers) reporting renewed agricultural activity, of which female-headed farms (percent)

Outcome 3: Country's preparedness against future locust outbreaks strengthened

- Yemen's locust control plan developed (Yes/No)
- Early warning system developed and functioning (Yes/No)

B. Project Components

23. **The proposed project design and structure reflects the approach adopted as part of the World Bank's Emergency Desert Locust Response Program (MPA)**. It groups its activities within three inter-linked technical components (Surveillance and Control; Livelihood Protection and Rehabilitation; and Coordination and Early Warning Preparedness), and a fourth component focuses on project management, monitoring, and evaluation. The implementation of project activities will be sequenced to respond first to the country's urgent needs: controlling the ongoing locust outbreak (Component 1) and providing immediate cash support and restoration of productive assets to households and farmers affected by the locust infestation (Component 2). Priority will be given to the most affected areas to ensure efficient control of locust reproduction. Annex 2 provides a detailed description of the project components.

24. **The proposed project leverages other World Bank–financed projects for livelihood restoration and support.** It will seek collaboration and complementarity with other World Bank–financed operations in the agriculture and social protection sectors. For example, it will provide further complementary support for protecting and restoring the livelihoods of farmers and other project beneficiaries in areas affected by desert locust infestations. It will also be coordinated closely with the implementation of the ongoing ECRP and future activities in the sector. Similarly, the Smallholder Agriculture Restoration and Enhancement Project (SAPREP) is leveraged to support farmers in locust-affected areas. SAPREP provides kits of productive assets to restore the production of crops and livestock (with seed, equipment, animals, feed, and other elements). Future support to the sector is expected to include activities to develop value chains, possibly with the involvement of the International Finance Corporation (IFC). Such commercialization-oriented activities may also be leveraged to support locust-affected farmers and ensure their access to markets through value chain development after production is restored.

25. **Climate and disaster risk screening performed as part of project preparation indicates that global warming will lead to higher-than-average rainfall and increased frequency of drought in Yemen.** Climate change has already triggered significant alterations in water temperature in the Indian Ocean creating ideal conditions for locusts to hatch, breed, and disperse widely. This project will address the vulnerability to climate-induced locust upsurge by strengthening capacity for ex ante surveillance and control operations. It will support investments in monitoring and control of the locust population, as well as build resilience by rehabilitating the livelihoods of locust-affected communities.

26. **In light of these considerations, the main interventions financed by the proposed project are detailed next for each project component.** The component costing includes operating costs as detailed in the project budget and annual work programs.

Component 1: Surveillance and Control Measures (US$10.1 million, all IDA)

27. **The objective of this component is to limit the growth and spread (driven by climate change) of current desert locust populations, while mitigating the risks associated with control measures and their impacts on human health and the environment**. Component 1 will improve the capacity for surveying and surveillance of breeding and infestation areas and for gathering meteorological data, support locust control activities (spraying), and implement risk mitigation measures for the workers and affected communities. This component has been designed to enable informed, climate-responsive decision making in locust management. Satellite images and associated geospatial technologies can provide timely data to assess the risk of impending locust outbreaks. This information will be used for targeted preventive management in locust breeding areas under changing climatic conditions. Habitat mapping will apply climate, soil, and other variables to map the susceptibility of land areas in space and time to locust outbreaks (locust vulnerability mapping) and also to highlight areas where locusts have already proliferated (locust impact map).

28. **Sub-component 1.1: Continuous surveillance (US$2.7 million).** Activities under this sub-component aim to provide early warning of locust outbreaks, inform effective control operations, and mobilize assistance (under Component 2) for affected and at-risk communities. The project will procure inputs for satellite surveillance (satellite maps and meta-data analysis) and equipment for land surveillance (elocust3, GPS, camping kits, dissection kits, 4WD pickup trucks), as well as finance costs associated with locust surveillance and monitoring. Training-of-trainers (TOT) sessions for representatives of the affected regions will ensure further organized training occurs in affected communities, in conformity with the Food and Agriculture Organization (FAO) Guidelines on desert locust surveillance. To the extent possible, communities will be equipped to participate actively in desert locust surveillance and monitoring.

29. **Sub-component 1.2 Control measures (US$6.3 million).** Activities under this sub-component aim to reduce locust populations and prevent their spread to new areas. It would emphasize neutralizing hopper bands using bio-pesticides before they develop into adult swarms, the control of which requires extensive use of conventional pesticides. The use of bio-pesticides with lower carbon footprint compared to conventional pesticides will help reduce GHG emissions. This sub-component will finance the procurement of all material and equipment for operations to control the desert locust on the ground, including 4WD pickup trucks, pesticides and bio-pesticides (in accordance with FAO Guidelines and Pesticide Referee Group recommendations), vehicle-mounted ultra-low volume (ULV) sprayers, backpack motorized ULV sprayers, hand-held ULV sprayers, pesticide pumps, pesticide drum cleaners and crushers and personal protective equipment (PPE). The operational costs of control operations (salaries of workers, vehicle fuel and maintenance) will also be supported. Pesticide-related equipment will be procured, used, and maintained in conformity with the FAO Guidelines on pesticide equipment, application, and maintenance. The vehicle-mounted sprayers to be procured will have specifications that cannot be altered and will be manufactured as built-in modules that cannot be used for another purpose. The technical specifications will also ensure that these units are energy efficient.

30. **Sub-component 1.3: Risk reduction and management (US$1.1 million).** Activities financed under this sub-component aim to monitor and assess environmental and human health risks associated with locust control and to implement health, environmental, and safety measures to reduce risks to an acceptable minimum. Activities and measures financed under this sub-component will include: (i) procurement of the ChE Cholinesterase Test System; (ii) testing of human health and soil and water for contamination arising from the use of insecticides. All personnel involved in the project and exposed to pesticides will meet the necessary health and safety

requirements; and (iii) at the end of the locust control campaign, soil, water, and plant samples will be tested for pesticide residue. This sub-component will also support: (iv) preparation of a comprehensive National Pest Management Strategy (NPMS); and (v) safety and awareness training for spraying teams and other locust control personnel.

31. **Support for women's participation in locust surveillance and control will help to narrow the gender differences in locust control interventions**. To that end, the project will support women's participation and learning in several ways. It will engage young women graduates on the staff responsible for treating the nymph centers and strips, encourage rural women to take on the role of preventing packaging materials for treatment products (pesticides) from being reused at home, and employ rural women to alert children to keep away from chemical products and storage areas.

Component 2: Livelihood Protection and Rehabilitation (US$4.75 million, all IDA)

32. **Component 2 is designed to provide a robust protection response that ensures immediate relief to affected farmers and livestock owners and build their resilience to climate-induced locust infestation.** It includes two types of measures: (i) creation of temporary employment opportunities, and (ii) restoration of lost assets. Farmers, beekeepers, livestock owners, and other primary producers and agricultural laborers who have incurred losses as a direct result of the climate-induced desert locust crisis need urgent assistance to reverse the decline in their incomes and meet their production and consumption needs. Component 2 will promote the adoption of climate-smart crop and livestock management practices as well as diversification into livelihood activities that are less dependent on climate and weather variability. Households benefitting under Sub-component 2.1 below will not be eligible to benefit under Sub-component 2.2, and vice versa. The Yemen Social Fund for Development (SFD) has extensive prior experience in implementing the types of activities supported under Component 2 and will be the implementing agency for this component. SFD has strong capacity and experience spanning over 20 years in undertaking participatory and community-based development activities involving women and men from local communities. This arrangement will ensure the transparency and availability of information to cross-verify the beneficiaries of each sub-component to avoid double-dipping and spread the project's benefits across a greater number and wider range of beneficiaries.

33. **The project will specifically seek to address the women employment and equality gap through the creation of short-term work opportunities under Cash for Work (CfW) targeted at women, and the inclusion of women livestock breeders, farmers and beekeepers in livelihood restoration activities.** The SFD has a well-developed CfW program (currently also supported by the WB's ECRP project) that includes activities and sub-projects performed by rural women. SFD actively ensure women's participation in these activities by leveraging their vast network across the country, using their credibility and local support to navigate the complex political terrain, engaging gatekeepers and local stakeholders (including community leaders, family members), undertaking community sensitization and awareness, mobilizing women in CfW activities, and carefully selecting the types of public works project activities that are acceptable for women to perform. The project will benefit from this experience to ensure the fullest participation of women farmers and agricultural laborers in CfW activities, while ensuring the necessary protection, community support, and suitable selection of sub projects. In addition, the livelihood restoration interventions will seek to prioritize women especially in small ruminant rearing which is dominated by women. Among rural occupations, the livestock sector is critical as it continues to employ large numbers of women, and because its potential contribution to women's employment and entrepreneurship and food security is extremely valuable in the current context of conflict, famine risk, and decreasing opportunities for

women's employment. Further details of the strategies for securing women's active participation in the project will be developed and outlined in the Project Operational Manual (POM).

34. **Sub-component 2.1: Safeguarding food security and protecting human capital for enhanced resilience (US$1.45 million).** This sub-component aims to provide immediate Cash for Work (CfW) support to selected beneficiaries in locust-affected areas. These beneficiaries are expected to be primarily women (around 80 percent of all beneficiaries), as well as agricultural laborers, tenant farmers, and sharecroppers. The CfW program will provide short-term employment (up to six months) to these beneficiaries for a monthly wage payment in cash. The CFW program relies on a mechanism of self-targeting that sets wages below market rates to limit participation to the genuinely poor and limit leakage and over-subscription. The focus on women participants in CfW interventions is motivated by the need to promote gender equality by supporting women's empowerment through livelihood protection, as well as to promote women's roles in enhancing community resilience.

35. **The CfW activities selected will include**: (i) clearing dead locusts from affected agricultural land; (ii) planting seedlings and hybrid seed; (iii) rehabilitating small water reservoirs to improve water storage and tackle drought; (iv) collecting locusts (not treated under the control activities) from fields to use as fertilizer and livestock feed; (v) (re)introducing selected pollinators following control measures; (vi) training women in target areas on best health practices and hiring them as community health workers (to be integrated with the COVID-19 response); (vii) providing childcare activities/services near CfW worksites; and (viii) encouraging women to care for home gardens, cultivate plants that repel locusts from houses, and improve family nutrition. This sub-component will reach an estimated 1,500 beneficiaries, including 1,200 women.

36. **Sub-component 2.2: Rehabilitating agricultural and pastoral livelihoods (US$3.3 million).** This sub-component focuses on the longer-term restoration of livelihoods by providing targeted support to restore the assets of farmers and livestock owners affected by locust infestations and train primary producers to restart production based on more resilient practices. To that end, this sub-component will prioritize the adoption of climate-smart crop and livestock practices for reduced greenhouse gas emissions, enhanced resilience, and the implementation of livelihood support/diversification initiatives. Support will be provided for agroecosystem management approaches that enhance resilience of farm and landscape to changes in climate and pests. Climate-resilient grazing will be supported, including legumes and grasses adapted to the local environment to increase biodiversity and landscape resilience. Leguminous species are also beneficial for climate mitigation, fixing atmospheric nitrogen and improving soil fertility. Specific activities will include: (i) provide productive assets (farmer packets/kits) to affected households dependent on agriculture, livestock, and beekeeping to help them resume activities, and (ii) increase the production, productivity, and climate resilience of farmers and agricultural households through training and agri-technical assistance. The farmer kits will build on good and climate-smart practices to support diversified production and climate resilience—for instance, by introducing improved varieties and plantings that will restore pollinator populations. It is estimated that around 5,600 beneficiaries, including 1,450 women, will receive productive asset kits, which will include agricultural inputs as well as emergency fodder and limited animal restocking. Selection criteria for eligible beneficiaries are briefly described in Annex 2 and will be developed in detail in the POM. The project will also ensure that a beneficiary feedback process involving farmers and livestock owners is implemented, either directly with both groups or through any representative association that is voted by farmers, that discusses the restoration process, including how delivery and trainings occur. An ongoing engagement would allow for identification and introduction of any adjustments, if necessary. The sub-component will also finance SFD operating costs.

Component 3: Coordination and Early Warning Preparedness (US$5.6 million, all IDA)

37. **The objective of Component 3 is to strengthen the national capacity for early warning and early response, linking these efforts to regional locust surveillance and control networks thereby enhancing climate-resilience.** Early warning systems will be developed and implemented to support prevention and rapid response to new and existing climate change induced locust infestation, thereby limiting in-country and cross-border spread and intensification. Emphasis will be placed on building capacity to enable rapid and targeted short-term responses and long-term adaptation planning.

38. **Sub-component 3.1: Improving the infrastructure and institutional capacity of the national locust control centers (US$4.5 million).** This sub-component will build a network of DLCCs as follows: (i) establish a new Central Desert Locust Control Center (CDLCC) in Aden and three regional hub centers in Hodeidah, Shabwa and Sieun, as well as (ii) rehabilitate the infrastructure and operational capacity of the DLCCs in Sanaa and Hodeidah, which have been severely affected by the ongoing crisis. The new centers will be built on land that belongs to the Government of Yemen.

39. **The network of control centers will be established near key locust breeding areas to permit rapid deployment of technical and human resources to respond to an infestation**. The centers will be furnished and equipped to be fully operational. Investments in climate-proof and energy-efficient infrastructure will be pursued. The centers will have facilities suitable for storing pesticides and other control material and equipment, including refrigerated facilities/stores for bio-pesticides. Investments in storage facilities will be designed with the objective (among others) of reducing the exposure of products to extreme weather conditions. The centers are expected to be prefabricated buildings that are easily and quickly constructed, to be built within a fenced area to ensure the safety of assets procured under the project. The standard operating procedures for a desert locust response will be established and agreed in connection with the relevant international and regional organizations. The centers will also prepare and maintain the National Desert Locust Control Plan, which will include the measures and procedures for locust surveillance and control, as well as resource requirements and planning and deployment mechanisms. To ensure a coordinated locust response, the network of centers will be operationally linked through the analytical and information platform described in Sub-component 3.2.

40. **Sub-component 3.2: Early warning preparedness (US$1.1 million).** This sub-component will finance the design, testing, and deployment of a Desert Locust Early Response System (DLERS) throughout the DLCC network. Early warning systems will be developed and implemented to support prevention and rapid response to current and new climate-change-induced locust infestations, thereby limiting their spread and intensification within Yemen and across bordering nations. This integrated system will have the most up-to-date information to trigger informed desert locust ground and/or aerial operations for swarm control. The system will also monitor metrological data, which will enable response mechanisms for other disasters and adverse climate events. Monitoring will also help increase outreach on reliable climate-smart pest management knowledge in the communities. This integrated system is based on an application installed on mobile devices to enter data in the field on the locust situation, monitor and maintain the necessary equipment and logistics, and track the quantity and quality of pesticide stocks.

41. **The DLCC network will aim to develop regional collaboration.** In addition to participating in the regional network that provides regular updates and information on the desert locust situation to the FAO, the network of DLCCs will also benefit from collaboration with other countries in East Africa and MENA participating in ELRP. In

particular, the DLCCs will provide regular reports on the situation on the ground to help implement a consistent management of regional risks, ensure timely response activities and share the lessons learned. The DLERS information platform will allow DLCCs to consolidate and easily share the information and data for regional use. Through the MPA, DLCCs would also be able to collaborate multilateral, donor and regional agencies active in the locust area.

Component 4: Project Management and Knowledge Management (US$2.90 million, all IDA)

42. **Project Management (US$2.40 million).** Component 4 will cover FAO costs associated with project management, such as implementation support, financial management, procurement, monitoring the project environmental and social aspects, and overall monitoring and evaluation (M&E). This component will also finance a third-party monitoring (TPM) mechanism and the establishment and maintenance of a grievance redress mechanism (GRM).

43. **Component 4 also provides support for awareness raising, communication, and knowledge management activities (US$0.15 million), and for response to COVID-19 (US$0.35 million)**. Before, during, and after locust control operations, a public awareness campaign will be implemented to keep the public informed about possible environmental and health effects of insecticides and empty pesticide containers. It will be delivered through different channels to ensure that it will reach women and men equally. The community representatives engaged in the locust surveillance under Sub-component 1.1 will also engage with the community representatives and, if possible, communities themselves on the public awareness campaign designed to keep the public informed about the possible environmental and health effects of insecticides before, during, and after locust control operations. Monitoring and building environmental and climate literacy will also help to increase the dissemination of reliable climate-smart pest management knowledge. The public awareness campaigns are expected to reach at least 75,000 beneficiaries.

44. **Integration of COVID-19 response.** The project will use its resources (such as field consultants) to integrate COVID-19 awareness and preventive measures in the training events and awareness campaigns planned for beneficiaries. Awareness raising and training events will follow precautionary measures described in workshop/training protocols, as well as enforce and maintain adequate distancing during control, distribution, training, payment, and other project activities. These will also be conducted in locations and during times that are convenient for women. The project will work with local communities, female and male consultants, and beneficiaries to reach households with awareness and hygiene materials (such as masks, hand sanitizers and other relevant consumables) that will be developed in a way that will resonate with women and men's different roles and behaviors at home and in society. The decision on which hygiene materials to procure will be made in coordination with the COVID-19 health emergency project in Yemen.

45. **To reduce greenhouse gas (GHG) emissions from project interventions, the program also includes activities from the approved list in Annex A.C.1 of the Joint Report on MDB's Climate Finance**[7] and the World Bank's Guidance for Addressing Climate Change Corporate Commitments in Agriculture.[8] The project activities fully qualify as generating climate change mitigation Co-Benefits under Sub- Category 4.1. Agriculture and 9.1 from

[7] Joint Report on Multilateral Development Bank's Climate Finance (2019).
http://pubdocs.worldbank.org/en/650791574955718829/2018-joint-report-on-mdbs-climate-finance.pdf
[8] World Bank (2018). Climate Change Requirements: Guidance Note for Meeting Corporate Requirements for Climate Smart Agriculture.

the A.C.1 List of activities eligible for classification as climate mitigation finance. The GHG accounting results are summarized in Section IV, Project Appraisal Summary.

Project Financing Instrument

46. **The project will be financed through an Investment Project Financing (IPF) instrument in the amount of US$25.0 million IDA grant**. The project will be implemented over a three-year period.

Table 1: Project Costs by Component and Financing

Project Components	Project Cost (US$ million equiv.)	IDA Financing (US$ million equiv.)	% Financing
1. Surveillance and Control Measures	**10.10**	**10.10**	100.0
1.1 Continuous surveillance	2.70	2.70	
1.2 Control measures	6.30	6.30	
1.3 Risk reduction and management	1.10	1.10	
2. Livelihood Protection and Restoration	**4.75**	**4.75**	100.0
2.1 Safeguarding food security and protecting human capital	1.45	1.45	
2.2 Rehabilitating agricultural and pastoral livelihoods	3.30	3.30	
3. Coordination and Early Warning Preparedness	**5.60**	**5.60**	100.0
3.1 Improving the infrastructure and institutional capacity of the national locust control centers	4.50	4.50	
3.2 Early warning preparedness	1.10	1.10	
4. **Project Management**	**2.90**	**2.90**	100.0
Sub-Total Component Cost	**23.40**	**23.40**	100.0
FAO Fee 7%	1.64	1.64	100.0
Total Project Cost	**25.0**	**25.0**	

C. Project Beneficiaries

C. Project Beneficiaries

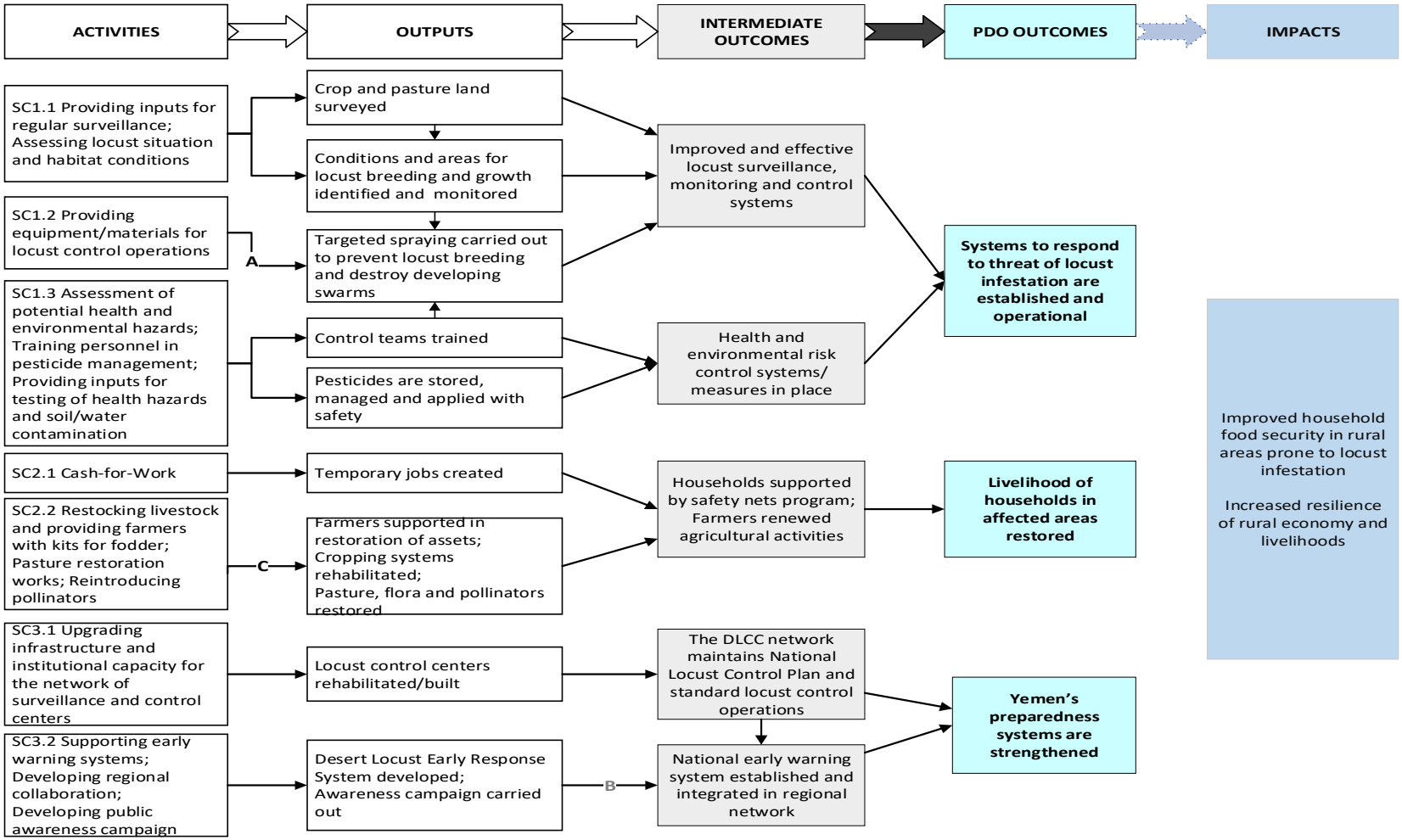
47. **The primary beneficiaries of the proposed project will be farmers and agricultural laborers of Yemen, particularly farmers, semi-pastoralists, and pastoralists who live in areas prone to desert locust infestation.** For

these groups, the proposed project will prevent locust infestations from damaging their livelihoods and provide compensatory income support opportunities for the affected farmers and agricultural laborers. Government agencies will also benefit from improvements in their response capacity and capabilities under the project. At least 7,100 farmers, agricultural laborers, and women beneficiaries are expected to benefit from the program directly under Component 2. Ultimately, however, all agricultural producers and farmers in locust-affected areas of Yemen will benefit, given the project's strong capacity and technical support for a robust locust response. The project is also expected to contribute to the national economy by preventing crop and pasture damage, which will help to maintain food security and productivity in crop and animal production. Neighboring countries will also benefit as effective and timely control operations minimize the migration of swarms.

D. Results Chain

48. **The Theory of Change (TOC) for the proposed project is closely linked to the TOC of the Emergency Desert Locust Response Program.** Figure 1 outlines the TOC, which is anchored in the PDO.

Figure 1: Theory of Change for the Proposed Yemen Desert Locust Response Project



Critical Assumptions:
***A**: Locust control equipment, materials, labor and other needed supplies are available and can be deployed in a timely manner;*
***B**: COVID-19 emergency restrictions are eased allowing for community outreach campaign to take place;*
***C**: Favorable rainfall supports crop production and rangeland recovery.*

E. Rationale for Bank Involvement and Role of Partners

49. **The World Bank Group is well placed to support the response to the desert locust crisis; it can draw on extensive crisis response experience,[9] deep multisectoral expertise, and strong client relationships and global partnerships.** Alongside its multisectoral technical expertise, tested procedures, and financial resources, the Bank has developed substantive experience in responding to emergencies in settings marked by fragility or active conflict, or in contexts where the client lacks the implementation capacity to coordinate a response. The Bank's experience in crisis response has also yielded detailed lessons to support interventions that preserve livelihoods in the near term, promote recovery over the medium term, and support resilience over the longer term (see the discussion in the section that follows).

50. **The Bank's effective collaboration with partners is critical for mobilizing a successful and technically sound crisis response on the ground.** In these instances, as discussed next in the section on lessons learned, success depends on an effective presence on the ground, a clear understanding of partners' respective roles and responsibilities, the skillful navigation of organizational differences, and open communication. The technical scope of this project was developed through close consultation with FAO (the leading technical agency overseeing global locust surveillance and control) and SFD (which brings extensive expertise in rural livelihoods and safety net programs in Yemen). The project may also lead to a more extensive partnership across the World Bank Group, particularly with IFC, which is scoping a complementary program expected to focus on agribusiness and value chains.

F. Lessons Learned and Reflected in the Project Design

51. **Drawing on lessons from past crisis responses, the proposed project integrates interventions to sustain recovery and assure resilience in the near term, medium term, and longer term.** The project supports immediate monitoring and control, as well as immediate livelihood protection interventions for those affected by the crisis, so that negative medium-term impacts are not aggravated by destructive short-term coping solutions. From the start, the project initiates efforts to ensure that over the medium term, producers recover the means to earn income and access food from agricultural and pastoral asset bases that have been depleted or destroyed by the locust crisis. Finally, to ensure resilience over the longer term, project interventions build, strengthen, and implement early warning systems and preparedness measures.

52. **Another lesson from previous crisis responses is that most issues arise from a lack of coordination and timely funding, which delay the response, and that it is essential to deal with environmental impacts and the accumulation of obsolete pesticide stocks**. Accordingly, the proposed project will establish a network of DLCCs to ensure a timely and well-coordinated response to future outbreaks of desert locusts, and it will build extensive capacity to respond to the potential impacts of pesticide use by supporting the preparation of a comprehensive NPMS and ensuring that pesticides are stored appropriately.

53. **Direct, rapid, and effective crisis response is possible in the most challenging operational environments, but success hinges on carefully considered partnership and implementation support arrangements.** Where the

[9] The Bank has broad experience in responding to a wide range of crises, including past locust outbreaks, the global food and avian influenza crises of 2007–08, the Ebola response of 2014–16, and many others.

client lacks the capacity to implement and coordinate a crisis response, the key is to work effectively with external partners whose presence on the ground can mobilize the response. Success factors in these cases include a mutual understanding of respective roles and responsibilities; acceptance of the need to navigate organizational differences; open lines of communication throughout implementation; and the adoption of best practices in terms of TPM.

54. **The deployment of public goods to implement a comprehensive set of crisis response measures will increase the national and regional effectiveness of the response to desert locust infestations.** To respond comprehensively to the locust crisis, it is essential to direct public resources toward all aspects of the crisis—to controlling the pests, protecting livelihoods and human capital, rehabilitating livelihoods, and building preparedness. The benefits of these comprehensive measures will extend beyond Yemen. Control measures adopted in Yemen will build national capacity while helping to reduce the risks faced by neighboring countries. Past responses to locust plagues have generated important guidance and technical lessons that can be applied to benefit all program participants, including lessons on the very high cost of delay and guidance on good practices for procuring, storing, and safely using pesticides, as well as for controlling locust populations while minimizing the human and environmental impacts.

55. **The rapid delivery of an effective short-term response can help frame a longer-term institutional and policy agenda.** Lessons from dealing with earlier crises (such as the food crisis of 2007–08) have helped subsequent efforts to mitigate the short-term negative effects of price increases by demonstrating the effectiveness of a "twin track" approach, in which interventions such as social protections, policy advice, and investments in local food production (spurring a near-term supply response) complement distributive responses such as the provision of physical food aid. This approach opens the way for transitioning to more adaptive crisis response interventions, such as efforts to boost the productivity and resilience of agriculture over the longer term. Another example is the use of timely, targeted cash transfers such as those provided under the ECRP, which have succeeded not only in addressing short-term consumption poverty and food insecurity in Yemen but in emphasizing how expanded social protection systems can support better access to education, healthcare, and nutrition. This explicit "twin track" approach has been shown to have substantial pay-offs in terms of future productivity, livelihoods, and resilience, which are all critical dimensions of inclusive growth and poverty reduction.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

56. **The World Bank - UN partnership will allow an operational reach that would be difficult to achieve otherwise.** First, partnering with UN agencies allows the project to reach more conflict-affected areas where vulnerability and needs are high, yet a government-led project may not be able to access. Second, it enables the project to continue despite increased insecurity as UN agencies have demonstrated their ability to operate continually in volatile situations. Third, it will allow the Bank to leverage UN agencies' existing in-country capacity, technical expertise, and existing relationships with various stakeholders. Fourth, the partnership allows the Bank to seek synergies with other UN-supported programs and make a greater impact.

57. **Under the proposed project, therefore, FAO will be responsible for successful overall project implementation.** The proposed project will operate within the Financial Management Framework Agreement (FMFA) signed by the World Bank and FAO on March 10, 2006. The FAO will be a recipient of the IDA financing, as well as the overall managing and implementing agency responsible for project implementation. As such, FAO will help ensure financial and technical accountability of the implementing partner organizations (such as SFD) and ensure appropriate training and capacity building of the staff of the implementing partner organizations. In addition, FAO will provide technical leadership for implementing Component 1 (*Surveillance and Control Measures*), Component 3 (*Coordination and Early Warning Preparedness),* and the technical activities (community outreach) under Component 4 (*Project Management and Knowledge Management)*.

58. **The FAO is well positioned to ensure satisfactory leadership and project management of the locust crisis response project.** As a specialized UN agency, FAO is primarily responsible for responding to emergencies in agriculture and food security, including crop and food supply monitoring and needs assessments, evaluations of agricultural relief requirements, and the mobilization of assistance and resources to restore agricultural activity. The FAO has prior experience in supporting implementation of IDA-financed projects on the ground in Yemen (since 2017 it has led implementation of SAPREP toward satisfactory achievement of results), and it has global technical knowledge on locust monitoring and response, including management of the global locust early warning system.

59. **The FAO Country Representation in Yemen will be responsible for implementing the project and coordinating all project activities at the sub-national level.** The FAO has fast-track procedures in place for countries in level 3 emergencies, such as Yemen, where a dedicated country Emergency Support Team can ensure that the required technical and operational support are provided to the country on a timely basis. The SFD will play a key part as the local implementing partner for Component 2, alongside FAO, building on SFD's recognized strengths in sustaining the delivery of critical programs throughout the conflict in a politically neutral and credible manner, including under the IDA-funded ECRP and SAPREP (the latter in collaboration with FAO). The FAO and SFD have well-established institutional and implementation mechanisms for delivering project activities in Yemen. The FAO will also work closely with the DLCCs to ensure adequate capacity building of the center networks that will enable the DLCCs to mount a coordinated response to future outbreaks of desert locusts.

60. **The FAO team in the office—the Project Coordination Unit (PCU)—in Sana'a will be in charge of the day-to-day management of the project, including all fiduciary, environmental, and social aspects, as well as monitoring and reporting.** The PCU in Sana'a will comprise a Chief Technical Advisor, Operations Officer, Procurement Specialist, M&E Specialist, Communication Specialist, Administration and Finance Officer, and Environmental and Social Specialist.

61. **At the regional level, implementation will be supported by the Regional Project Coordination Units (RPCUs) set up under SAPREP and located at the FAO regional hubs in Aden, Hodeidah, and Saada**. The tasks performed by the RPCU staff will include providing implementation advice and general supervision, monitoring progress, addressing environmental and social risks and impacts, reviewing and approving annual work plans for the region (which would then be consolidated at the national level), conducting M&E, and reporting. The RPCU in Aden will coordinate activities in Lahj, Abyan, Al Dalea and Taiz. The FAO hub in Shabwa will provide support for activities in Marib, Albida, and AlJaf, whereas the RPCU in Hodeidah will provide support to Hajjah and Al Mahweet. The regional hub in Ibb will support implementation in the part of Taiz that is not covered by the Aden hub. The Saada RPCU will be responsible for implementing project activities in Saada Governorate. Each hub office

will have dedicated project staff, including a Technical Advisor, Operations Specialist, Administration and Financial Management Specialist, and M&E and Reporting Officers.

62. **FAO will take the lead in sourcing equipment, vehicles, tools, information platforms, and other assets required for implementing Components 1, 3, and 4, as well as production inputs for emergency livelihood interventions under Component 2.** These inputs (seeds of staple crops, agricultural tools, and startup packages for backyard poultry and small ruminant production and apiculture) will enable crop and livestock production to resume in the locust-affected areas. Frontline services will be carried out by local implementing partners (such as SFD) engaged through standard agreements of FAO. The partners will be selected based on their technical and logistical capacities to implement the respective activities, past experience, track records in implementing related projects, value for money, and extent of coverage in the target districts. Some project activities will be implemented directly by staff and consultants of the FAO Country Representation in Yemen, particularly those related to support for activities under Components 1 and 3, for which FAO has technical expertise. As needed, the project will closely collaborate with the local implementation partners, which will include local non-governmental organizations (NGOs), local authorities, community-based organizations (CBOs), and private service providers.

63. **The SFD is a key institution for poverty reduction and social and economic development in Yemen, with extensive experience in working with local communities, as demonstrated under previous World Bank–financed agricultural and social protection operations in Yemen**. Among the most significant investments of SFD are investments in agriculture. The SFD is a key local partner in implementing the ongoing ECRP, and it will lead the implementation of Component 2 (Livelihoods Protection and Rehabilitation) under the proposed project. The selection of SFD for this role will preserve national capacity for community-based interventions during the post-conflict phase. For activities that will be implemented by SFD, FAO will provide technical guidance and backstopping as required. The Agriculture and Rural Development Unit (ARDU) in SFD's central office in Sana'a will provide overall support to the project, while the branch offices in Aden, Ammran, and El Mukalla will provide support and coordination for the project activities in Abyan, Lahj, Saada, and Shabwa, and branch offices in Hajjah, Taiz, and Al-Hodeidah will provide support and coordination in their own governorates. Staff in the branch offices include a Branch Manager, Procurement Officer, Financial Management Officer, and Technical Officer for Quality Supervision, M&E, and Information Technology (IT), who are involved in day-to-day operational activities. Additional personnel will be recruited to cover areas where there are gaps. All staff are required to have satisfactory expertise, experience, and qualifications.

64. **A network of DLCCs will be established as described under Sub-component 3.1**. These centers will be key project beneficiaries, receiving technical and capacity building support to sustain their key role in locust monitoring, surveillance, and future response. The centers will be established in Aden and Sana'a, as well as in the three RPCUs close to the desert locust breeding and development areas. As discussed, all of the DLCCs will be operationally linked in a network to ensure they have the capacity to mount a coordinated locust crisis response.

65. **Project Operational Manual (POM)**. A detailed POM and a separate CfW Transfer Manual will be prepared for all project components within three (3) months of effectiveness. The POM and the Manual will be subject to the World Bank's no objection.

66. **Financial Management and Procurement arrangements**. The project's financial management (FM) arrangements will be governed by the FMFA between the World Bank and the UN agencies, which provides for the use of the UN's Financial Regulations. For procurement, FAO will follow its own procurement procedures as

Alternative Procurement Arrangements, as provided under the World Bank New Procurement Framework Policy Section III. F. This implementation arrangement is sound, since the procurement procedures of FAO were assessed and found acceptable to the World Bank under agreements with UN agencies.

B. Results Monitoring and Evaluation Arrangements

67. **FAO will be responsible for the overall coordination of project monitoring.** The objectives of the M&E system are to measure input, output, and outcome indicators to provide project staff and stakeholders with regular information on project implementation and outputs, identify potential problems, and determine to what extent the project is achieving its development objectives. The M&E methodology will be aligned with the definitions and collection methodologies of the project to enable data aggregation and consolidation at the project-wide level. As an integral part of project implementation, the M&E system will be designed to provide timely and reliable results for management to facilitate informed decision-making. In addition to being an important management tool, the M&E system will be a valuable source of learning and a knowledge management mechanism.

68. **Monitoring and evaluation will be based on the collection and reporting of data on the PDO and intermediate indicators** (see the Results Framework for a full description of these indicators). The results will be presented to the Bank in semi-annual progress reports as well as the Mid-Term Review (MTR) and final independent evaluation reports. A baseline survey (that is, a needs assessment) will be conducted during the first three months of the project, and additional surveys will be held at the MTR stage and project completion. For their respective activities, FAO and SFD will use the detailed data collected through the standard reporting formats for different levels and other relevant documentation, including formats for mobile team reporting and integrated outreach reporting on all interventions. At each FAO or SFD hub office, data will be collected and reviewed before it is consolidated at the central level by FAO. A rapid assessment of (i) the awareness of beneficiaries (first and second year) and (ii) restoration of livelihoods (beginning the second year following the provision of support under the Component 2) would also be carried out.

69. **In addition to regular M&E activities, the project will hire an independent TPM Agency (TPMA) through FAO to assess quarterly performance and field monitoring of the project implementation.** The TPMA will be expected to: (i) track performance through the collection of appropriate and credible data and other evidence; (ii) analyze evidence to inform decision making by World Bank and FAO management; (iii) recommend improvements in effectiveness and efficiency as necessary; and (iv) report on performance and lessons to facilitate learning and support accountability, including learning from beneficiaries' experience. Data collection, analysis and reporting will be carried out in a sex-disaggregated way. The terms of reference (TORs) for the TPMA will be developed and agreed upon with the World Bank. The TPM reports will be shared simultaneously with the World Bank and FAO to enable concurrent supervision and timely assessment of project implementation. In addition to routine monitoring activities, the project will also explore the technical feasibility of evaluating the impact of specific interventions (especially activities under Sub-components 2.1 and 2.2 that target specific households) and seek to raise the required resources.

C. Sustainability

70. **The design of the project activities takes into account the sustainability of the immediate locust surveillance and control measures as well as the more medium-term activities entailed in building national**

preparedness to respond to desert locust outbreaks in the future. The project will achieve immediate national and broader regional impact by controlling locust swarms that develop in Yemen and spill over to the rest of the Middle East, Africa and South Asia. To ensure a robust and holistic response to the ongoing locust invasion, the project will not only provide technical equipment, access to the needed inputs, and human resources but will undertake a range of measures to ensure adherence to appropriate health practices as well as environmental and social sustainability. The project also has a strong climate resilience dimension, including efforts to ensure the adoption of locust response measures, CfW measures, and agro-technical practices on beneficiary farms that improve climate resilience. To enhance the sustainability of the immediate locust response measures, the project provides support to restore the livelihoods of farmers affected by the locust invasion and to build capacity for Yemen to respond in an adequate, timely manner to future locust outbreaks.

71. **To ensure that sustainable long-term response capacity for future locust outbreaks is available in the country, the project will establish a network of DLCCs located near all locust breeding areas**, which will be adequately equipped with the technical equipment, pesticides, pesticide storage facilities, and analytical tools required for locust monitoring and surveillance and sustain the operations of the center network into the future. An appropriate project exit strategy for the center network will be designed and agreed during the second year of project implementation, by the time of the MTR.

IV. PROJECT APPRAISAL SUMMARY

A. Technical and Economic and Financial Analysis

Technical

72. **The proposed project includes a set of short-term and medium-term activities to support all key components of a comprehensive desert locust response.** These activities integrate: (i) surveillance, monitoring, and immediate control activities to respond to the ongoing locust invasion; (ii) livelihood protection interventions that provide productive asset kits (inputs for crop production, emergency fodder supplies, and limited restocking of animals) to farmers in the locust-affected areas; and (iii) medium-term capacity building activities to establish an early warning system and improve the country's overall preparedness to respond to future locust invasions. The assets provided under the project are accompanied by the relevant technical assistance, capacity building, and awareness raising measures, which will allow the beneficiaries to maximize benefits from the goods and assets received under the project. Technical assistance also includes agro-technical advice to strengthen the climate resilience of the project beneficiaries.

Greenhouse Gas Accounting

73. **The World Bank uses the Ex-Ante Carbon-Balance Tool (EX-ACT) to estimate the impact of agricultural investment lending on greenhouse gas (GHG) emissions and carbon sequestration.** EX-ACT is a land-based appraisal system for assessing a project's net carbon balance—the net balance of tons of CO_2 equivalent (tCO_2eq) of GHGs that were emitted, or carbon sequestered as a result of project interventions—compared to a "without project" scenario. The GHG accounting analysis shows that over 15 years (a 3-year implementation phase and 12-year capitalization phase), the project constitutes a carbon sequestration of -567,087tCO_2e. Per hectare, the

project will sequester -28.2 tCO_2e which is -0.4 tCO_2e per year. The full GHG accounting summary is provided in Annex 4.

Climate Risk and Disaster Screening

74. **The project was screened for climate and disaster risks**. The climate and geophysical hazards that were identified as likely to be relevant to the project location both now and in the future include extreme temperature, drought, extreme precipitation and flooding, sea-level rise, and geophysical hazards, and the project's risk of exposure to these hazards was assessed as High. The potential impacts on project infrastructure and assets in the sub-sectors relevant to the project (particularly livestock, crop and land management, irrigation and drainage, and storage and processing) were also assessed as High. Project-supported activities corresponding to the project's soft components—such as emergency and long-term planning; capacity building, training, and outreach; data gathering; and the development of management information systems—were seen as mitigating and reducing risk within the project's immediate and broader development context. The risk analysis identified women as a group that is particularly vulnerable to the impacts of climate and geophysical hazards, but it also determined that the project contains components and activities that are expected to alleviate the risks to women from climate and geophysical hazards. The overall risk to the outcome/service delivery of the project is assessed as Moderate.

Economic and Financial Analysis

75. **The economic and financial analysis for the proposed project benefits from the broader economic and financial analysis conducted during preparation of the Emergency Desert Locust Response Program, which covered Yemen and nine countries in the Greater Horn of Africa Region (GHOA).** Like previous outbreaks, the current desert locust infestation in GHOA and Yemen is likely to linger for more than a single growing season, and if unchecked will cause large-scale economic losses in crop and milk and meat production. Total DALOs for the 2020 agricultural season in all ten countries were assessed at US$8.49 billion, including US$222 million in Yemen.

76. **Based on FAO's assessment of evidence to date, Yemen is very likely to experience major negative economic shocks and a substantial deterioration in food security.** The precise locations that will be affected by locust infestations are difficult to predict, because swarms are carried by wind, breeding is influenced by variable climatic and environmental factors, and threats escalate very quickly into crises. Locust swarms can damage assets directly—for example, causing livestock deaths (or distress sales) or reducing animal health and welfare (and thus prices) when animals are deprived of pasture throughout the region—and indirectly (for example, reducing human capital in rural areas through impacts on nutrition and loss of schooling).

77. **This analysis estimates the potential direct impact of an uncontrolled locust infestation in Yemen, focusing on households that are already food insecure and on the potential DALOs to agriculture, based on impact assessments by FAO, FEWS-NET[10], and other sources.** It also estimates benefit-cost ratios for a set of interventions under the proposed project, based on the data that are currently available. Note that the estimates do not include indirect income losses from rural non-farm activities, such as losses from trade and consumption. Such losses are likely to be substantial in the affected areas, given the reduction in agricultural income—potentially of the same order of magnitude as the direct losses estimated here.[11]

[10] Famine Early Warning System Network.

[11] The *World Development Report 2008: Agriculture for Development* shows that under economic conditions in rural areas in many developing countries, a dollar of income generated from farming leads to at least an additional dollar of income from non-farm activities

78. **Depending on the weather and on the breeding and movement of locusts through July 2020, three scenarios were assumed for the economic and financial analysis**:

1) *Best case*: Pasture is depleted by 5–20 percent in localized areas, which would allow livestock to migrate to adjacent unaffected grazing areas, and cereal crop losses are 20–30 percent in locust-affected areas.
2) *Intermediate case*: Pasture is depleted by 20–35 percent in affected areas, triggering abnormal livestock migration, animal losses, and distress sales. Crop failures lead to a 30–50 percent loss of the cereal crop harvest in affected areas.
3) *Worst case*: Pasture is depleted by 35–60 percent in many areas, triggering abnormal livestock migration to distant grazing areas. Crop failures result in a 50–75 percent loss of the cereal harvest in the affected areas.

79. **The potential economic DALOs in Yemen were estimated by applying various assumed loss and adjustment factors to a baseline valuation (taking three-year averages over 2016–18) of their main agricultural assets and outputs.** The analysis relied mainly on international databases. Under the intermediate scenario, which assumes no or minimally effective control, the potential DALOs for Yemen for the entire 2020 agricultural season are estimated at US$222 million, including US$100 million of livestock asset damages, US$108 million in livestock production losses, and US$14 million in staple crop production loss (Table 2).

80. **Benefits/costs for the currently planned emergency locust control campaign are estimated by comparing unit control costs with unit agricultural benefits**, using the derived estimates for monetary agricultural yields per hectare—all staple crops (US$115.7/cultivated ha); livestock products (milk and meat) (US$44.0/pasture ha); live animals exports (US$0.0118/pasture ha); and livestock assets (carrying capacity) (US$101/pasture ha)—and the derived control costs per targeted hectare, based on all available information from FAO. Taking this approach, the direct monetary benefit to crop production per cultivated hectare sprayed (before planting) can be assumed to be as high as the loss avoided in annual production of staple crops on that hectare (US$115.7/ha). The direct benefit-cost ratio for using locust control measures on land planted to staple crops is therefore as high as 4.95 (this ratio uses the average cost for spraying in Yemen, which is US$23.33/ha).

Table 2: Agricultural Yield and Projected Damages and Losses (DALOs)to Staple Crops and Livestock in 2020 from an Uncontrolled Desert Locust Infestation in Yemen

AGRICULTURAL YIELDS	All Staple Crops	115.7	US$/cultivated ha
	Livestock Products (Milk & Meat)	44.0	US$/pasture ha
	Live Animal Exports	0.0118	
	Livestock Assets (Carrying Capacity)	101	
DALOs	Staple Crops Production Losses	14	In current US$, million
	Livestock Production Losses	108	
	Livestock Assets Damages	100	
	Total DALOs	222	

by stimulating local demand in rural areas with substantial underemployment. Loss of farm income has a much stronger impact (at least two times) on poverty than loss of income in manufacturing or services.

81. **Similarly, the direct monetary benefit per hectare of sprayed pasture can be assumed to be as high as one third of the sum of livestock production, exports, and the monetary yield from livestock assets on that same area of pasture** (US$145.0118; see Table 1). The application of this adjustment factor (one-third) to the benefits from spraying pasture is a conservative way of estimating the pass-through from vegetation preserved from locusts on that hectare of sprayed rangeland and the annual productivity and welfare of animals depending on that same hectare of pasture. With the adjusted direct benefits assumed at US$48.34 per sprayed hectare of pasture versus an average cost of US$23.33/ha, the direct benefit-cost ratio related to livestock for control measures over pasture-land is 2.07.

82. **These estimated ratios (4.95 for staple crops, 2.07 for livestock) are likely to underestimate the true benefit-cost ratio of the locust-control and related livelihood support campaign**. These estimates reflect the benefits (reduced agricultural DALOs) of using the farming and livestock packages provided under the project (which represent the bulk of project measures to safeguard livelihoods), but they overlook the direct benefits from unconditional cash or CfW transfers. Thus, the allocation for livelihoods will be considered not only as a cost but also as partial compensation for income lost by locust-affected households. By adding this amount (or any fraction of it, after subtracting administrative delivery costs) to the total agricultural benefits, the true total benefit-cost ratio would be higher than the estimates described above. Additionally, based on the shadow price calculation using carbon price starting at US$40 and 80 with the growth rate of 2.25 percent per year, the project cost-effectiveness is US$26.63million and US$53.26 million for the economic lifetime of the project. Thus, the benefit-cost ratio for society is 1.06 and 2.1 for the low and high values on carbon prices, respectively. Furthermore, recent research suggests that the frequency of locust swarms will increase with climate change. In that case, if the benefits of the long-term early warning, building climate resilience and control capacity supported under the proposed project are also considered, the true total benefit-cost ratio is likely to be much higher than the estimates above would indicate.

B. Fiduciary

(i) Financial Management

83. **Taking into consideration all of the management actions agreed with FAO to mitigate financial management risks for the proposed project, the FM arrangements under the project will be consistent with those used by FAO under SAPREP**. FAO will maintain separate accounts for both projects and ensure that original supporting documents of expenditures are retained. The proposed project will use unaudited Interim Financial Reports (IFRs) for disbursements and will submit the reports on a quarterly basis to the Bank. Funds will flow from the Bank to FAO and onward to the ultimate recipients/beneficiaries. The project will follow the audit arrangements agreed between the Bank and UN agencies as per the FMFA. In addition, the Bank may require additional audits of project activities based on TORs agreed with the Bank. Additional details on FM are provided in Annex 3.

84. **Fiduciary risk is High**. Table 3 describes the elements of fiduciary risk for the proposed project and the respective mitigating measures. The FM risk for this project is high as some of the below proposed mitigating measures are of long-term nature due to the level of work required which will also be impacted by the conflict situation and the pandemic circumstances. Implementation of the mitigation measures will be reviewed, and the risks will be reassessed, as part of the continuous implementation support for the project.

Table 3: Fiduciary Risks and Mitigation Measures for the Proposed Yemen Desert Locust Response Project

FM Risks	Proposed Mitigation Measures
High risk due to limited capacity and fragile independence of TPMs/auditors, implementing partners (IPs), and M&E consultants. This risk derives from the conflict in Yemen, resulting in reliance on local firms hired directly by FAO. **Impact**: Misuse of funds and inaccurate reported results. Both FAO and the World Bank are relying on the work of IPs and reports from various types of monitoring and review agents, while there is no proof that those IPs and agents have been recently assessed to have the appropriate capacity for the job. The fact that contracts of TPMs and auditors can be terminated directly by the hiring agency may also have a negative impact on their independence and impartiality in reporting findings.	- New assessments of the IPs/TPM agents and audit firms to take stock. - The World Bank will explore, with the help of Yemeni Association of Accountants and Auditors, areas where capacity building support needs to be provided to local firms. - Selection related actions of TPMs and auditors will be in consultation with the World Bank. - TORs for TPMs will be prepared in agreement with the World Bank. - Insistence on stipulating that TPM agency will simultaneously share TPM reports with the World Bank. - Implementation of these mitigation measures will reduce the risk to **Substantial**.
High risk related to fraud and corruption due to use of cash in IDA projects **Impact**: Misuse of IDA funds	- Regular FM reviews during supervision missions to ensure that FAO is complying with the World Bank rules/regulations and that proper controls are in place. - FAO will use a Direct Implementation modality for this project, in which funds will flow directly from FAO accounts to the ultimate beneficiaries/recipients. - FAO will rely more on mobile banking and payment agencies to ensure that the funds reach the legitimate beneficiaries - Implementation of these mitigation measures will reduce the risk to **Substantial.**
High risk due to limited capacity of national and international staff on the ground. **Impact**: Inadequate controls are applied, augmenting the risk of misuse of funds; a gap emerges between what is reported and what is implemented on the ground (inaccurate reporting of results).	- FAO will ensure its finance and compliance departments are sufficiently staffed with qualified individuals who will be responsible for the ex-ante and ex-post review of all transactions. - Implementation of these mitigation measures will reduce the risk to **Substantial.**
High risk due to improper use of funds **Impact**: Using the funds for unintended purposes.	- Use of Direct Implementation modality by FAO. - Regular review of samples of expenditures reported by FAO during supervision missions to ensure proper controls are applied.
High risk due to limited access to areas (nationally and sub-nationally) due to conflict. **Impact**: The number of project beneficiaries could be affected; the capability of TPM and monitoring agents to access those areas and provide assurance on the work could also be affected.	- Regular check by the World Bank team with the UN agencies, national institutions, and monitoring agents to assess the magnitude of this risk and areas affected. - World Bank and FAO to be ready with plan B in cases where this risk materializes. The residual risk remains **High**.

(ii) Procurement

85. **Alternative Procurement Arrangements will be applied in line with the World Bank's Procurement Regulations for IPF Borrowers**, dated July 1, 2016 (revised in November 2017 and August 2018), given that the procurement procedures of FAO (the implementing agency) were assessed and found acceptable to the World Bank under other agreements as allowed by the Procurement Framework Policy Section III. F. Additional details on procurement are provided in Annex 3.

86. **FAO will follow its own procurement procedures to procure the required supplies, including storage and distribution to the final destination**.

87. **Overall procurement risk is rated High** due to the security situation in Yemen, composition of the marketplace (limited competition and availability of service delivery), and the nature of project activities (which are not complex but might be impacted by the situation on the ground in conflict or post-conflict zones).

88. **The project includes risk mitigation measures such as frequent reporting, supplemented by regular direct contact between the World Bank and FAO to review the status of activities**. Aside from more frequent and detailed reporting, combined with closer supervision by the World Bank, the Bank will: (i) review and approve the procurement plan and its respective updates, and (ii) conduct prior review of the selection of the TPMA. FAO will provide quarterly reports on progress with implementation of the procurement plan.

89. **FAO will be responsible for**: (i) implementing the procurement plan as agreed with the World Bank; (ii) hiring the TPMA; (iii) preparing a quarterly report on the progress of procurement and distribution, and preparing updates on the implementation of the Environmental and Social Commitment Plan (ESCP); (iv) reporting on the indicators in the results framework; (v) providing other relevant performance information to the World Bank as requested; and (vi) engaging a firm(s) to conduct an audit of project activities as part of end-of-project M&E.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

Waivers of Operational Policies

90. **The following waivers are sought from the IDA Board of Executive Directors for the third-party implementation:** (i) waiver of (a) the IDA national allocation eligibility criteria to allow the FAO to receive the grant out of the IDA allocation for the Republic of Yemen; and (b) the IDA Regional Window eligibility criteria to allow the FAO to be a grant recipient under the IDA Regional Window; (ii) waiver of application of the Anti-Corruption Guidelines for the IDA Grant – a waiver is sought of the Bank Directive for Investment Project Financing and Section 5.14 of the IDA General Conditions for Credits and Grants for Investment Project Financing, which would otherwise require application of the World Bank's Anti-Corruption Guidelines, in favor of relying on the fraud and corruption procedures of FAO; and (iii) waiver of the application of IDA commitment charge to FAO for the project's duration.

D. Environmental and Social

Environmental

91. **Environmental risk rating is Substantial.** The environmental benefits of this project are expected to be greater than any adverse environmental impacts. Even so, there are potential environmental risks and impacts related to the implementation of interventions under Components 1, 2, and 3, particularly Sub-component 1.2 (Control Measures), which will support (among other activities) the procurement and application of bio-pesticides. Three groups of pesticides reviewed and recommended by the FAO Locust Referee Group are: (a) conventional pesticides: organophosphates (chlorpyrifos, fenitrothion, and malathion) and pyrethroid (deltamethrin); (b) Insect Growth Regulator (teflubenzuron); and (c) Bio-pesticide (Metarhizium acridum). The choice of a particular insecticide depends on the specific circumstances and dominant features of the areas concerned. The main potential environmental risks and impacts are associated with: (i) procurement, transport, handling, storage of the pesticides, dosage during treatment, and disposal of used pesticide containers; (ii) risk of polluting ecological habitats such as wetlands, national parks, and water bodies; (iii) risks of contaminating pasture, local water sources, and agronomically sensitive areas; and (iv) poisoning and contamination of field officers who are directly involved in handling and spraying operations as well as communities that might be exposed to pesticides.

92. **Component 2.1 will support the provision of short-term employment opportunities to beneficiaries under the CfW program of the Yemen SFD, focusing primarily on engaging women.** Such opportunities (described in more detail in Section B) would potentially include clearing dead locusts from affected agricultural land, planting crops, rehabilitating small reservoirs, collecting untreated locusts for feed and fertilizer, (re)introducing pollinators, and providing childcare near CfW sites. Women will also receive tailored training related to health and nutrition and hired as community health workers in targeted areas. Under Sub-component 3.1, the project will finance a new DLCC in Aden, three regional centers/units in Hodeidah, Shabwa and Sieun, and rehabilitate the infrastructure and operational capacity of DLCCs in Sana'a which the ongoing crisis has affected severely. These interventions under Sub-components 2.1 and 3.1 may cause risks and impacts related to construction works—dust, debris and other solid waste generation, ground/surface water contamination, and social annoyance and community safety issues (arising from increased traffic, blocked streets, noise, dust, unsafe construction sites, and other sources)—as well as risks related to occupational health and safety. These environmental risks and impacts are expected to be site-specific, reversible and of low magnitude, however, and will be mitigated by following appropriate measures.

93. **To address and manage any potential adverse risks and impacts, and to ensure that environmental and social management is integrated into the development cycle of individual subprojects, an Environmental and Social Management Framework (ESMF) and a stand-alone Pest Management Plan (PMP) will be prepared, including screening tools to identify sub-projects that might have adverse environmental impacts**. Based on results of the screening procedures under the ESMF and the PMP, subproject-specific Environmental and Social Management Plans (ESMPs) and site-specific PMPs will be prepared. For sub-projects involving the use of pesticides, the PMP will include measures for procurement, transport, handling, storage, and application of pesticides. FAO has produced several international guidelines and codes of conduct on pest and pesticide management which will be applied under the project such as the "International Code of Conduct on Pesticide Management" which includes measures for transport, storage, application and monitoring of pesticides; as well as the "Guidelines for Personal Protection When Handling And Applying Pesticides". For sub-projects under Sub-

component 2.1 and 3.2 and depending on the results of the screening detailed in the ESMF, site-specific ESMPs will be prepared, including preventative actions and mitigation measures to address any potential adverse environmental and social impacts.

94. **Implementation of the ESMF will be the responsibility of the FAO Country Representation in Yemen.** As noted, FAO will work with its key local implementation partner, SFD, to implement Component 2. Both FAO and SFD have adequate arrangements for managing environmental and social issues in operations financed by the World Bank.[12] Implementation and monitoring arrangements will be carried out through the PCU and RPCUs, which will include environmental and social expertise. The ESMF, as well as the Pest Management Plan and Labor Management Plan referred to in this section will be prepared within one month of the project effectiveness.

Social

95. **By restoring lost assets and providing temporary employment, the proposed project will deliver a robust social protection response to farmers, livestock owners, beekeepers, and other primary producers experiencing losses as a result of the desert locust crisis.** At the same time, several social risks and impacts will accompany the project. Component 1, for example, involves health risks for field officers and other locust control personnel directly involved in handling insecticides and conducting spraying operations. Local populations could be exposed to health risks, especially in the areas where spraying is carried out and also through the consumption of pesticide-contaminated food grown in sprayed areas. Under Component 2, there is a risk that CfW activities may exclude vulnerable and very poor groups, such as households headed by women and elderly tenant farmers and sharecroppers. Livelihood restoration activities risk bypassing some of the producers who have suffered the most from the locust crisis, including small-scale farmers, livestock producers, and beekeepers who are highly dependent on these activities. Component 3 will rehabilitate DLCCs and establish new centers; although efforts will be made to establish the new centers on government land, land acquisition from other sources cannot be excluded because the locations of the new centers have not been identified at this stage. Mitigation measures for community health and safety and the management of workers will be detailed in the Labor Management Procedure (LMP) in the ESMF. The LMP of the CfW program will describe specific COVID-19-related social distancing and hygiene requirements.

96. **Social risks are Substantial**. The social risks of the proposed project are considered Substantial, mainly because of the risk that elites and relatively more fortunate individuals may capture the benefits and undermine the objectives of the project by excluding poor and vulnerable groups such as the elderly, poor farmers, women, and individuals displaced by the ongoing conflict. The main challenge is thus to ensure that services provided by the project reach the affected population and are distributed in a transparent, equitable manner. To mitigate these social risks, FAO will work closely with SFD to define key selection criteria for target areas; these criteria will form part of the stakeholder engagement process, including the disclosure of public information and outreach related to the project. Project implementation also will ensure appropriate stakeholder engagement to avoid conflicts resulting from unfair distribution of services, the inability of vulnerable groups to access services, or issues related to the location of producers in remote rural areas.

[12] To manage environmental and social aspects under this project, SFD will apply its current Environmental and Social System, which includes an Environmental and Social Officer in Sana'a and focal points at governorates. The Environmental and Social System was developed by several World Bank–financed projects, including ECRP and SAPREP, and includes procedure for sub-project screening and assessment.

97. **The risk of social exclusion will be mitigated by relying on FAO's experience of working in Yemen and the capacity of SFD, which will provide a participatory, inclusive, and transparent mechanism to identify and target beneficiaries based on clear eligibility criteria**. The ESMF will help mitigate potentially high adverse environmental and social impacts stemming from the selection and implementation of sub-projects. A TPMA will be hired to monitor environmental and social aspects and help ensure compliance.

98. **A Stakeholder Engagement Plan (SEP) will enable the project to identify and reach the most vulnerable groups in communities affected by locust breeding and spread.** Implementation of the SEP (to be developed, consulted upon, and finalized within one month of project effectiveness) will ensure appropriate stakeholder awareness raising and engagement, as well as timely dissemination of information, to: (i) help the project provide the maximum possible equitable access to services for all who need them; (ii) address the issues of those who are most affected by the locust crisis (very poor farmers, women, and the elderly, for example); and (iii) address the exposure of rural women to gender-based violence (GBV). An initial GBV risk assessment conducted for the project concluded that the GBV risk was Substantial. FAO will recruit an NGO experienced in GBV assessment to monitor and report on potential cases. The SEP will also include an updated GRM for addressing any concerns and grievances raised (see the next paragraph). The GRM will forward information to the GBV specialist to continuously and confidentially assess and address risks related to cases of GBV and/or sexual exploitation and abuse.

99. **To respond to complaints or concerns related to project activities, the proposed project will adopt the GRM of FAO[13] in addition to the SFD GRM**. The FAO will take overall responsibility for managing complaints received through SFD. The FAO will disseminate the hotline number at regional and local levels to increase accountability at those levels to citizens' inquiries. This GRM system will include multiple uptake mechanisms (telephone, complaints box, website, email, and text messaging). It will be critical to have good communication on the processes of the GRM system, both in terms of beneficiaries' rights and the boundaries of the system. Complaints received by the GRM system will be registered, tracked, investigated, and promptly resolved.

100. **Gender considerations**. The conflict in Yemen had a particularly negative impact on women and their ability to perform their daily activities, including farming and raising animals. As noted, the project will support women under CfW activities by providing training in target areas on community health, nutrition, and cultivation of plants in home gardens to repel locusts; more generally the project will support women farmers to restore their agricultural land and other livelihood activities.

[13] Similar to the one previously prepared by SAPREP.

V. GRIEVANCE REDRESS SERVICES

101. Communities and individuals who believe that they are adversely affected by a World Bank–supported project may submit complaints to existing project-level GRMs or the World Bank Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project-affected communities and individuals may submit their complaint to the World Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate GRS, please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org

VI. KEY RISKS

102. **The overall risk rating is High**. This rating stems from the exceptional context of the ongoing conflict in the Republic of Yemen. The key risks that may affect the achievement of the PDO and results are: (i) political and governance; (ii) sector strategies and policies; (iii) macroeconomic; (iv) environmental; (v) technical design; (vi) institutional capacity for implementation and sustainability; (vii) fiduciary; (viii) stakeholders; and (ix) other risks, namely, risks related to the lack of an official counterpart and security situation. Several important risk mitigation measures have been integrated into the design of the project. A considerable degree of risk is inherent, however, due to the country context, the rapidly evolving situation on the ground, and the increasingly difficult operating environment. For that reason, the overall residual risk remains High.

103. **Political and governance risks are High**. The ongoing conflict can negatively affect achievement of the PDO. Difficulties in supervision and implementation may result in the diversion of funds to benefit populations in areas linked to political interests. In addition, the control of geographical areas by different political or armed factions could lead to interference and inadequate targeting of truly vulnerable people. This challenging environment also poses risks related to sector strategies and policies. Key mitigation measures include maintaining a strong focus on the procurement of necessary supplies and equipment, training staff of DLCCs and communities, and working with politically neutral implementing partners and with different levels of different authorities. The residual risk remains High.

104. **Macroeconomic risk is High**. A sharp depreciation of the currency would trigger high inflation, compounding the challenges of working in this challenging operating environment. Cash transfer programs in the North could potentially be disrupted by the limited availability of old banknotes. Liaising with partner banks to ensure sufficient availability of appropriate notes for each region is necessary to minimize inconvenience to the beneficiaries. The economic impact of the conflict has been devastating for Yemen, which suffered from weak economic performance prior to the conflict; the COVID-19 pandemic, as well as the DALOs associated with desert locusts, could add to the economic burden. While risks associated with macroeconomic weaknesses cannot be fully mitigated, it is expected that the project will have a positive impact on the national economy and food security.

105. **Sector strategies and policies.** The risk is rated as Substantial. The agriculture sector has been under severe distress due to the ongoing conflict. The overall sector priorities have shifted as a result of the conflict and may be revised again depending on the situation in the country, which adds to the sectoral volatility. Locust response remains one of the priorities. This risk will be mitigated by the project through its interventions, which focus on the short-term locust response, but also on the medium-term preparedness capacity building and linking Yemen's locust response systems to the regional networks. The project would also contribute to restoring production at the farms in the locust-affected areas and ensure community capacity building and awareness campaigns.

106. **Environmental and social risks are Substantial**. Overall, the direct benefits and positive externalities of project interventions are significant compared to the risks and impacts envisaged. Nonetheless, the challenging environment in which the project is implemented translates into Substantial residual risk. The environmental risks and impacts under this project are related mainly to the procurement and handling of pesticides, the pollution of ecological habitats, the contamination of land and water used for agriculture, including livestock, and human health issues for field officers and communities. The social risks are mainly related to inequitable and non-transparent access to project services by the affected population and vulnerable groups, owing to factors such as elite capture and the ongoing conflict. These risks and associated risk mitigation measures are discussed in detail in Section IV.D of the document.

107. **Stakeholder risks are Substantial**. Negative media coverage has targeted UN agencies in Yemen. Given that the project includes activities that may affect the larger population (such as the pesticide spraying), the project will include an extensive public awareness campaign and training of population. The residual risk is considered Substantial, given the varied level of access to information among the population.

108. **Fiduciary risks are High**. Detailed information on the elements of fiduciary risk and their respective mitigation measures is provided in Section IV.B and Annex 3 of the document. Issues identified during SAPREP audits pertaining to the fiduciary aspects of the project (implemented by FAO) were addressed in the design of this project. For instance, the requirement for maintaining adequate financial records for accounting and reporting purposes under the project has been significantly strengthened. The implementation of the mitigation measures will be reviewed, and the risks will be reassessed as part of continuous implementation support of the project.

109. **Other risks are High.** Risks related to the lack of an official counterpart remain, as well as the risks associated with the security situation in the country. If the conflict escalates and UN offices in Yemen close, the risk that implementation would come to a halt will be mitigated by local staff following the business continuity plan for project implementation as much as feasible. The security situation in the country may also impact the assets procured under the project, for instance, they could be looted. In order to remedy possible looting episodes, the project assets will only be kept and stored in fenced and secured areas and buildings by (private) security personnel. In addition, any vehicles procured under the project would only be single-use, suitable only for their intended purpose of locust control. In addition, the increasing uncertainty presented by the COVID-19 pandemic may present implementation challenges, for instance, the introduction of the quarantine regimes between South and North may delay access to potential project sites. The residual risk therefore remains High.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Yemen, Republic of

Yemen Desert Locust Response Project

Project Development Objectives(s)

The Project Development Objectives are to control the desert locust outbreak, support livelihoods in locust-affected areas and strengthen Yemen's preparedness for future locust infestations.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Control of desert locust outbreak implemented			
Share of affected pasture/rangeland restored to productivity (Percentage)		0.00	90.00
Share of the affected agricultural land area restored to productivity (Percentage)		0.00	90.00
Livelihoods in locust affected areas supported			
Affected households supported by social safety nets (Number)		0.00	1,500.00
Females as the direct recipients of social safety benefits (Number)		0.00	1,200.00
Share of locust-affected farmers (incl. livestock owners/ beekeepers) reporting renewed agricultural activity (Percentage)		0.00	80.00
Share of locust-affected female farmers reporting renewed agricultural activity (Percentage)		0.00	80.00
Country's preparedness against future locust outbreaks strengthened			

Indicator Name	PBC	Baseline	End Target
National locust control plan developed (Yes/No)		No	Yes
Early warning system developed and functioning (Yes/No)		No	Yes

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Surveillance and Control Measures			
Land area sprayed for locust control (Hectare(Ha))		0.00	200,000.00
Area of locust-affected land surveyed (Hectare(Ha))		0.00	400,000.00
Locust monitoring system operational (Yes/No)		No	Yes
Pesticide inventory stored in accordance with appropriate international safety standards (Yes/No)		No	Yes
Livelihood Protection and Rehabilitation			
Affected farmers receiving input packets (Number)		0.00	2,000.00
Affected female farmers receiving input packets (Number)		0.00	200.00
Affected livestock holding households receiving emergency fodder (Number)		0.00	3,000.00
Female-headed affected livestock holding households receiving emergency fodder (Number)		0.00	1,000.00
Affected livestock holding households receiving replacement livestock (Number)		0.00	600.00
Female-headed affected households receiving replacement livestock (Number)		0.00	250.00
Person work-days generated by emergency cash-for-work		0.00	198,000.00

Indicator Name	PBC	Baseline	End Target
schemes (Number)			
Person work-days generated by emergency cash-for-work schemes benefiting women (Number)		0.00	158,400.00
Beneficiary satisfaction with the training received (Percentage)		0.00	85.00
Farmer and livestock owner levels of satisfaction related to the engagement process. (Percentage)		0.00	85.00
Coordination and Early Warning Preparedness			
National locust outbreak emergency risk communication plan tested (Yes/No)		No	Yes
DLCCs fully operational (Number)		0.00	5.00
Project Management and Knowledge Management			
Awareness raising communications campaigns conducted (Yes/No)		No	Yes
Community members reached through awareness campaigns (Number)		0.00	75,000.00
Number of women reached through awareness raising campaigns (Number)		0.00	37,000.00
Grievances registered and addressed in a timely manner (Percentage)		0.00	100.00
Level of satisfaction related to the community engagement process on the public awareness campaign. (Percentage)		0.00	80.00

Monitoring & Evaluation Plan: PDO Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Share of affected pasture/rangeland restored to productivity	The indicator will measure the share of the land area that had sustained significant vegetative loss but had recovered that vegetation sufficiently to maintain typical livestock population. It would track the cycle of vegetation loss and regeneration after project intervention.	Annual	Project's M&E system	Project's progress reports	FAO
Share of the affected agricultural land area restored to productivity	This would track the share of the land where crops had been lost due to locust infestation but were replanted in the wake of the locust damage.	Annual	Project's M&E system	Project's progress reports	FAO
Affected households supported by social safety nets	Number of households receiving social assistance to mitigate the effects of locust damage.	Monthly	Project's M&E system	Project's progress reports	FAO, SFD
Females as the direct recipients of social safety benefits	The share of females that are the direct recipients of the social safety nets benefits of the total number of households receiving social assistance to mitigate the effects of locust	Monthly	Project's M&E system	Project's progress reports	FAO, SFD

	damage.				
Share of locust-affected farmers (incl. livestock owners/ beekeepers) reporting renewed agricultural activity	Share of locust-affected farmers (including crop farmers, livestock owners and beekeepers) who have restarted (and reporting) agricultural activity within one year of having been affected by the locust.	Annual	Project's M&E system	Project's progress reports	FAO, SFD
Share of locust-affected female farmers reporting renewed agricultural activity	Share of locust-affected female farmers (including crop farmers, livestock owners and beekeepers) who have restarted (and reporting) agricultural activity within one year of having been affected by the locust.	Annual	Project's M&E system	Project's progress reports	FAO, SFD
National locust control plan developed	The national locust development plan designed and agreed on.	Annual	Project's M&E system	Project's progress reports	FAO
Early warning system developed and functioning	Early warning system developed and functioning in the DLCCs.	Annual	Project's M&E system	Project's progress reports	FAO

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Land area sprayed for locust control	Total land area in ha sprayed for locust control (annually).	Monthly	Project's M&E system	Project's progress reports	FAO
Area of locust-affected land surveyed	Area of locust-affected land surveyed (annually)	Monthly	Project's M&E system	Project's progress reports	FAO
Locust monitoring system operational	Assessment of whether country-level locust monitoring systems are operational.	Semi-annual	Project's M&E system	Project's progress reports	FAO
Pesticide inventory stored in accordance with appropriate international safety standards	Country-level assessment of safety of storage of locust pesticide inventory	Annual	Project's M&E system	Project's progress reports	FAO
Affected farmers receiving input packets	Number of affected farmers receiving input packets.	Monthly	Project's M&E system	Project's progress reports	FAO, SFD
Affected female farmers receiving input packets	Number of affected female farmers receiving input packets.	Monthly	Project's M&E system	Project's progress reports	FAO, SFD
Affected livestock holding households receiving emergency fodder	Number of livestock holding households receiving emergency fodder	Monthly	Project's M&E system	Project's progress reports	FAO, SFD
Female-headed affected livestock holding households receiving emergency fodder	Female-headed affected livestock holding households receiving emergency fodder.	Monthly.	Project's M&E system	Project's progress reports.	FAO, SFD
Affected livestock holding households receiving replacement livestock	Number of livestock holding households receiving	Monthly	Project's M&E system	Project's progress reports	FAO, SFD

	replacement livestock				
Female-headed affected households receiving replacement livestock	Number of female-headed livestock holding households receiving replacement livestock.	Monthly.	Project's M&E system	Project's progress report	FAO, SFD
Person work-days generated by emergency cash-for-work schemes	Number of person work-days generated for affected populations though emergency cash-for-work schemes	Monthly	Project's M& E system	Project's progress reports	FAO, SFD
Person work-days generated by emergency cash-for-work schemes benefiting women	Number of person work-days generated for affected populations though emergency cash-for-work schemes, benefitting women	Monthly	Project's M&E system	Project's progress reports	FAO, SFD
Beneficiary satisfaction with the training received	Level of satisfaction of the beneficiaries with the training received under the project.	Semi-annual	Beneficiary surveys and project's M&E system.	Project's progress reports	FAO, SFD
Farmer and livestock owner levels of satisfaction related to the engagement process.	The indicator will measure the farmer and livestock owner levels of satisfaction related to the engagement process (livelihood restoration and training). The feedback will be collected either directly with both groups or through any representative association	Semi-annual	Beneficiary surveys and project's M&E system.	Project's progress reports.	FAO, SFD

	that is voted by farmers that discusses the restoration process.				
National locust outbreak emergency risk communication plan tested	Assessment of readiness to launch locust emergency risk communication plan.	Annual	Project's M&E system	Project's progress reports	FAO
DLCCs fully operational	Number of Desert Locust Control Centers (DLCC) in the network, rehabilitated and/or newly established and fully operational.	Semi-annual	Project's M&E system	Project's progress reports	FAO
Awareness raising communications campaigns conducted	Assessment of whether awareness raising communications campaigns have been conducted.	Semi-annual	Project's M&E system	Project's progress reports	FAO
Community members reached through awareness campaigns	Number of community members reached with awareness raising campaigns on locust monitoring, safety aspects, COVID-19 and other subjects of awareness raising activities.	Semi-annual	Project's M&E system	Project's progress reports	FAO
Number of women reached through awareness raising campaigns	Number of female community members reached through the awareness raising campaigns.	Monthly	Project's M&E system	Project progress reports	FAO, SFD
Grievances registered and addressed in a timely manner	Percentage of grievances registered and addressed (%) within 14 days of registration.	Monthly	GRM reports and Project's M&E system	GRM reports and Project's M&E system	FAO, SFD

Level of satisfaction related to the community engagement process on the public awareness campaign.	The levels of satisfaction related to the engagement of the community representatives and, if possible, communities themselves on the public awareness campaign designed to keep the public informed about the possible environmental and health effects of insecticides before, during, and after locust control operations.	Semi-annual	Beneficiary surveys and project's M&E system.	Project's progress reports	FAO, SFD

ANNEX 1: IMPLEMENTATION ARRANGEMENTS AND SUPPORT PLAN

COUNTRY: Yemen, Republic of
Enhancing Preparedness and Capacity for Desert Locust Response in Yemen

Implementation Arrangements

1. **Under the proposed project, the FAO will be the IDA grant recipient, the overall implementing entity responsible for project activities, and the technical lead for Components 1, 3, and 4.** This project will operate within the FMFA signed between the World Bank and FAO on March 10, 2006. The FAO will be a recipient of the IDA financing, as well as the overall managing and implementing entity. In addition, FAO will provide the technical leadership for implementation of Component 1 (*Surveillance and Control Measures),* Component 3 (*Coordination and Early Warning Preparedness),* as well as the technical activities (community outreach) under Component 4 (*Project Management and Knowledge Management)*.

2. **The FAO is well positioned to ensure satisfactory project management lead on issues related to locust response.** As a specialized UN agency, FAO is primarily responsible for responding to emergencies in the agriculture and food security sectors, including crop and food supply monitoring and needs assessment, evaluation of agricultural relief requirements, and mobilization of the assistance and resources needed to restore agricultural activity. FAO also has prior successful experience in supporting implementation of Bank-financed projects on the ground in Yemen.[14] As mentioned, the FAO also has global technical knowledge of locust monitoring and response, including management of the locust early warning system.

3. **The FAO Country Representation in Yemen will be responsible for implementation of the project and for coordination of all project activities at the subnational level.** FAO has in place fast-track procedures for countries in level 3 emergencies such as Yemen, where there is a dedicated country Emergency Support Team to ensure that the required technical and operational support are provided to the country on a timely basis. The SFD will be a key local implementation partner of FAO for Component 2. SFD has sustained delivery of critical programs in the country throughout the conflict in a politically neutral and credible manner, including under the World Bank–funded ECRP and SAPREP (the latter in collaboration with FAO). FAO and SFD have established institutional and implementation mechanisms relevant for the delivery of the proposed project activities in Yemen. The FAO will also work closely with the DLCC network, to ensure adequate capacity building of the center networks and link the centers in appropriate information networks to ensure that they can mount a coordinated response against desert locust outbreaks in the future.

4. **The FAO team in the office—the PCU—in Sana'a will be in charge of day-to-day management of the project, including all fiduciary aspects, environmental and social aspects, monitoring, and reporting.** The Project Team in Sana'a will comprise a Chief Technical Advisor, an Operations Officer, a Procurement Specialist an M&E Specialist, a Communication Specialist, an Administration and Finance Officer, and an Environmental and Social Specialist.

[14] FAO is the implementing agency for SAPREP, financed by the Global Agriculture and Food Security Program Trust Fund, and since 2017 has led the project toward satisfactory achievement of results.

5. **At the regional level, implementation will be supported by the Regional Project Coordination Units (RPCUs) set up under SAPREP and located at the FAO regional hubs in Aden, Hodeidah, and Saada**. The tasks performed by the RPCU staff will include providing implementation advice and general supervision, monitoring progress, addressing environmental and social risks and impacts, reviewing and approving annual work plans for the region (which would then be consolidated at the national level), conducting M&E, and reporting. The RPCU in Aden will coordinate activities in Lahj, Abyan, Al Dalea and Taiz. The FAO hub in Shabwa will provide support for activities in Marib, Albida, and AlJaf, whereas the RPCU in Hodeidah will provide support to Hajjah and Al Mahweet. The regional hub in Ibb will support implementation in the part of Taiz that is not covered by the Aden hub. The Saada RPCU will be responsible for implementing project activities in Saada Governorate. Each hub office will have dedicated project staff, including a Technical Advisor, Operations Specialist, Administration and Financial Management Specialist, and M&E and Reporting Officers.

6. **FAO will take the lead in sourcing equipment, vehicles, tools, information platforms, and other necessary assets for implementation of Components 1, 3, and 4, as well as production inputs for emergency livelihood interventions under Component 2** (seed of staple crops, agricultural tools, startup packages for backyard poultry, small ruminants, and apiculture) to resume crop and livestock production in the locust-affected areas. Frontline services will be carried out by local implementing partners (such as SFD and other specialized local entities) engaged through standard agreements of FAO. The partners will be selected based on their technical and logistical capacities to implement the respective activities, past experience, track records in implementing related projects, value for money, and extent of coverage in the target districts. Some project activities will be implemented directly by staff and consultants of the FAO Country Representation in Yemen, in particular those related to support for activities under Components 1 and 3, where FAO has technical expertise. As needed, the project will closely collaborate with the local implementation partners, which include local NGOs, local authorities, CBOs, and private service providers.

7. **SFD is a key institution for poverty reduction and social and economic development in Yemen, with extensive experience working with local communities, as demonstrated under the previous World Bank–financed agricultural and social protection operations in Yemen**. Agriculture is one of SFD's most significant investment areas. SFD is also a key local partner in the implementation of the ongoing World Bank-financed ECRP in Yemen. The selection of SFD as a local implementation partner preserves the national capacity for community-based interventions during the post-conflict phase. SFD will lead the implementation of Component 2 (Livelihood Protection and Rehabilitation). For activities that will be implemented by SFD, FAO will provide technical guidance and backstopping as required. The ARDU in the SFD central office in Sana'a will provide overall support to the project, while the branch offices in Aden, Ammran, and El Mukalla will provide support and coordination for the project activities in Abyan, Lahj, Saada, and Shabwa, and branch offices in Hajjah, Taiz, and Al-Hodeidah will provide support and coordination in their own governorates. Staff in the branch offices include a Branch Manager, Procurement Officer, FM Officer, Technical Officer for Quality Supervision, M&E, IT, who are involved in day-to-day operational activities. Additional personnel will be recruited to cover areas where there are gaps. All staff will have satisfactory expertise, experience, and qualifications.

8. **A network of DLCCs will be established as described under Sub-component 3.1**. The centers will be a key beneficiary under the project, receiving technical and capacity building support, given their key role in locust monitoring, surveillance, and response in the future. The centers will be established in Aden and Sana's, as well as three regional hubs close to the desert locust breeding and development areas. The centers will be operationally linked in a network, to ensure a coordinated locust response.

9. **Project Operational Manual (POM)**. A detailed POM (including a separate section dealing with CFWs) will be prepared for all project components within three (3) months of effectiveness. The POM and the Manual will be subject to the World Bank's no objection.

10. **Financial Management and Procurement arrangements**. The project's FM arrangements will be governed by the FMFA between the World Bank and the UN agencies, which provides for the use of the UN's Financial Regulations. For procurement, FAO will follow their own procurement procedures as Alternative Procurement Arrangements as provided under the World Bank New Procurement Framework Policy Section III. F. This implementation arrangement is sound, since the procurement procedures of FAO were assessed and found acceptable to the World Bank under agreements with UN agencies.

Implementation Support Plan

11. **The Implementation Support Plan (ISP) is adapted to the design and risk profile of the project**. Both implementing entities (FAO and SFD) have extensive technical and project management experience in their respective areas and have capacity to implement the project satisfactorily (at a minimum). However, the complex operating environment has heightened the risks and complexities associated with implementation. As a result, the World Bank team is proposing three implementation support missions every year at least for the first two project implementation years, instead of the usual two missions.

12. **While FAO is responsible for overall project implementation, including the project's technical aspects, the mandate of World Bank implementation support includes**: (i) assessing implementation progress and achievement of results on the ground through reviews of progress reports by FAO and the TPMA, as well as SFD for Component 2, and regular implementation support missions; (ii) proactively raising and assisting with solutions to any emerging issues before they become critical problems; and (iii) between missions, following up on monitoring and reporting on implementation progress and achievement of results.

13. An MTR mission will be conducted around 18 months into project implementation to assess progress toward achieving the PDO, identify challenges and any changes needed, including possible changes to the implementation of the project. The MTR will also review the draft exit strategy for the DLCC network. No later than six months before the expected project closing, an Implementation Completion and Results Report (ICR) Review mission will be organized to carry out a comprehensive assessment of the project and draft the World Bank ICR, as well as to guide FAO in the preparation of its ICR.

14. **Fiduciary aspects of project implementation** will be reviewed and advised on as part of the implementation support missions, as well as on an ad hoc basis as issues arise. In particular, fiduciary issues identified under the previous project preparation will be monitored during the implementation of this project.

15. **Social and environmental aspects.** Supervision will place particular emphasis on ensuring that social and environmental risks and impacts are adequately monitored and addressed in a timely manner, should issues arise. World Bank Environmental and Social Specialists will participate in all implementation support missions, as well as provide guidance on an ad hoc basis.

16. **The ISP focuses on actions that the Bank will perform and on associated needs in terms of skills and**

resources. Given the multisectoral nature of the proposed project, successful support and monitoring of implementation will require a multidisciplinary set of technical specialists along with fiduciary and environmental and social specialists. It is expected that a core group of the Bank's technical experts will help to provide regular guidance and implementation support, with outside experts mobilized as needed. As noted, it is also expected that during the first two years of project implementation, more frequent visits (three times a year) may be required; it is estimated that two visits a year may be sufficient for the remaining project implementation period.

Main Focus of Implementation Support

17. **Implementation Support Plan and Skill Mix:** See Table 4.

Table 4: Focus of Implementation Support and Skills Required for the Yemen Desert Locust Response Project

Time Needed	Focus	Skills
0–12 months	• Baseline survey • Preparation of the POM and CFW Manual • Preparation of the ESMF, PMP for the project, and LMP • Proceeding with the procurement of necessary equipment and inputs for locust control • Proceeding with the locust monitoring and control activities • Livelihood protection and restoration activities • Awareness raising and outreach campaigns in particular in the locust-affected areas • Confirmation of sites for the DLCCs • Social and environmental assessments of the DLCC sites, if required (new construction) • Environmental and social supervision • Proceeding with procurement of the DLERS suppliers and developers	• Core task team, including FM, Procurement, M&E • Technical Specialist (locust) • ICT expert • Climate change economist (agriculture)
12–34 months	• Locust monitoring and control activities • Livelihood protection and restoration activities • Awareness raising and outreach campaigns in particular in the locust-affected areas • Construction/refurbishment and equipping of DLCCs • Implementation of DLERS • Environmental and social supervision • Midterm evaluation of the project • Implementation of MTR recommendations on project management systems including fiduciary, environmental and social, and M&E • Technical adjustments of project activities • Critical stocktaking of available resources for successful project completion	• Core task team, including FM, Procurement, M&E • Technical Specialist (locust) • ICT expert • Climate change economist (agriculture)
34–40 months	• Completion of all technical activities under the project • End-term evaluation and project ICR	• Core task team, including FM, Procurement, M&E • Technical Specialist (locust) • ICT expert Climate change economist (agriculture)

18. **Skill mix.** Table 5 proposes the skill mix and team composition for supporting project implementation.

Table 5: Team Composition and Skills to Support Implementation of the Yemen Desert Locust Response Project

Skills Needed	No. of Staff Weeks/Year	Number of Missions *	Comments
Task team leader/Agriculture	10	Three in the first two years and two in the last year	International staff
Task team leader/Social Protection	10	Three in the first two years and two in the last year	International staff
Agricultural Specialist	10	Three in the first two years and two in the last year	Staff in the country office/international
Procurement Specialist	3	Three in the first two years and two in the last year	Staff in the country office/international
FM Specialist	3	Three in the first two years and two in the last year	Staff in the country office/international
Social Specialist	5	Three in the first two years and two in the last year	Staff in the country office/international
Environmental Specialist	5	Three in the first two years and two in the last year	Staff in the country office/international
Climate Change Economist (agriculture)	4	Three in the first two years and two in the last year	International staff
Technical Expert (desert locust)	4	Three in the first two years and two in the last year	International staff

* Technical missions will supplement the regular implementation support missions as needed.

ANNEX 2: DETAILED PROJECT DESIGN

COUNTRY: Yemen, Republic of
Enhancing Preparedness and Capacity for Desert Locust Response in Yemen

A. Project Development Objective

PDO Statement

1. The Project Development Objectives (PDO) are to control the desert locust outbreak, support livelihoods in locust-affected areas and strengthen Yemen's preparedness for future locust infestations.

2. **In the context of Yemen, the PDO encompasses:** (i) a respose to the threat posed by the locust outbreak through ensuring improved locust surveillance, monitoring, and control activities, as well as liveliood support and restoration in the locust-afftected areas, and (ii) strengthening Yemen's systems for preparedness through establishing and equipping a network of DLCCs, establishing the early response system, and linking Yemen into regional networks and organizations for information and data exchange and improved coordination of the locust response.

PDO Level Indicators

3. **Progress toward the achievement of the PDO will be measured by the following outcome indicators**:

Outcome 1: Control of desert locust outbreak implemented:

- Share of affected pasture/rangeland restored to productivity (percent)
- Share of affected agricultural land restored to productivity (percent)

Outcome 2: Livelihoods in locust affected areas supported

- Affected households (number) supported by social safety nets, of which females (percent) are the direct recipients of benefits
- Share of locust-affected farmers (including crop farmers, livestock owners and beekeepers) reporting renewed agricultural activity, of which female-headed farms (percent), of which female-headed farms

Outcome 3: Country's preparedness against future locust outbreaks strengthened

- Yemen's locust control plan developed (Yes/No)
- Early warning system developed and functioning (Yes/No)

B. Project Components

Component 1: Surveillance and Control Measures (US$10.1 million, all IDA)

4. **The objective of this component is to limit the growth of existing climate change–driven desert locust populations and curb their spread, while mitigating the risks associated with control measures and their impacts on human health and the environment**. The component would improve the capacity (equipment and capacity building) for improved surveying and surveillance of the breeding and infestation areas and meteorological data collection, ensure locust control activities (spraying), and implement risk mitigation measures for the workers and affected communities. Efforts will focus on determining the likely impacts of climate change on pest establishment, development, phenology, behavior, interactions with host and natural enemies, and other variables in specific agricultural settings. The component will be designed to enable informed and climate-responsive locust management decision-making. Satellite images and the associated geospatial technologies can provide timely data to assess the risk of impending locust outbreaks. This information will be used for targeted preventative management actions in the locust breeding areas under changing climatic conditions. Habitat mapping will apply climate, soil, and other variables to map susceptibility of land areas in space and time to locust outbreaks (locust vulnerability map) or land areas where locusts have already proliferated (locust impact map).

5. **Sub-component 1.1: Continuous surveillance (US$2.7 million).** The objective of activities under this sub-component is to provide early warning, inform effective control operations, and mobilize assistance (under Component 2) to affected and at-risk communities. Activities would include support for: (i) continuous surveillance and monitoring of observed breeding and egg-laying areas and the movement of developing nymphs, hopper bands, and adult locust swarms; (ii) preparation of habitat maps applying climate, soil and other variables to map susceptibility of land areas in space and time to locust outbreak (locust vulnerability map) or land areas that are already proliferated by locusts (locust impact map); and (iii) collecting and analyzing data to inform planning, to identify and plan control targets, and to ensure appropriate control methods are applied at the optimal time to break the cycle of the next generation; to forecast breeding and migration; and to evaluate the effectiveness of locust control campaigns. Satellite images, the associated geospatial technologies, as well as ground surveying and other data collection methods will provide timely data to assess the risk of impending locust outbreaks. The project will, therefore, procure the necessary inputs for satellite surveillance (satellite maps and meta-data analysis) and necessary equipment for land surveillance (elocust3, GPS, camping kits, dissection kits, 4WD pickup trucks), as well as finance the staff and operating expenditures for locust surveillance and monitoring. The project will also organize the necessary training (TOT) sessions for representatives from the affected regions to ensure further organized training of the affected communities in conformity with the FAO Guidelines and Standard Operating Procedures (SOPs) on desert locust surveillance. It is expected that 15–25 representatives with relevant backgrounds from each of the locust-affected regions will be trained to subsequently work with the affected communities, raising their awareness. To the extent possible, communities will also be equipped to actively participate in the desert locust surveillance and monitoring.

6. **Sub-component 1.2: Control measures (US$6.3 million).** The objective of the activities under this sub-component would be to reduce locust populations and prevent their spread to new areas. This would be achieved via a range of targeted ground control operations and would emphasize, whenever possible, neutralizing hopper bands before they develop into adult swarms. It is expected that mostly bio-pesticides[15] with lower carbon

[15] The pesticides used will be selected from those recommended by the FAO Locust Referee Group: A. Conventional pesticides:

footprint will be financed under this sub-component to lessen the impact on honey producers and reduce GHG emissions. This would be deployed via ULV spraying, a technique that uses much smaller volumes of spray liquid compared to conventional spraying methods and has become the most commonly used method for desert locust control. The sub-component will support the procurement of all material and equipment for the ground control operations of the desert locust, including: 4WD pickups, pesticides and bio-pesticides (in accordance with the FAO Guidelines and Pesticide Referee Group recommendations), various types of vehicle-mounted ULV sprayer equipment, backpack motorized ULV sprayers, hand-held ULV sprayers, pesticide pumps, pesticide drum cleaner and crushers and PPE. The operational costs of control operations (salaries of workers, vehicle fuel and maintenance) will also be supported. The pesticide-related equipment would be procured, used, and maintained in conformity with FAO Guidelines on pesticide equipment, application, and maintenance. The design of the energy-efficient vehicles with mounted sprayers that would be procured and utilized would have non-adjustable specifications and be manufactured as a build-in module that cannot be used for another purpose.

7. **Sub-component 1.3: Risk reduction and management (US$1.1 million).** The principal objective of activities financed under this sub-component is to monitor and assess environmental and human health risks associated with locust control and implement health, environmental, and safety measures to reduce risks to an acceptable minimum. Insecticides that are used in locust control pose risks to human and animal health and to biological systems and biodiversity. Field officers who are directly involved in handling and spraying operations run the highest risk of being poisoned, either accidentally or during the normal course of their work, but local populations are also at risk, especially in the areas in which spraying is carried out. For field officers, to reduce risks of overexposure to chemical pesticides, all field officers and spray operators will be equipped with appropriate PPE and pumps to limit handling of chemicals. In addition, all operators will have access to the Materials Safety Data Sheet and relevant materials to contain and absorb accidental spills. Acetylcholinesterase will be used to monitor for exposure to certain types of pesticides, and locust control (spray) personnel will be rotated to the extent possible, to avoid overexposure and poisoning. Exposure could also occur through consumption of contaminated food grown in sprayed areas, and there is need to promote awareness and to ensure that communities respect the re-entry time for their livestock and withholding periods for their harvests.

8. **Activities and measures financed under the sub-component would include**: (i) procuring the ChE Cholinesterase Test System for the control of acetylcholinsterase, and (ii) testing people (especially logistical staff involved with handling, transporting and storing insecticides, and spraying teams) and soil and water for insecticide contamination. All personnel involved in the project and exposed to pesticides (storage, transport, calibration, empty containers, handling, etc.), will have a health certificate, insurance, take an acetylcholinesterase test before and at the end of the desert locust control campaign, and will be trained on the appropriate use of PPE; and (iii) at the end of the desert locust control campaign, soil, water, and plant samples will be taken for pesticide residue analysis by a nationally or regionally accredited laboratory. This sub-component will also finance: (iv) preparing a comprehensive NPMS, which will optimize the selection of control strategies, protection measures, and insecticides based on situational and environmental assessment; and (v) providing safety and

organophosphates (chlorpyrifos, fenitrothion, and malathion) and pyrethroid (deltamethrin); B. Insect Growth Regulator (teflubenzuron); C. Bio-pesticide (*Metarhizium acridum*). The choice of a particular insecticide depends on the specific circumstances and dominant features of the areas concerned. The FAO *Desert Locust Guidelines on Control* (FAO 2001) and on *Safety and Environmental Precautions* (FAO 2003) provide detailed guidance on choosing the appropriate insecticide for Desert Locust control. FAO relies on the preventive strategy, which includes early detection of infested areas and rapid response, which includes targeted treatments of locust groups and insect growth regulators, and bio-pesticides are most suitable for such preventive treatments. Conventional pesticides, insect growth regulators, and bio-pesticides are applied in an integrated approach to address all locust lifecycle stages.

awareness training (for example in handling, transporting, and storing pesticides) for spraying teams and other locust control personnel.

9. **Women's participation in locust surveillance and control.** To narrow the gender differences in locust control interventions, the project will support women's participation and learning, especially by engaging young women graduates among the staff responsible for treating the nymph centers and strips, by encouraging rural women to take a role in preventing the use of treatment product packaging materials at home, as well as employing them to alert children to keep away from the chemical product treatment and storage areas.

Component 2: Livelihood Protection and Rehabilitation (US$4.75 million, all IDA)

10. **Component 2 is designed to provide a robust protection response that ensures immediate relief to affected farmers and livestock owners and build their resilience to climate-induced locust infestation.** It includes two types of measures: (i) creation of temporary employment opportunities, and (ii) restoration of lost assets. Farmers, beekeepers, livestock owners, and other primary producers and agricultural laborers who have incurred losses as a direct result of the climate-induced desert locust crisis need urgent assistance to reverse the decline in their incomes and meet their production and consumption needs. Component 2 will promote the adoption of climate-smart crop and livestock management practices as well as diversification into livelihood activities that are less dependent on climate and weather variability. Households benefitting under Sub-component 2.1 below will not be eligible to benefit under Sub-component 2.2, and vice versa. The Yemen Social Fund for Development (SFD) has extensive prior experience in implementing the types of activities supported under Component 2 and will be the implementing agency for this component. It has strong capacity and experience spanning over 20 years in undertaking participatory and community-based development activities involving women and men from local communities. This arrangement will ensure the transparency and availability of information to cross-verify the beneficiaries of each sub-component to avoid double-dipping and spread the project's benefits across a greater number and wider range of beneficiaries.

11. **The project will specifically seek to address the women employment and equality gap through the creation of short-term work opportunities under Cash for Work targeted at women, and the inclusion of women livestock breeders, farmers and beekeepers in livelihood restoration activities.** The SFD has a well-developed CfW program (currently also supported by the WB's ECRP project) that includes activities and sub-projects performed by rural women. SFD actively ensure women's participation in these activities by leveraging their vast network across the country, using their credibility and local support to navigate the complex political terrain, engaging gatekeepers and local stakeholders (including community leaders, family members), undertaking community sensitization and awareness, mobilizing women in CfW activities, and carefully selecting the types of public works project activities that are acceptable for women to perform. The project will benefit from this experience to ensure the fullest participation of women farmers and agricultural laborers in CfW activities, while ensuring the necessary protection, community support, and suitable selection of sub projects. In addition, the livelihood restoration interventions will seek to prioritize women especially in small ruminant rearing which is dominated by women. Among rural occupations, the livestock sector is critical as it continues to employ large numbers of women, and because its potential contribution to women's employment and entrepreneurship and food security is extremely valuable in the current context of conflict, famine risk, and decreasing opportunities for women's employment. Further details of the strategies for securing women's active participation in the project will be developed and outlined in the POM.

12. **Sub-component 2.1: Safeguarding food security and protecting human capital for enhanced resilience (US$1.45 million).** The sub-component will provide immediate CfW support to the beneficiaries in the locust-affected areas who are not expected to benefit from the livelihood restoration measures under Sub-component 2.2. The beneficiaries under Sub-component 2.1 are expected to be primarily women (around 80 percent of the total number of beneficiaries), as well as agricultural laborers, tenant farmers and sharecroppers. The CfW program will provide short-term employment opportunities (up to six months) against a monthly cash payment. The CfW program is an ongoing activity under the Bank-financed ECRP,[16] which provides income support to work-capable individuals from poor households through community-level, participatory public works programs. The program relies on a mechanism of self-targeting, through which wages are set below market rates to limit participation to the genuinely poor, and limit leakage and over-subscription. The sub-component will also finance eligible operating costs of SFD.

13. **The main focus on women participants in CfW interventions is motivated by the need to promote gender equality by supporting women's empowerment through livelihood protection, as well as to promote women's roles in enhancing community resilience**. Women's participation in CfW will provide much-needed income support to female farm laborers and small farmers affected by the crisis, while providing opportunities for skills training in a manner that promotes dignity through work. The project will ensure that the assigned work for women will be suitable (in terms of level of physical strength needed, and acceptability among families and communities), conveniently located, and accessible to them. During the identification of CfW sub-projects, participatory and community-based approaches involving women will be undertaken to identify such suitable and accessible activities for the women participants. The project will also explore the possibility of employing a few women to provide support services for other CfW participants such as childcare facilities located close to CfW worksites or cooking and serving of meals. Focusing on women in CfW interventions will help increase women's contributions to household income and food security, which in turn is expected to increase women's decision-making within the household over key matters including intra-household nutrition and dietary diversity, use of savings and transfers, and household expenditures.

14. **The CfW activities would focus on actions that can primarily engage women,** including: (i) clearing affected agricultural land of dead locusts through hiring women as short term laborers; (ii) planting seedlings and hybrid seeds through laborers; (iii) rehabilitation of small water reservoirs to reduce irrigation costs and tackle drought; (iv) collecting locusts (not treated under the control activities) from fields to be used as fertilizers and a source for feeding animals; (v) (re)introducing select pollinators following control measures; (vi) training women in target areas on best health practices and hiring them as community health workers (to integrate COVID-19 response); (vii) providing childcare activities/services near CfW worksites; and (viii) encouraging women to take care of their home gardens, cultivate plants that repel locust from houses, and improve family nutrition. An estimated 1,500 beneficiaries (primarily women) from among the affected small farmers, primary producers, and agricultural laborers will receive short-term CfW opportunities (lasting for a duration of six months per beneficiary).

110. **Sub-Component 2.2: Rehabilitating agricultural and pastoral livelihoods (US$3.3 million).** This sub-component focuses on the longer-term restoration of affected farms and livestock owners through targeted asset restoration support and training to primary producers to help them restart production affected by locusts (in support of food security). The sub-component will prioritize the adoption of climate-smart crop and livestock

[16] The project will seek strong complementarity with ECRP, which has provided around US$376 million in CFW programs since 2016.

practices for reduced greenhouse gas emissions, enhanced resilience, and the implementation of livelihood support/diversification initiatives. Support will be provided for agroecosystem management approaches that enhance resilience of farm and landscape to changes in climate and pests. Climate-resilient grazing will be supported, including legumes and grasses adapted to the local environment to increase biodiversity and landscape resilience. Leguminous species are also beneficial for climate mitigation, fixing atmospheric nitrogen and improving soil fertility. Specific activities will include: (i) provide affected households dependent on agriculture, livestock, and beekeeping with productive assets (farmer packets/kits) to resume activities; and (ii) increase farmer and agricultural household production, productivity, and climate resilience through training and agri-technical assistance to the beneficiaries receiving productive asset support. Farmer kits would build on the good practices and climate-smart practices promoted by the World Bank,[17] giving attention to supporting diversified production and climate resilience and introducing improved varieties. It is estimated that around 5,600 beneficiaries, including 1,450 women, will be reached with the productive asset kits for restoring production of crops, animals, and honey. The kits would include agricultural inputs, as well as emergency fodder and limited animal restocking. The crop and pasture restoration would need to support plantings that would promote the restoration of pollinator populations in the affected area. The sub-component will also finance SFD operating costs.

15. **Selection of beneficiaries under Sub-component 2.2.** All farmers in the locust-affected areas, irrespective of farm size, will be eligible to receive assistance under the project. The locust-affected area will be confirmed by ground-truthing during the first year of the project and through the DLERS platform (to be developed under Component 3) in subsequent years. Given the limited amount of funding available, first the locust-affected areas (district-level) will be prioritized based on: (i) climate vulnerability and the severity of the locust invasion impact; (ii) the severity of the food insecurity—namely, the share of people at IPC Level 4 (Emergency) or above; and (iii) the share of agricultural households (namely, households deriving most of the their income from agricultural activities). At the household level, the beneficiary selection criteria would adopt community-based and participatory approaches to identify the most-affected farmers, livestock owners, and beekeepers to receive assistance. The detailed selection criteria for beneficiaries at the household level in the prioritized districts would be further developed in the POM.

Component 3: Coordination and Early Warning Preparedness (US$5.6 million, all IDA)

16. **Recognizing the cause-effect relationship between climate change and desert locust infestations, the component will strengthen national capacity for early warning and early response, linking these efforts to regional networks** thereby enhancing climate-resilience. Early warning systems will be developed and implemented to support prevention and rapid response to new and existing climate change induced locust infestation, thereby limiting in-country and cross-border spread and intensification. Emphasis will be placed on building capacity to enable rapid and targeted short-term responses and long-term adaptation planning**.**

17. **Sub-component 3.1: Improving the infrastructure and institutional capacity of the national locust control centers (US$4.5 million).** The objective of this component is to establish a network of DLCCs as follows: (i) establish a new Central DLCC in Aden (covering Aden, Lahj, Abyan, Al Dalea, and Taiz) and three regional hub centers in Hodeidah (covering Hodeidah, Hajja and Al Mahweet), Shabwa (covering Shabwa, Marib, AlBida, and AlJaf) and Sieun (covering Hadramout and Almahra), as well as (ii) rehabilitate the infrastructure and operational

[17] The project will collaborate with SAPREP which has built significant experience in providing productive kits to farmers.

capacity of the DLCC in Sanaa (covering Sadaa, Amran and AlJof) which have been severely affected by the ongoing crisis in Yemen. The new centers will be built on lands that belong to the Government of Yemen.

18. **The network of centers would be established in key areas with proximity to locust breeding areas, which would permit rapid deployment of technical and human resources to respond to a locust infestation**. As indicated, each center will cover several governorates. The centers will be furnished and equipped to be fully operational. Investments in climate-proof and energy-efficient infrastructure will be pursued. The centers will consist of suitable storage facilities for pesticides and other control material and equipment, including refrigerated facilities/stores for bio-pesticides. Investments in storage facilities will be designed with the objective (among others) of reducing exposure of products to extreme weather. The standard operating procedures for a desert locust response will be established and agreed in connection with the relevant international and regional organizations. The centers will have a limited number of offices to house the necessary staff and equipment for the information platform described in 3.2 below. A detailed strategy for the operation and maintenance of the DLCC network after the project will be developed at the project outset. The centers will also prepare and maintain the National Desert Locust Control Plan, which will include the measures and procedures for locust surveillance and control, as well as resource requirements and planning and deployment mechanisms. The network of centers will be operationally linked through the analytical and information platform described in 3.2 below, to ensure a coordinated locust response.

19. **Sub-component 3.2: Early warning preparedness (US$1.1 million).** The sub-component will finance the design, testing, and deployment of a DLERS (early response system), based on the development and implementation of early warning systems that support prevention and enable a rapid response to new and existing climate change-induced locust infestations, thereby limiting in-country and cross-border spread and intensification. Emphasis will be placed on building capacity to enable rapid, targeted short-term responses and long-term adaptation planning. The DLERS will be composed of four sub-systems: a Desert Locust Early Warning System (DLWS), Desert Locust Operation System (DLOS), Desert Locust On-Farm Impact Monitoring System (DLOFIMS), and Pesticide Stock Management System (PSMS).[18] This integrated system will have the most up-to-date information to trigger informed desert locust ground and/or aerial control operations for swarm control. The system would also enable response mechanisms for other disasters and adverse climate events by monitoring metrological data. The sub-component will also finance the establishment and testing of the National Desert Locust Outbreak Emergency Risk Communication Plan. Both the system and the communication plan will be housed at the CDLCC, with linkages to the regional offices.

20. **This integrated system is based on an application installed on mobile devices to enter field data on the locust situation** and to monitor and maintain equipment, logistics, and the quantity and quality of pesticide stocks. The mobile devices are equipped with GPS, camera, internet connection, standard digital forms for collecting data

[18]"Desert Locust Early Response System" means the Recipient's database on existing aerial and control equipment, trained staff, logistic and pesticides/bio pesticides to trigger a timely control operation to stop locust invasion. "Desert Locust Early Warning System" means a system that is intended to provide the most recent information on first observation of locust larvae, adults, specific density, geographical area and their potential threat to trigger an early response. This is expected to be the RAMSES GIS that will be enhanced. "Desert Locust Operation System" means a system that is intended to provide up-to-date information on existing logistics, control, protection equipment and trained staff to undertake survey and control operations, which will be used extensively during control campaigns. "Desert Locust On-Farm Impact Monitoring System" means a system that will monitor crops and pastures in the agricultural areas and provide an early warning of any negative impacts, as well as provide information for impact assessment. The "Pesticide Stock Management System" is intended to provide up-to-date information on quantities, qualities (shelf life, packaging, etc.), storage conditions, and a national map of stores of pesticide products.

on surveillance sites (habitat conditions, observed breeding, egg-laying areas, and the movement of developing nymphs, hopper bands, and adult locust swarms), pesticide storage and equipment for pesticide application and surveys (pesticide stores, equipment, logistics, and pesticide products). Data entered in the mobile devices will be instantly sent to the CDLCC, equipped with the custom RAMSES Geographic Information System application that is used in every locust-affected country for data analysis, locust infestation vulnerability mapping, and reporting. Selected personnel from the five affected regions will be trained to use the system. In addition to the central server in Aden, the DLERS will be linked to FAO to share up-to-date information on surveillance, equipment, and expertise with other countries in East Africa and MENA. FAO will also receive periodic reports containing (among other information): data on desert locust early warning, quantities and qualities of pesticide application equipment, pesticide stocks and logistics, geographical distribution, storage conditions, and photos of stocks. Periodic reports are produced and disseminated to all stockholders for information and appropriate action.

21. **The DLCC network will aim to develop regional collaboration.** In addition to being part of the regional network that provides regular updates and information on the desert locust situation to FAO, the DLCC network will also benefit from collaboration with the other countries in East Africa and MENA that benefit from the Emergency Desert Locust Response Program. In addition to the four first-mover countries (Djibouti, Ethiopia, Kenya, and Uganda), Somalia is joining the Program shortly, and South Sudan, Tanzania, Eritrea, and possibly other countries are anticipated to follow. The MPA is expected to provide a number of opportunities for participating countries to engage, including collaboration, communication, and information and data sharing networks.

Component 4: Project Management and Knowledge Management (US$2.90 million, all IDA)

22. **Project Management (US$2.40 million).** The component would cover the FAO costs associated with project management, such as implementation support, FM, procurement, environmental and social aspects, as well as M&E. The component will also finance a TPM mechanism and establishment and maintenance of the GRM.

23. **Component 4 also provides support for awareness raising, communication, and knowledge management activities (US$0.15 million), and for response to COVID-19 (US$0.35 million)**. It will help promote increased community awareness about the impacts of desert locust swarms and the response efforts to support communities before, during, and after locust invasions. The national and local governments, as well as communities across the affected areas, will need information about combatting and managing swarms, how and when pesticides can be used safely and effectively, and—when their area has been treated with pesticides—how to safely navigate the effects on plants, livestock, and water systems. A public awareness campaign will be implemented to keep the public informed about possible environmental and health effects of insecticides and empty pesticide containers before, during, and after locust control operations. The campaign will be delivered through multiple channels to ensure it will reach women and men equally. Monitoring and building environmental and climate literacy will also help increase outreach of reliable climate-smart pest management knowledge. It is expected that at least 75,000 beneficiaries will be reached through the public awareness campaigns.

24. **Integration of COVID-19 response.** Like all countries, Yemen faces the alarming threats accompanying the COVID-19 pandemic, but concerns related to the pandemic are particularly severe for Yemen, because it is a fragile country with very weak health systems and high illiteracy levels, especially among women (65 percent) compared to men (27 percent). In addition, less than 25 percent[19] of the population has internet access, and public electricity

[19] Internet World Stats - *https://www.internetworldstats.com/me/ye.htm*

is almost non-existent in many parts of the country. It is essential for the proposed project to integrate preventive measures, such as raising widespread awareness of the severity of the virus among rural households. The project will use its resources, such as both female and male field consultants, to integrate awareness-raising measures against COVID-19 outbreak in the training and awareness campaigns planned for beneficiaries. The awareness raising and training events will follow precautionary measures on workshop/training protocols, as well as enforce and maintain adequate distancing during control, distribution, training, payment, and other project activities. The project will work with local communities, consultants and beneficiaries to reach the largest numbers of households with awareness and hygiene materials (such as masks, hand sanitizers, and other relevant consumables). It will be tailored in a way that will equally reach women and men and resonate with their different roles and behavior at home and in society. The decision on which hygiene materials to procure will be made based on the results achieved and gaps identified in coordination with the COVID-19 health emergency project in Yemen.

ANNEX 3: FIDUCIARY ASPECTS OF THE PROJECT

COUNTRY: Yemen, Republic of
Enhancing Preparedness and Capacity for Desert Locust Response in Yemen

Financial Management

1. **FM Arrangements**: The project will use the FM arrangements implemented by FAO under SAPREP, taking into consideration the mitigation measures agreed with the Bank during the implementation support missions.

2. **Accounting and financial reporting**: FAO will: (i) maintain an FM system, including records and accounts, adequate to reflect the transactions related to the activities, in accordance with the requirements of the UN Financial Regulations; (ii) maintain a separate ledger account (Grant Control Account) in their books to record the financial transactions of this project; and (iii) prepare, on a quarterly basis, unaudited IFRs, in accordance with accounting standards established pursuant to the UN Financial Regulations and in the format agreed with the Bank during negotiation of this project, adequate to reflect the expenditures related to the project. The IFRs will be provided to the World Bank no later than 45 days after the end of the quarter.

3. **SFD is a main implementing partner of FAO under the project**. The accounting and reporting system of the SFD needs to be adjusted to ensure advances to the different SFD branches are not recorded or reported as expenditures. Currently this process is being manually implemented by the SFD team. FAO will need to work with SFD to ensure that their system is updated to address this issue. Until this happens, FAO will need to verify the numbers reported by SFD to ensure no advances are reported as expenditures.

4. **Internal controls**: To ensure proper controls are applied over the use of funds, FAO will ensure the following:

- The FAO finance team located in the field is comprised of sufficient qualified staff to review and properly maintain and file all original supporting documents of the project. The finance team will also ensure that proper controls are in place over the use of funds and that payments are made for eligible expenditures with consideration to economy and efficiency.
- The compliance team of FAO will assist their finance team to ensure arrangements are in place for funds to reach the legitimate beneficiaries.
- FAO finance and compliance teams will ensure proper controls are in place for management and recording of inventory. In addition, they will ensure that proper measures are in place to prevent double-dipping of activities.
- Adequate financial and technical reviews are conducted regularly by the TPMs and FAO finance and/or M&E teams.
- In case of payments to individuals in return for goods or services rendered, FAO will use mobile banking, payment agencies or other methods that can provide a high level of assurance that funds reached the intended beneficiaries.
- FAO will ensure that IFRs are properly reviewed and approved before submission to the Bank. In addition, IFR reported expenditures will include no advances other than those agreed with the Bank and disclosed in the IFR.

5. **Flow of funds**: The project will use the IFR method for the flow of funds to the FAO. The form and substance of the IFR report was agreed with FAO during negotiation. For this project, FAO will use the Direct Implementation modality as much as possible, to mitigate any risk associated with advances to implementing partners, by which funds will flow from the Bank to FAO and then to the ultimate beneficiaries/recipients without going through intermediary accounts.

6. Use of advances to implementing partners will be limited. In cases when advances are used, FAO will ensure proper controls are in place, such as: (i) the advances will not exceed certain thresholds; (ii) no new advances are released to implementing agents unless previous advances are fully settled (in cases of partial settlement, additional funds can be provided within the limit of the partial settlements made); (iii) all original supporting documents for expenditures incurred under the project will be maintained by FAO; and (iv) all advances have proper audit trails.

7. FAO will exert all efforts to ensure that funds reach the ultimate beneficiaries with sufficient evidence provided. FAO will ensure that no funds are transferred to the central government or personal accounts of individuals unless those individuals are the legitimate recipients of cash for work or services rendered.

8. FAO will work with SFD and other implementing partners to ensure accurate lists of CfW beneficiaries are developed for reporting of results. Such lists will be made available to TPMs and auditors for selection of samples for reviews.

9. **Audit**: The project will be subject to the audit arrangements applicable to FAO as set out in the UN's Financial Regulations. FAO will make the audited statements and accompanying reports available to the World Bank. FAO will retain all records evidencing all expenditures in respect of which withdrawals of proceeds were made.

10. The Bank may require additional audits of project activities in accordance with TORs agreed between the Bank and FAO.

11. **Supervision Plan:** The Bank will carry out quarterly supervision of project activities. The supervision will include desk work, which will incorporate the review of financial reports provided by FAO and TPMA, and field visits to review samples of expenditures and control procedures applied.

Procurement Arrangements

12. The project aims to finance the procurement of essential equipment, vehicles, and capacity building expertise to enable improved locust monitoring and control in Yemen, as well as to finance innovative approaches to surveillance such as the use of satellite maps, GPS enabled cameras, and meta-data analysis to better pinpoint outbreaks and aid in damage assessment and response programming. It is expected that mostly bio-pesticides will be financed under Sub-component 1.2 to lessen the impact on honey producers; pesticides will be deployed using ULV spraying. The project will also finance a public awareness campaign to inform the public about possible environmental and health effects of insecticides before, during, and after locust control operations. Furthermore, the project will finance the procurement of productive assets (farmer packets/kits) to help affected households to resume their activities, and it will finance the establishment of new centers for desert locust control in addition to rehabilitating existing centers. Finally, the project will finance implementation expenses, including M&E of project implementation and the establishment and maintenance of the GRM.

13. The FAO will follow its own procurement procedures under Alternative Procurement Arrangements to procure the required supplies, including storage and distribution to the final destination. FAO will follow their own procurement rules and procedures. No contract will be subject to World Bank prior review.

14. **Alternative Procurement Arrangements**: FAO will apply its own procurement procedures as Alternative Procurement Arrangements found acceptable to the Bank under other agreements and allowed by the Procurement Framework Policy Section III. F. This procurement arrangement is considered a fit-for purpose arrangement for several reasons:

- FAO has a strong presence on the ground and has proven that it is well equipped to work in conflict and post conflict areas in Yemen and has the capacity to reach out to the most affected beneficiaries.
- The procurement activities proposed under this project are within the mandate of FAO. It uses the same implementation mechanism applied in SAPREP, as FAO has in place fast-track procedures for countries in level 3 emergencies such as Yemen where there is a dedicated country Emergency Support Team to ensure that the required technical and operational support are provided on timely manner.
- The implementation arrangement is flexible and may rely on the capacity of SFD, the local partner, for activities under a threshold as assessed and prescribed by FAO in coordination with the Bank.
- FAO has preparedness and mobilization mechanisms in place, which enable optimal emergency procurement.
- FAO is well informed about the market response locally and internationally, has a strong presence on the ground, and has the capacity to work in conflict and post-conflict areas in Yemen.
- FAOs' procurement arrangements provide reasonable assurance that World Bank financing will be used for the intended purpose.

15. FAO will be responsible for: (i) implementing the procurement plan as agreed with the Bank; (ii) hiring the TPM, among other activities; (iii) preparing a quarterly report on the progress of procurement and distribution as well as updates on the implementation of the ESCP; (iv) reporting on the indicators in the results framework; (v) providing other relevant performance information to the World Bank as requested; and (vi) engaging a firm(s) to conduct an audit of project activities as part of end-of-project M&E.

16. Overall procurement risk is rated High due to the security situation in Yemen, composition of the marketplace (limited competition and availability of service delivery), and the nature of project activities, which are not complex but might be impacted by the situation on the ground in the conflict or post-conflict zones.

17. There is a risk of procurement delays due to unexpected events (if clashes break out between rival groups, for instance) in addition to difficulties with logistics (mainly in importation, storage, and distribution) arising from the need to obtain required security clearances from several political parties. This risk will be mitigated through advance coordination by FAO with the different political parties to ensure smooth implementation/delivery. Another foreseen risk is delays occasioned by FAO internal processes and approvals. This risk would be mitigated by advance planning and delegation of authority at the right levels as well as a commitment by FAO to comply with agreed timelines. In addition, there is a risk related to the government's capacity to monitor and control receipt, storage, and distribution of the procured goods; FAO will be responsible for storage, distribution, and delivery of the supplies to the final destination, as explained in the POM. Discussions will be held with FAO to adopt smart fiduciary tools, such as Internet of Things (IoT) and Block Chain, which can track goods to their final destination. TPM will also include checking the availability of supplies at final destinations. Moreover, there is a

foreseen risk related to outbreaks of COVID-19 that may delay implementation/delivery.

18. **Project Procurement Strategy for Development (PPSD) and Systematic Tracking of Exchanges in Procurement (STEP).** Since this is an emergency operation, preparation of the PPSD is deferred to the implementation phase. The use of STEP is not recommended under this project due to the unique nature of the project arrangements. In addition, there will be no contract subject to prior review and the implementing agency (FAO) has its own tracking system and could generate procurement progress reports as required.

19. **Procurement Management.** For the purposes of this project, FAO will ensure that procurement unit is staffed with one qualified international and at least one qualified national procurement officer to conduct day-to-day procurement functions.

ANNEX 4: GREENHOUSE GAS ACCOUNTING ANALYSIS

COUNTRY: Yemen, Republic of
Enhancing Preparedness and Capacity for Desert Locust Response in Yemen

Background and Methodology

1. **Motivation.** The World Bank Environment Strategy (2012) adopted a corporate mandate to account for GHG emissions for investment lending. The quantification of GHG emissions is an important step in managing and ultimately reducing emissions, as it provides an understanding of a project's GHG mitigation potential and can support sectoral strategies to promote low-carbon development.

2. **Accounting methodology**. The EX-ACT tool developed by FAO[20] is used to estimate the impact of agricultural investment lending on GHG emissions and carbon sequestration in the project area. EX-ACT is a land-based appraisal system that allows the assessment of a project's net carbon-balance. The latter refers to the net balance of tons of CO_2 equivalent (tCO_2e) of GHGs that were emitted, or carbon sequestered, as a result of project interventions, compared to a "without project" scenario.

Application of EX-ACT

3. **Project boundaries.** The proposed intervention aims to implement integrated, comprehensive, and coordinated efforts to effectively control the desert locust invasion, reduce the accompanying damages, and compensate for the losses, thereby enhancing the livelihoods and food security of farming and pastoralist communities and increasing climate resilience in the agriculture sector.

4. **Data source.** Data is provided by the country team based on expert estimates.

5. **Basic assumptions.** Yemen has a warm temperate climate with a dry moisture regime. The dominant soil type is High Activity Clay (HAC) soils. The implementation phase is 3 years and the capitalization phase is assumed to be 12 years. The "without project scenario" is assumed not to differ from the "initial scenario." The analysis further assumes the dynamics of change to be linear over the duration of the project.

6. **Crop production**. The project will promote different types of good and climate-smart agricultural technologies such as improved agronomic practices manure management (30 percent of the total area). These improved technologies will be introduced to 20 782 ha of perennial crops. The good and climate-smart agronomic practices would focus on soil and water conservation, intercropping (cereals/legumes) and crop rotation; improved seeds (certified, drought-tolerant, early maturing seeds), crop protection - a critical practice in enhancing yields and quality; integrated pest management (IPM) practices, post-harvest management as well as community/farm level seed conservation methods.

7. **Grassland management.** The project is expected to improve the degradation levels for 2,500 ha of grasslands through improved input application (seeds) and 82,718 ha mixed area with grasslands.

[20] See http://www.fao.org/tc/exact/ex-act-home/en/.

8. **Livestock management.** The project will implement improved good and climate-smart management activities to a total of 6,211,200 heads of livestock, including cattle (dairy and other), goats, sheep and camels. The animal husbandry would focus on feeding practices with fodder and feed concentrates, supplementary feeding with mineral salts; housing, animal health, pasture management, dairy hygiene and processing and other areas of that would be identified by the beneficiaries.

9. **Inputs.** The project will implement control operations to protect crops from locust infestation, including an increase in the application of insecticides. Fertilizer and fungicide inputs are also expected to increase significantly.

Results

10. Net carbon balance. The net carbon balance quantifies GHGs emitted or sequestered as a result of the project compared to the without-project scenario. Over the duration of 15 years (implementation phase 3 years, capitalization 12 years), the project constitutes a carbon sink of -567,087 tCO_2e. Per hectare, the project will sequester -28.2 tCO_2e which is -0.4 tCO_2e per year (Table 6). At a conservative carbon price (US$40/t) and growth rate of 2.25% per year, the value of the reduced GHG emissions under the Project is US$26.63 million.

Table 1: Results of the Ex-Ante GHG Analysis (tCO_2e) for the Yemen Desert Locust Response Project

Project Name	*Yemen Locust*		**Climate: Tropical dry**
Continent	*Middle East*		**Dominant Regional Soil Type: HAC Soils**
Components of the project	**Gross fluxes**		**Balance**
	Without	**With**	
	All GHG in tCO2eq Positive = source / negative = sink		
Annual crops through improved practices	0	-186, 570	**-186,570**
Improved grassland management	311,185	-61,133	**-372,318**
Livestock management through improved management practices	45,146,754	45,136,579	**-10,074**
Increased inputs application in response to locust infestation	0	1,876	**1,876**
Total	45,457,839	44,890,752	**-567,087**
Per hectare	428.8	423.5	**-5.3**
Per hectare per year	28.6	28.2	**-0.4**

10. **Carbon sources and sinks.** The main carbon source of the project is from livestock management. Improved management of grassland and improved agricultural technologies and practices will lead to a carbon sink for the project (Figure 2).

Figure 2: GHG Emissions and Carbon Sequestration (tCO_2e), Net Carbon Balance per Project Activity and for the Entire Project, and Share of Emission Sources and Carbon Sinks (tCO_2e) for the Entire Project