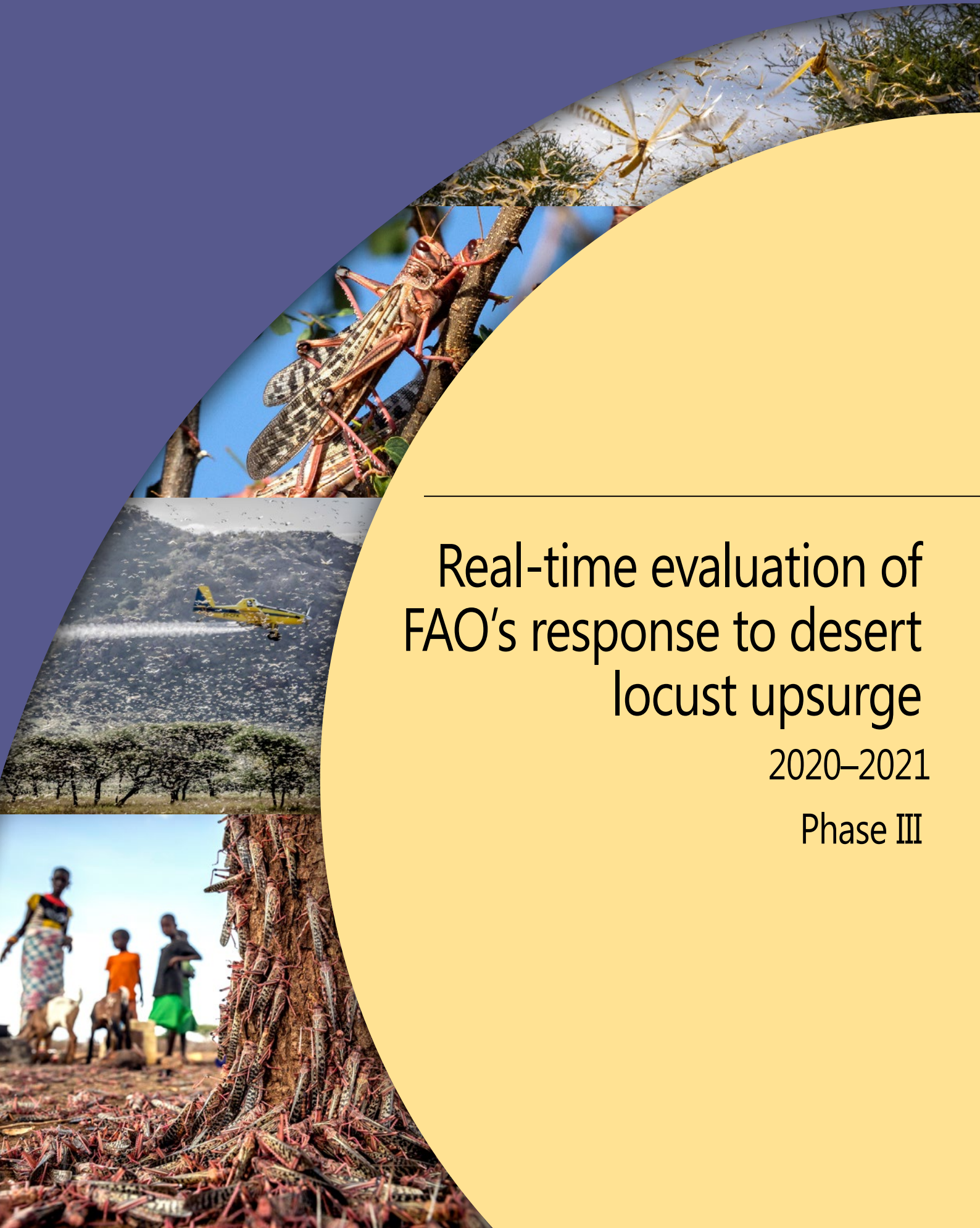




Food and Agriculture  
Organization of the  
United Nations

Programme Evaluation Series  
04/2022



# Real-time evaluation of FAO's response to desert locust upsurge

2020–2021

Phase III

**Programme Evaluation Series  
04/2022**

**Real-time evaluation of FAO's response to  
the desert locust upsurge  
2020–2021  
Phase III**

**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
Rome, 2022**

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## Abstract

Over the course of 2020–2021, the world witnessed the most devastating desert locust upsurge of the past 25 years, with several generations of desert locust breeding in parts of the Near East, the Greater Horn of Africa and Southwest Asia. The upsurge posed an unprecedented risk to livelihoods and food security in some of the most food insecure countries in the world. The Food and Agriculture Organization of the United Nations (FAO) and its partners mobilized more than USD 243 million since January 2020. The response included three key pillars: i) curbing the spread of desert locusts (including surveillance); ii) safeguarding livelihoods and promoting recovery; and iii) coordination and preparedness of the rapid surge support. In this context, the Director-General requested that the FAO Office of Evaluation (OED) conduct a real-time evaluation, carried out across three phases. Each phase was designed to cover specific aspects of the response. Phase I looked at the first six months of the scale-up response, assessing the strategic leadership role played by FAO during that period, and its coordination with donors, locust-affected governments, regional locust commissions, non-governmental organizations (NGOs) and other actors involved in the response. Phase II assessed the results of the response including both locust survey and control operations and livelihood protection activities. This report presents Phase III, which focused on developing recommendations to improve preparedness for and response to future upsurges, collected through a consultative process of key informant interview and online submissions targeting critical stakeholders involved in the desert locust response 2020–2021 from a range of organisations, including: affected country ministries of agriculture and departments of plant protection; regional organisations involved in locust control and livelihoods; partners from NGOs, the private sector and research institutes; FAO; and donors to the response.

Eight priority areas for recommendations emerged from this process, with distinct recommendations being made across each one: i) procurement and positioning; ii) training of local locust response teams; iii) embedding sustainable national locust control capacity; iv) optimizing the regional architecture for locust response; v) pesticide selection and stock management; vi) data collection, analysis and dissemination; vii) livelihoods support; viii) innovation and learning. For each priority area, the evaluation has made a range of recommendations targeting either FAO headquarters, donors and partners, or FAO country offices.



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## **Abbreviations and acronyms**

|         |  |
|---------|--|
| CRC     | Commission for Controlling the Desert Locust in the Central Region |
| DLCO-EA | Desert Locust Control Organization for Eastern Africa              |
| DLIS    | Desert Locust Information Service                                  |
| FAO     | Food and Agriculture Organization of the United Nations            |
| NGO     | Non-governmental organization                                      |
| RTE     | Real-time evaluation   |
| RDLA    | Regional Desert Locust Alliance                                    |

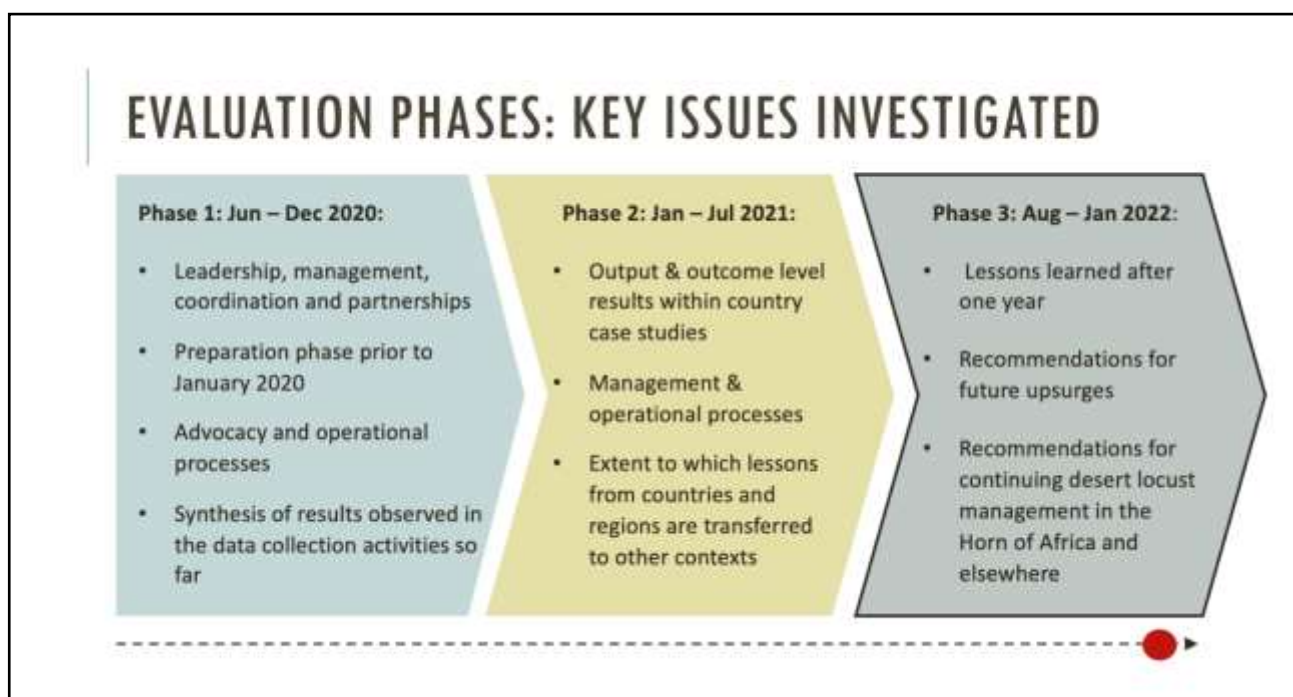




# 1. Introduction

1. Over the course of 2020–2021, the world witnessed the most devastating desert locust upsurge of the past 25 years, with several generations of desert locust breeding in parts of the Near East, the Greater Horn of Africa and Southwest Asia. The upsurge posed an unprecedented risk to livelihoods and food security in some of the most food insecure countries in the world. Over the past few years, consecutive shocks, including poor rainfall, flooding, macroeconomic crises and armed conflict have contributed to a significant level of vulnerability across the countries most affected by the desert locusts. In 2020, this was exacerbated by the impacts of the COVID-19 pandemic, and the global response to it. In May 2021, 36.6 million people in locust-affected countries face crisis-level food insecurity (IPC 3+).
2. With a new generation of desert locusts breeding in Northeast Africa and Yemen, the upsurge continued in the Horn of Africa and Yemen through 2021. Large-scale ground and aerial control operations continued throughout the region with an emphasis on control activities in Ethiopia, Somalia and Yemen to reduce the potential of swarm formation that could spread locust populations more widely. This continued to be a rapidly changing situation and the Food and Agriculture Organization of the United Nations (FAO) had a unique mandate to respond.
3. FAO and its partners mobilized more than USD 243 million since January 2020 (FAO, 2021). The response included three key pillars: i) curbing the spread of desert locusts (including surveillance); ii) safeguarding livelihoods and promoting recovery; and iii) coordination and preparedness of the rapid surge support.
4. In this context, the FAO Office of Evaluation (OED) was requested to conduct a real-time evaluation (RTE), conducted across three phases. Each phase covered specific aspects of the response, as follows:

**Figure 1. Real-time evaluation phases**



Source: Developed by the evaluation team.



## **2. Phase III purpose and scope**

### **2.1 Evaluation purpose**

5. This RTE has two dimensions:
  - i. mutual accountability: providing an independent assessment of what FAO and its partner organizations have achieved since January 2020, including timeliness and sufficiency of resourcing, efficacy of the operations, and the environmental impacts of control operations; and
  - ii. learning for FAO and all partners and stakeholders on what has worked and what has not worked, and what should be done to adjust current and future operations.
6. Both of these objectives concern FAO activities, as well as activities by FAO partners in the desert locust response. Indeed, a wide range of actors contribute vital parts of the locust response, including donors, regional locust commissions, national governments, United Nations (UN) agencies, non-governmental organizations (NGOs) and research institutes. For this reason, the evaluation is taking a system-wide lens when assessing the response. But it should be noted that the evaluation scope is limited to partner activities to the extent that they are part and parcel of FAO's activities in response to the desert locust upsurge. This principle guided methodological design and the selection and focus of evaluation questions.
7. Appendix 2 to this document presents the full evaluation matrix, which includes evaluation questions, sub-questions, data collection tools and the phases of the RTE process in which each question was addressed.
8. The aim of Phase III of the RTE was to provide recommendations to improve preparedness for and responses to future upsurges of the desert locust in the Horn of Africa and Yemen. As the experience of 2020–2021 shows, response to desert locust upsurges of this scale is a truly multi-actor endeavour. FAO has a core mandate and technical capacity in such response, most notably in the area of data collection, analysis and forecasting and supporting its member countries in the management of locust crises. Nevertheless, locust response is a multi-actor endeavour, with a wide range of actors who were required to act in concert during the response to the 2020–2021 upsurge in the Horn of Africa, Yemen and Southwest Asia. Such actors include, among others, the Commission for Controlling the Desert Locust in the Central Region (CRC), individual locust scouts and control teams on the ground and in the air, farmers and rural communities in locust-hit areas, national and provincial authorities in locust-affected countries, NGOs and community groups including both local and international organisations, private sector actors including suppliers of equipment, pesticide and pesticide stock management apparatus, international donors and research institutes involved in innovation and learning. For this reason, Phase III was designed to convene the views and perspectives of a wide range of response actors, with the hope that this will encourage the system as a whole to plan for and respond more effectively to future upsurges, outbreaks or plagues.

### **2.2 Phase III scope**

9. In line with the evaluation purpose outlined above, the evaluation team designed a consultative approach to gathering recommendations for improving preparedness and response from the community of actors involved in desert locust response. The focus of the consultations was fixed on gathering, testing and triangulating recommended changes to better prepare for future upsurges. The consultations did not aim to provide an evaluative assessment of what took place

over 2020–2021, as this was covered during Phases I and II of the desert locust RTE. As such, Phase III prioritised learning over accountability.

10. Consultations were guided by both the stakeholder's own area of expertise (e.g. procurement, field scout training and capacity building, or data analysis) and the major findings and recommendations arising from Phases I and II of the evaluation. As such, consultations were grouped around the following areas, with specific sets of questions designed for particular stakeholders according to their respective area of expertise:
  - i. Procurement and positioning: how can we improve the procurement and pre-positioning of pesticides and control equipment for future desert locust upsurges?
  - ii. Training: how can we improve the consistency, quality and efficiency of training at national level, particularly on environment, health and safety?
  - iii. National locust control capacity: how can we foster more sustainable surveillance and control capacities at national level?
  - iv. Regional architecture: how can we improve the regional architecture for desert locust response in the Horn of Africa?
  - v. Pesticides: what lessons have we learned about the use and applicability of different pesticides and biopesticides in different contexts during this desert locust response?
  - vi. Data: what could be improved in the data collection system for monitoring, early warning and forecasting?
  - vii. Livelihoods support: how could the livelihood protection response be improved in future locust upsurges in the Horn of Africa?
  - viii. Innovation and learning: can innovation and learning be improved for future locust upsurges?

These areas were drawn out from those areas of recommendations made during Phase I and II that have the clearest applicability to future upsurges.

## **2.3 Phase III method**

### **2.3.1 Consultation process**

11. The approach to consultation was designed in line with the information needs arising from the eight areas of investigation outlined above, as well as with the initial stakeholder assessment conducted for the concept note of the RTE process.
12. Given the prioritisation of learning over accountability, and the long-term nature of the recommendations being developed during Phase III, the evaluators emphasised open-ended enquiry wherever possible in the development of consultation tools. Whilst the eight lines of enquiry were used to guide discussions with key stakeholders, participants were encouraged to think as widely as possible about potential solutions to the problems encountered during 2020–2021 and to use as much “blue-sky thinking” as possible when forming recommendations for change in the future.
13. The evaluators used key-informant interviews as the lynchpin of the consultation process. Single person interviews were preferred over group discussions, to give time for the evaluator and the interviewee to open-up the issues widely enough for long-term recommendations to be developed. A co-design approach to recommendations was fostered, with the evaluators acting primarily as facilitators to the participants thinking, rather than data collectors in the traditional evaluative style.

14. In addition to key-informant interviews, the evaluators also provided an online form for stakeholder to use as a whiteboard for developing more nuanced recommendations. This space was designed to respond to the difficulty of some of the questions being asked in the key informant interviews. By providing the interviewees with an additional online and confidential space to provide further thinking, the evaluators sought to mitigate the challenge faced by many participants who didn't have the time and space to fully reflect during the interviews themselves.
15. A total of 50 stakeholders were interviewed for Phase III. In order to encourage a broad-based investigation of recommendations reflecting the multiplicity of actors involved in locust response, interview targets were sought across the following 12 key stakeholder categories:

| #  | Stakeholder category  |
|----|---|
| 1  | National ministries of agriculture  |
| 2  | Trainers and technical assistance experts provided by FAO to locust-affected countries                                |
| 3  | Aerial contractors (including fixed and rotary wing providers)  |
| 4  | Innovation partners   |
| 5  | Regional Desert Locust Alliance (RDLA) members (NGOs)   |
| 6  | Regional organizations operating in the Horn of Africa and Yemen on desert locust response and livelihoods protection |
| 7  | Members of the Locust Pesticide Reference Group (LPRG)  |
| 8  | FAO Resilience Hub in East Africa   |
| 9  | FAO Plant Production and Protection Division (NSP)  |
| 10 | FAO Office of Emergencies and Resilience (OER)  |
| 11 | FAO Procurement Division (CSLP)   |
| 12 | Donors  |

16. The full list of interviewees is presented in Appendix 1.
17. The recommendations gathered through these consultations were synthesized across the evaluation team to produce the recommendations presented in section 3 of this report.

## 2.4 Limitations

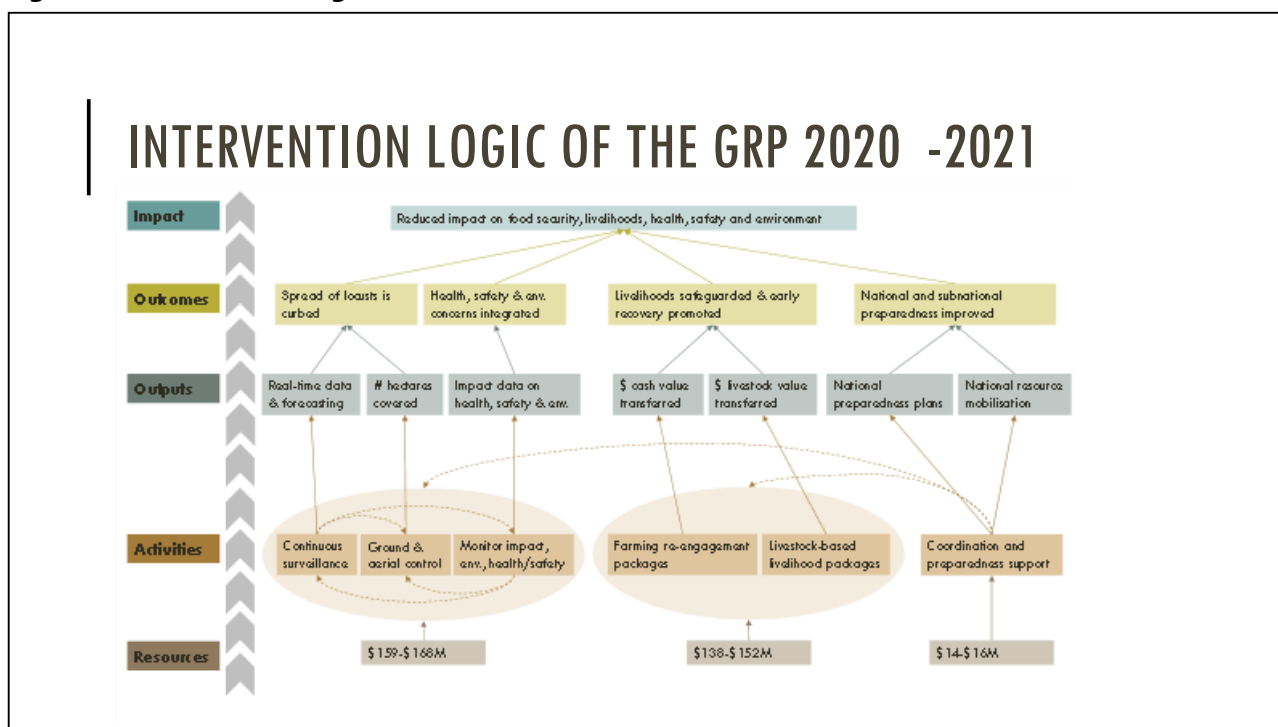
18. The major limitations faced during Phase III activities were linked to the remote consultation approach deployed. Travel restrictions arising from the COVID-19 pandemic meant that all key informant interviews had to be conducted remotely via Zoom. Given the focus on facilitative approaches to co-creation of recommendations, remote online tools were considered sub-optimal compared to face-to-face consultation and feedback. Moreover, the use of such tools meant that meaningful discussions with farmers and community groups in rural areas could not be conducted, removing their perspectives from the direct sample. In mitigation of this effect, discussions were included with stakeholders who have recent access with rural populations, including staff of the ministries of agriculture, aerial contractors and trainers of country-based locust scouts and control teams. Where possible, the views of affected persons have been considered in the development of recommendations below.



### 3. Summary findings of Phases I and II

19. The evaluation phases I and II highlighted the significant contributions made by FAO across full spectrum of preparation, surveillance and control of locust swarms and livelihood protection in the Horn of Africa and Southwest Asia. The logic of FAO's intervention covered three broad pillars including i) locust survey and control, ii) livelihood protection and iii) coordination and preparedness support:

**Figure 2: Intervention Logic of the GRP 2020–2021**



Source: Developed by the evaluation team.

20. The evaluation Phases I and II demonstrated that FAO contributed to the reduction of swarm and hopper band sizes and damage to crops and livelihoods assets in the Horn of Africa and Southwest Asia; and helped to guard against the spread of locust movements into the Sahel. Field studies in Kenya, Somalia (Puntland and Somaliland), Ethiopia, Sudan and Pakistan all highlighted the contributions of FAO's activities to swarm control through direct and indirect support to national locust survey and control campaigns, as well as design and delivery of livelihood protection packages to locust-affected communities.
21. FAO's support was generally well-tailored to national capacities and food security cases despite the challenges caused by political contexts in some countries. FAO also performed very well on the coordination of a highly complex and multi-actors response, building and maintaining good partnerships, including with foundations and private actors, despite the uniquely challenging external context. Some issues were observed in pesticides selection by individual countries, and procurement processes hampered FAO's effort to ensure timely supply of equipment and pesticides affecting the effectiveness of control operations. The response utilized a number of innovations in survey and control approaches, remote sensing and modelling, combined with good information sharing between countries; however, room for improvement was identified regarding the strategic approach to embedding innovation and learning across contexts.



22. Several areas for improvement in the preparedness for, and effective response to, future upsurges were identified during the process of Phases I and II. These areas formed the principal areas of investigation in Phase III, as outlined below.

#### **4. Preparing for and responding to future upsurges: issues for attention and recommendations**

23. The following recommendations are drawn from the consultation activities outlined in Section 2, above, and are indexed against the eight principal lines of enquiry outlined therein, namely:
- i. procurement and positioning;
  - ii. training;
  - iii. national locust control capacity;
  - iv. regional architecture;
  - v. pesticides;
  - vi. data;
  - vii. livelihoods support; and
  - viii. innovation and learning.
24. For each priority area, the evaluators have made a range of recommendations targeting either FAO headquarters, donors and partners, or FAO country offices. Notably, whilst several recommendations relate to country capacity, no direct recommendations have been made to national governments of locust-affected countries, in line with the scope and mandate of this real-time evaluation. Nevertheless, where relevant, the evaluators have made recommendations to FAO country offices regarding the areas for engagement with national governments to improve preparedness for future upsurges.

##### **PRIORITY AREA 1 – PROCUREMENT AND PRE-POSITIONING**

25. Consultations carried out in the course of Phase III indicated widespread recognition that there remains a problem with the process of ordering, procuring and supplying pesticides and essential equipment for desert locust upsurges. The speed and dynamic nature of locust emergencies, combined with the limited supplier pool and supply chain constraints, worsened by the COVID-19 pandemic, negatively affected the procurement system in the 2020–2021 upsurge.
26. FAO rightly responded to the scale of the upsurge in early 2020 by declaring an L3 emergency and opening up the streamlined L3 procurement system, which has the potential to greatly reduce procurement lead-times, allowing for direct procurement in certain conditions, while ensuring quality is maintained and due process is followed. Nevertheless, both FAO and external stakeholders recognised that locust emergencies add a level of dynamic urgency that surpassed and further compacted the impacts of other shock categories (natural hazards, protracted crisis and other food chain crisis emergencies). Critical factors highlighted here include the rapid movement of locust swarms over large distances, the crossing of international borders and political repercussions that can follow from that, the speed of swarm growth and the complex interaction with environmental conditions and agricultural cycles. Such factors make the challenge of supplying the right pesticides and control equipment in the right quantities to the right locations at the right time especially challenging.
27. As noted in Phase II of this evaluation, the problems encountered in 2020–2021 spread across the procurement cycle, extending well beyond areas that are the technical domain of FAO's procurement units themselves. Such problems included the preparation of procurement requests, the level of technical specification both provided and required, the pre-positioning of non-

perishable items and the triangulation of pesticide stocks.<sup>1</sup> These are, in truth, system-wide challenges, which can only be addressed through a concerted dialogue which reaches across FAO procurement, emergency and technical divisions, as well as locust-affected countries, regional locust commissions, donors and other partners.

**Recommendation 1.** FAO should conduct a learning exercise regarding procurement for future desert locust upsurges.

28. Given the breadth of the procurement challenges noted – from supply-side constraints to raising of procurement requests and the efficiency of the procurement process – it will not be possible to make progress without a full and proper lessons learning exercise being undertaken, with a scope restricted to the issues surrounding procurement specifically for the desert locust upsurge 2020–2021. Such an exercise should encourage a dialogue across the full range of FAO stakeholders in procurement for desert locust upsurges. It should include potential solutions that entail investment in preparedness before the next upsurge arises. Solutions already identified during the Phase III consultations include the following items:

**Recommendation 1a.** Drawing up and regularly reviewing/updating pre-approved supplier lists for desert-locust specific items.

29. In the event of a future L3 declaration around a locust response, these lists should be used for direct procurement rather than open tender. Such lists should include local and global suppliers of eLocust3 equipment, drones for both survey and control, ultra low volume (ULV) sprayers and spare parts, ULV bio-pesticides and desert locust aircraft for survey and spraying, among other items. Some of these items will require purchase (e.g. ULV sprayers) while other should be leased (e.g. aircraft). The supplier lists should therefore cover both contractors and vendors. Lists should be compiled through dialogue between technical and procurement departments of FAO, but should be built on the basis of a sound understanding of the current technical specifications for perishable and non-perishable items as well as current knowledge of the market for such supplies. Lists should be periodically, ideally annually, reviewed, in order to ensure that technical specifications are up to date, that suppliers still have the capacity to deliver, and to keep up-to-date with mergers and acquisitions and other changes within the industry. Sufficient and regular resources should be provided for CSLP to maintain a dedicated “task-force” responsible for establishing and updating the proposed supplier lists and leading market engagement on a periodic basis. Wherever possible, periodic review processes should involve pro-active conversations between FAO technical personnel and suppliers to encourage readiness on the part of suppliers and up-to-date awareness of supply-side constraints on the part of FAO units; thereby positioning both parties well to respond to any sudden upsurges in the future, with a reduction in delays arising from the specification of technical requirements.

**Recommendation 1b.** Building and maintaining such lists should allow FAO to prepare supply markets in advance.

30. In order to ensure, for example, that local aerial contractors with proven experience in locust operations and connections within country/region are known and on alert prior to an upsurge, as well as familiarising such contractors with FAO requirements. One such requirement should include mandating the use of eLocust3g on all aerial and, to the extent feasible, ground operations, and ensuring that EarthRanger can be used where possible. Periodic supplier and

---

<sup>1</sup> In addition, problems were identified around the acquisition of “technical” information tools, such as the procurement of new forecasting systems, eLocust 3G and Garmin tools, or information dissemination tools for use in the online Locust Hub. Issues surrounding the management of intellectual property rights after purchase causes delays in acquisition and implementation.

contractor reviews should enable FAO technical personnel to engage with local contractors to check capacity for operating such tools in emergency settings.

**Recommendation 2.** Pre-positioning of pesticides and non-perishable items should be encouraged as far as possible prior to future upsurges, with stocks regularly reviewed and maintained during remission periods to ensure operational readiness.

31. Pesticide stocks in particular should be maintained with consideration given to the “minimum required amount” to kick-start an operation, while waiting for larger stocks to be delivered during an active campaign. The task of storing and maintaining stocks should be undertaken by the regional commissions, which have the mandate to handle pre-positioning and stock management. In the case of the Horn of Africa, this means the CRC, which has both the operational mandate and the neutrality required to balance important resources in remission and critically upsurge periods. As part of FAO, it is also best-placed to update out-of-date supplies in pre-positioned locations, particularly if recommendations 1a and 1b are implemented. CRC should be supported to ensure its technical and operational capacity remains sufficiently strong in the medium-term, so that it can handle issues such as, for example, cold-storage of bio-pesticides in areas as close to locust frontline countries as possible. Alternatively, in the case of bio-pesticides, CRC could establish an arrangement with the supplier whereby CRC purchases a quantity to be held in storage by the supplier ready for rapid use if required. In such a set-up, it would be critical for the supplier to be required to regularly test the stocks to ensure viability. In the event that the stocks are not used during the warranty period, CRC would, with donor support or drawing from its core budget, need to purchase a new batch. This method would effectively treat the costs of unused biopesticides stocks as an insurance premium to enable biopesticide use during the early stages of any future outbreaks. It would also serve to maintain production of bio-pesticides during recession periods, thereby assuring a supply of viable product that can be made available to rapidly treat small outbreaks or kick-start operations during larger control campaigns. In addition to CRC taking a leading role in pesticide stock coordination, the Desert Locust Control Committee (DLCC) as well as regional bodies and national bodies involved in desert locust control processes should draw up formalised agreements to support CRC’s role and encourage harmonisation of desert locust product registration.

## **PRIORITY AREA 2 – TRAINING**

32. Pre-existing technical capacity of national staff in the survey and control of desert locusts was found to be a significant constraint on operations in several countries in the Horn of Africa during the 2020–2021 upsurge. While capacity levels certainly varied from country-to-country, in some countries national staff both in senior positions and in the field often lacked even the basic capacity to organise and coordinate survey and control operations, as well as lacking a basic understanding of desert locust biology and population dynamics. This was even the case in countries with relatively recent and fairly frequent experience of locust infestations.
33. The most promising method for overcoming this challenge is the training of trainers (TOT) model deployed previously under the EMPRES program. In previous years, the EMPRES programme developed and ran TOT services in the Horn of Africa with notable success. The programme closed when donor funding ended, after which the TOT programme continued on a smaller scale under CRC.

**Recommendation 3.** The major learning on national capacity from the 2020–2021 upsurge was that the TOT model developed under EMPRES should be re-booted for the future.

34. This means either finding additional donor funds or increasing allocations from CRC. In either case, the TOT system should be delivered on a larger scale and a consistent annual basis during

remission periods. CRC engagement should be facilitated through the provision of resources for additional technical staff able to deliver TOT and to embed with national locust control teams during future upsurges. Training should include the organization and execution of control campaigns, to enhance the capacity of field teams, locust managers, directors and other decision-makers. In line with recommendations 17 and 18 below, training should also cover the operation of the Desert Locust Information Service (DLIS) system, so as to ensure the developments in this system that were made during the 2020–2021 upsurge are fed through into capable country-level early warning systems for the future. Courses could also be supported through the faculties of agriculture in each country covering desert locust biology, behaviour and survey and control operations, including images and videos from field operations and the costing of control campaigns, etc.

**Recommendation 4.** The newly established desert locust training facility in Sudan's Red Sea Coast should be used as a hub for operational training in the Horn of Africa and Yemen.

35. With annual desert locust infestations requiring regular survey and control operations, the Red Sea Coast of Sudan presents an ideal training ground for national staff looking to build, refresh or update their operational experience of survey and control methods. The newly established training facility is designed to provide such training for Sudanese locust experts in the long-term future. FAO and its partners should encourage teams from other countries in the Horn of Africa and Yemen to attend training camps at the centre, including real-time survey and control operations alongside locust officers from Sudan's Plant Protection Directorate. Donors could provide bursaries to cover the training costs involved for neighbouring countries. FAO's Plant Production and Protection Division (NSP) should work with CRC to build a strategic training plan to identify numbers and profiles of potential trainees from countries within the Horn of Africa and Yemen; while FAO country offices could work with national ministries of agriculture to foster active participation and regular uptake of bursary opportunities. Standard training material should be further developed and utilized to ensure a harmonized approach across all regions. Training sessions on how to train should also be included so that a core of national master trainers can be established who are good trainers.

### **PRIORITY AREA 3 – NATIONAL CAPACITY**

36. There were clear gains made in the capacity of some invasion countries in the Horn of Africa during the 2020–2021 upsurge. The critical focus now falls on how to sustain this capacity during remission periods. For many countries in the Horn of Africa, desert locust threats are insufficiently frequent to justify dedicated desert locust units of the same size and scale as Sudan or Mauritania, for example. Nevertheless, a critical factor in responding to a future large-scale upsurge in this region will be the baseline of technical capacity within invasion countries such as Kenya; the presence of clear strategies and plans for upscaling capacity, and the availability of suitable facilities support on a regional basis.

**Recommendation 5.** FAO and the regional commissions should encourage all frontline countries to establish and maintain autonomous desert locust units with earmarked spending from national ministries of finance.

37. Where possible, legislation should be encouraged to ensure the sustainability of locust units during recession periods. Such units do not need to be large or employ a large number of officers. But they do need to maintain a small team of well-trained, regularly updated staff, who are sufficiently equipped and adequately funded to maintain on-going surveys and undertake rapid reaction control operations at the start of an upsurge as required. These officers could also serve as trainers and team leaders during larger-scale operations in the case of significant upsurges. Such systems do exist in Sudan and Mauritania, and are being developed in Yemen and Somalia.

FAO and the regional commission should encourage all frontline countries in the region to establish and maintain such resources throughout remission periods, with earmarked budgets that cannot be reduced by future administrations. Tailored advocacy approaches should be developed for each country including, where appropriate and feasible, communication campaigns aimed at legislators, media, academic and research institutions highlighting the potential damage of future invasions and encouraging the inclusion of desert locust preparedness in national disaster risk reduction and management plans.

**Recommendation 6.** For invasion countries such as Kenya, desert locust training and resources should be developed and maintained within the units responsible for other transboundary pests affecting the Horn of Africa, such as the fall army worm.

38. Whilst such threats are technically quite different, it remains relevant to tie together resources for survey and control of transboundary pests, particularly in invasion countries that do not witness annual infestations of desert locusts and cannot therefore justify the costs of autonomous desert locust units. In such cases, FAO's NSP and country offices should be provided resources to periodically liaise with transboundary pest units to ensure that staff have recent and up to date training on desert locust survey and control and, where possible, have recent experience in survey and control operations through Sudan's Red Sea Coast training centre.

**Recommendation 7.** In all countries of the Horn of Africa and Yemen, it is vital to continue practicing survey and control operations in order to maintain the momentum gained over 2020–2021.

39. The countries of this region should, in coordination with CRC, form a coalition of states committed to training together. A memorandum of understanding (MOU) should be signed between the countries of the region, to maintain the practice of sending officers on a seasonal basis, at the expense of their home countries, to join the survey and control operations on the ground and in the air in Sudan. FAO and its partners should whenever possible support home country costs through a bursaries program, as described above. But the critical factor must be the establishment of a protocol and an MOU for the practice of sending and embedding national experts from Kenya, Somalia, Ethiopia and other countries of the region, to join Sudan's survey and control operations and benefit from training provided at the Red Sea Coast centre. By actively training and working together in the field, lessons can be learned between countries and new practices in, for example, the use of bio-pesticides, can be shared on a regular basis. Such a coalition would then provide a stronger base for rapid scale-up of capacities in the event of a future upsurge of the scale seen in 2021.

#### **PRIORITY AREA 4 – REGIONAL ARCHITECTURE**

40. Stakeholders consulted during Phase III of this evaluation agreed that the functionality of the regional architecture could be improved to better serve the Horn of Africa in future upsurges. Problems were identified with the operational capacity and funding of the Desert Locust Control Organization for Eastern Africa (DLCO-EA), as well as the geographic reach and capacity levels of CRC. Some confusion also emerged about the respective roles of the Intergovernmental Authority on Development (IGAD), the IGAD Climate Prediction and Application Centre (ICPAC), CRC, DLCO-EA and FAO.

**Recommendation 8.** FAO and its partners should provide a package of capacity support for CRC.

41. Current levels of resourcing limit CRC's engagement and role in desert locust upsurges, particularly regarding supporting and building up national technical and field expertise. This could be overcome by providing an increased support package to CRC, with specific inclusion of a technical expert with recent experience of ground and air operations, national staff training and

liaison across the Horn of Africa and Yemen region. FAO should provide resources for such expertise on at least a two to three year basis, with a view to planning longer-term sustainability beyond that. The technical expert should be mandated to act as a “roving support” factor, moving between countries across the Horn of Africa and Yemen, providing support to training of trainer activities where needed, sharing lessons learned between countries, advocating within ministries of agriculture for actions and commitments that help sustain resources and attention for desert locust survey and preparedness. This could also help spread learning around innovations deployed within the 2020–2021 upsurge, such as by working with national governments to familiarise them with the EarthRanger system and encourage its inclusion in all future operations; likewise for sharing the learning around the use of biopesticides for future upsurges.

**Recommendation 9.** FAO and its partners should also support CRC to improve its liaison with non-member countries on the boundary between frontline and invasion zones.

42. Currently, CRC membership does not extend to several countries heavily affected by this upsurge and at risk of future upsurges given ongoing instability in Yemen and the Horn of Africa. Such countries include Somalia, Kenya, Uganda and South Sudan. Facilitating coordination between the activities of member countries and those undertaken by non-members could significantly improve the preparedness of the region and its capacity to respond in a robust and coordinated manner in any future upsurge. Non-member countries in the Horn of Africa such as Somalia and Kenya should be invited to attend CRC sessions as observers to help facilitate collaboration with CRC. CRC could, with adequate support from FAO and its partners, increase the “bridging” function it plays with these countries by, for example, committing to support operations in non-member countries during any future upsurge. This would help overcome the potential weakness of its limited geographical membership in the Horn of Africa.

**Recommendation 10.** DLCO-EA member countries should commission an external review of the capacity of DLCO-EA to respond to future upsurges, and FAO should, where possible and appropriate, offer to support the resourcing of such a review. DLCO-EA has a clear role in the regional architecture of desert locust response, with a responsibility to work with national governments in the region and support control operations for small regional outbreaks, limiting the potential for larger upsurges.

43. Significant problems were identified with its operations during the 2020–2021 upsurge, most of which stemmed from a lack of resources from member countries and insufficient organisational capacity to plan and assist survey and control operations. Increasing resources by encouraging member countries to pay annual fees would help overcome some of these challenges, but not all. An external review of DLCO-EA's capacity to support member countries should therefore be undertaken, with a mandate to review areas that need strengthening across management, operations, member liaison, procurement and management of material and human assets. Appropriate support should be provided by member countries to follow-up on capacity gaps where identified, and member countries should be encouraged to hold DLCO-EA accountable for improved systems in the future.

**Recommendation 11.** Finally, FAO should actively engage all parties to re-convene efforts to improve the regional architecture during the 2020–2021 upsurge.

44. The wider desert locust response community held a conference during 2021 looking at the regional architecture for response and the challenge of ensuring sustainable capacity to survey and control future upsurges. Stakeholders involved included FAO and many of its partners, including the World Bank and several bilateral donors. Following the conference, several actors have moved forward with plans to support sustainable capacity in this region, but with limited coordination between them. It remains important to encourage a coordinated response to this challenge, especially given the number of overlapping roles and mandates undertaken by actors

such as CRC, DLCO-EA, IGAD and FAO. In order to avoid duplication or overlap, parties to this conference should re-convene and conduct a mapping of activities undertaken since the conference, with a clear view to coordinating future efforts.

#### **PRIORITY AREA 5 – PESTICIDES**

45. FAO and its partners should work to make biopesticides the option of first-use during recession periods, and equal in application to chemical pesticides during upsurges. To get there, FAO should work with affected countries to dispel the myth that biopesticides are only effective against nymphs. The effectiveness of biopesticides for control operations during a significant upsurge was demonstrated in Somalia during 2020–2021. While some operational difficulties were observed, including delay in mortality and the risk of respraying treated swarms, biopesticides nevertheless proved to be highly effective in treating the upsurge in Somalia, tackling swarms at various stages of the life-cycle while improving environmental, health and safety outcomes as well. Bringing biopesticides into the response strategy in a significant way could also help address some of the procurement challenges observed, by increasing the supplier-base.

**Recommendation 12.** FAO and CRC should work to address shortages in the supply of biopesticides.

46. The 2020–2021 upsurge witnesses several countries competing with each other for access to pesticide stocks. As noted above, bringing more options onto the table could potentially help relieve the supply constraints, as long as supply-chain constraints can be overcome. One critical element of this could be tackled by CRC and other regional commissions ensuring that biopesticides get registered nationally, so that suppliers can have an accurate gauge of the potential market. In parallel to this, FAO and CRC should work with national governments to build awareness and support their use. And FAO should, in line with previous recommendations on procurement, update supplier lists and periodically engage with biopesticide suppliers to ensure good understanding of market demand and technical requirements. See also the suggestion of supporting bio-pesticide production during recession periods in the section on Priority Area 1, above.

**Recommendation 13.** FAO should also continue recommending the increased use of insect growth regulator (IGR) with strip and barrier treatment as a means to treat large areas of nymph populations.

47. This can improve the efficiency of efforts to reduce populations and limit the spread and migration of adult locusts. Operations in Somalia demonstrated the effectiveness of this approach in one context. FAO and its partners should work with affected countries to study the potential scale-up of this approach and application in other contexts.

**Recommendation 14.** FAO should continue to support the use of chemical pesticides where crops are threatened by locusts.

48. Chemical pesticides still present the most effective tool for a rapid knock-down in locust numbers, especially when controlling swarms. In situations where crops are under imminent threat, their use can greatly support a country's ability to protect its agricultural production. But FAO should work with affected countries – including both frontline and invasion countries – to improve training regarding the effects of chemical pesticides on the environment including on public health, waterways and sensitive areas.

**Recommendation 15.** FAO and its donor partners should also agree to avoid repeating imposition of requirements for the use of certain pesticides linked to particular aircraft.

49. Logistical problems were observed during the 2020–2021 upsurge regarding the imposition of one donor of a requirement to use malathion in Ethiopia. This added delays and complications to



operations being conducted in an area where logistics were already very challenging. Agreeing ahead of time – during remission periods – to avoid repeating this episode could improve the speed of response to future upsurges.

**Recommendation 16.** FAO should consider commissioning “how to” guidance for gathering data on innovative practices in pesticide applications.

50. Some opportunities were missed during the 2020–2021 upsurge regarding the evaluation of new pesticides and new pesticide application techniques under operational conditions. Full evaluation during active campaigns can be challenging, given the urgent need to dedicate all staff and spray assets directly to the response operations. Nevertheless, ad-hoc data collection is still possible, especially by focusing on pre- and post-treatment assessments. Guidance for operational teams on how to collect such information could increase the learning from such innovations in future upsurges.

#### **PRIORITY AREA 6 – DATA**

51. The quality, coverage and reliability of data provided by the Desert Locust Information Service stood out as a critical success factor in the 2020–2021 upsurge. The major areas for consideration moving forward are i) ensuring that early warning translates into early action by the wider community; ii) continuing survey operations during remission periods; and iii) succession planning for DLIS in the long-term.

**Recommendation 17.** The wider desert locust response community should look to ensure that early warning data is turned into timely response and action in future desert locust upsurges.

52. Updates to the technologies, innovations and digital tools used during this response has improved the quality and timeliness of data and forecasting of desert locust movements. The process of turning this data into advocacy-ready material and messaging could be improved, particularly by focusing on tailoring messages to specific audiences and technical levels of understanding to facilitate a better understanding and higher level of action by affected countries, donors and FAO. Given the limited staffing resources at DLIS, this will need to be achieved through streamlined and semi-automated mechanisms that can provide data users with regular updates during an operation. The Desert Locust Watch website could be overhauled and modernised as part of this process. But beyond these FAO-internal recommendations, the wider community should also review how it received desert locust information and understands the need for prioritisation before an upsurge reaches the scale it did during early 2020.

**Recommendation 18.** Desert locust surveys must be continued during recession periods across the Horn of Africa and Yemen.

53. Such surveys are vital in the first instance to supply the data underpinning the DLIS. Without continued survey operations, the quality of background data on the presence of locust populations in the Horn of Africa and Yemen will be greatly reduced. In addition, the conduct of regular surveys during recessions periods could help to maintain the survey skills and resources required during upsurge periods, a critical issue in invasion countries such as Kenya where momentum for desert locust operations can drop between upsurges. Such operations can also provide FAO and CRC with useful vehicles for training and updating skillsets on tools such as the eLocust3 platforms or the use of EarthRanger systems.

**Recommendation 19.** FAO should begin succession planning within the DLIS now.

54. The quality of the DLIS data is a critical part of FAO's reputation in the desert locust community. Replacement of current staff with suitably qualified candidate(s) will be essential to maintain that

reputation in the future. Each regional commission should also add one responsible staff officer to clean and validate data and support countries in the field. Additional staffing should also be brought into DLIS to include specialists in GIS and modelling where appropriate, so as to encourage a more sustainable unit with skills spread across more than one person in the future.

## **PRIORITY AREA 7 – LIVELIHOODS**

55. Phase II of this evaluation reported that the livelihoods protection activities undertaken during the 2020–2021 upsurge were largely successful. The only areas for consideration regarding future upsurges surrounded the rapidity of scaling up operations across the Horn of Africa and, conversely, the challenge of providing support tailored to local contexts and needs. These two issues – macro-scaling and micro-tailoring – both present opposing tensions on the response. Nevertheless, options are available to overcome this challenge in the future, outlined below.

**Recommendation 20.** FAO should work in the first instance with NGO consortia such as the RDLA membership.

56. The RDLA of NGOs in the Horn of Africa proved to be an effective coordination mechanism for livelihood protection activities in the 2020–2021 upsurge. With the winding down of livelihood operations at the end of 2021, this alliance has reverted to a “sleeper” mode, with relevant contact details stored and kept in member databases ready for future upsurges. The major learning from the 2020–2021 upsurge was that, in the initial stages of the upsurge, prior to the RDLA being formed, it proved challenging for FAO to coordinate livelihood protection activities with NGO partners operating across the Horn of Africa. This was mostly due to the rapidity and dynamism of the locust upsurge, and the absence of a pre-existing coordination mechanism such as the RDLA. Therefore, in future, FAO should be pro-active in encouraging its major NGO partners operating livelihood protection operations in the region to form a coordination mechanism following the model of the RDLA at the earliest stage of the upsurge, so as to encourage higher levels of NGO engagement in the design of the first phase of livelihood protection activity.

**Recommendation 21.** Increased use of cash distributions to help tailor the response to local needs should be encouraged.

57. Some of the challenges observed surrounding the selection of the most appropriate products for livelihood support can be overcome by increasing the use of cash distributions to populations affected by locust infestations. To make this work, FAO should review capacity and resources within its cash support team to ensure it has the capacity to conduct adequate market assessments prior to delivery. Such assessments are essential to ensure availability of assets on local markets and their responsiveness to changes in level of demand. One example of how FAO could provide such assessments is the conduct of rural market assessments carried out by FAO in Somalia, demonstrating reasonable market responsiveness for seeds and tools. This is less the case for livestock feed. The use of “cash plus” approaches can help here, which combine delivery of cash distributions alongside in-kind support for assets unavailable in local markets or technical assistance and capacity-building activities where appropriate. But without significant resource within the cash support office, FAO may have to rely on pre-existing market assessments or work with other UN agencies and the cash cluster to ensure access to enough information.

**Recommendation 22.** Coordination with national social protection mechanisms and cash working groups should be encouraged to support rapid delivery of livelihood protection support at scale.

58. The need to rapidly scale-up livelihood protection support was demonstrated during the 2020–2021 upsurge, most clearly in Ethiopia where some farming communities felt the cash distributions didn’t reach them early enough. In countries where pre-existing social safety nets

exist, FAO should consider leveraging these for delivery of cash assistance to farming communities badly hit by locust swarms.

## **PRIORITY AREA 8 – INNOVATION AND LEARNING**

**Recommendation 23.** FAO should develop a dedicated mechanism sharing learning between countries during remission periods.

59. A dedicated online platform could be developed by FAO, within a relaunched iteration of the Desert Locust Watch website, where national survey and control teams can share learning from innovative approaches to survey (e.g. use of EarthRanger systems) or control operations (e.g. innovative (bio)pesticide application techniques). Such a platform should support the sharing of lessons learned from ad hoc experimentation and operations.

**Recommendation 24.** FAO should work with CRC to encourage sharing of lessons between countries within the Horn of Africa.

60. As part of its support to an alliance of countries training and practicing survey and control operations during remission periods (see recommendations on national capacity above), FAO and CRC should encourage teams to learn from each other and update each other's understanding of what works in different contexts. A peer-learning model could be deployed alongside the TOT approach to be undertaken at the Red Sea Locust Training Centre in Sudan.

**Recommendation 25.** FAO and CRC should consider adding a requirement to document new techniques used during operations.

61. Such documentation need not involve experimental studies or robust research. But simply by documenting in real-time any new activities conducted, and where possible, a basic pre- and post-treatment data collection, could greatly enhance operational learning. The types of innovations that could be tried here include: the use of fixed wing aircraft and helicopters for band & swarm survey, strip spraying, target assessment methods, defining target areas using online mapping tools (e.g. Google Earth with spray track overlays).

**Recommendation 26.** FAO and CRC should continue to work with affected countries to increase the use of improved satellite monitoring systems with enhanced definition to locate potential survey areas.

62. As satellite monitoring systems improve in capability, FAO should encourage affected countries to work with innovative approaches, such as rainfall greenness mapping, to assist survey planning.

**Recommendation 27.** FAO should consider novel methods for supporting learning about new tools and approaches.

63. A massive open online (MOOC) course established by DLIS, for example, could help provide staff within national ministries of agriculture, and students of agriculture in universities in the Horn of Africa and Yemen, to gain specific skillsets around the use of EarthRanger and eLocust3 platforms. Such an approach, while not sufficient on its own, could increase the base-level of understanding in the region, thereby decreasing the lead-time when trying to scale-up operations-ready staff in future upsurges.

## Appendix 1. People interviewed

| Last name       | First name | Organization                          | Category                      |
|-----------------|------------|---------------------------------------|-------------------------------|
| Abdo            | Saeed      | Yemen Ministry of Agriculture, PPD    | National agriculture ministry |
| Abt             | Vincent    | AFD/French Embassy                    | Donor & RDLA                  |
| Al Dobai        | Shoki      | FAO                                   | NSP & TA                      |
| AlMamari        | Mohammed   | Yemen Ministry of Agriculture, PPD    | National agriculture ministry |
| AlSarai Alalawi | Mamoon     | CRC                                   | Regional organization         |
| AlZourka        | Hussein    | Yemen Ministry of Agriculture, PPD    | National agriculture ministry |
| Artan           | Guleid     | IGAD                                  | Regional organization         |
| Aston           | Bob        | FAO                                   | NSP & TA                      |
| Belayneh        | Yene       | USAID                                 | Donor & RDLA                  |
| Bernardi        | Myra       | DEVCO                                 | Donor & RDLA                  |
| Blancato        | Davide     | FAO                                   | Procurement                   |
| Bourgeon        | Dominique  | FAO                                   | OER & Resilience hub          |
| Bradshaw        | John       | FCDO                                  | Donor & RDLA                  |
| Butros          | Munir      | FAO                                   | LPRG                          |
| Cherlet         | Michael    | JRC                                   | Innovation partner            |
| Choudhary       | Vikas      | World Bank                            | Donor & RDLA                  |
| Cournut         | Mathilde   | AFD/French Embassy                    | Donor & RDLA                  |
| Craig           | Batian     | 51 Degrees                            | Innovation partner            |
| Cressman        | Keith      | FAO                                   | NSP & TA                      |
| Dunn            | Toby       | Farmland Aviation                     | Aerial contractor             |
| Edan            | Marie      | AFD/French Embassy                    | Donor & RDLA                  |
| Fabiani         | Anne       | FAO                                   | Procurement                   |
| Ferrand         | Cyril      | FAO                                   | OER & Resilience hub          |
| Ghaout          | Said       | FAO                                   | NSP & TA                      |
| Gichuru         | Martin     | FCDO                                  | Donor & RDLA                  |
| Gilligan        | Chris      | Cambridge University                  | Innovation partner            |
| Guma            | Ibrahim    | Sudan Ministry of Agriculture, PPD    | National agriculture ministry |
| Hughes          | David      | Penn State University                 | Innovation partner            |
| Jama            | Abdi       | IGAD                                  | Regional organization         |
| Khan            | Tariq      | Pakistan Ministry of Agriculture, PPD | National agriculture ministry |
| King            | Sarah      | RDLA/NRC                              | Donor & RDLA                  |
| Kinyanjui       | Catherine  | Kenya Ministry of Agriculture, PPD    | National agriculture ministry |
| Kumar Vutukuru  | Vinay      | World Bank                            | Donor & RDLA                  |
| Marchesich      | Rosanne    | FAO                                   | OER & Resilience hub          |
| Mcrae           | Heath      | FAO                                   | NSP & TA                      |
| Menard          | Hugo       | Delta 2                               | Aerial contractor             |
| Mohamed         | Ameen      | Yemen Ministry of Agriculture, PPD    | National agriculture ministry |

| Last name       | First name | Organization                          | Category                      |
|-----------------|------------|---------------------------------------|-------------------------------|
| Mohamed Hussein | Abdi       | Somalia Ministry of Agriculture, PPD  | National agriculture ministry |
| Musa            | Mahgoub    | Sudan Ministry of Agriculture, PPD    | National agriculture ministry |
| Njoka           | Stephen    | DLCO-EA                               | Regional organization         |
| O'Neill         | Brendan    | ESRI                                  | Innovation partner            |
| Olsen           | Max        | RDLA/ACTED                            | Donor & RDLA                  |
| Pantenius       | Christian  | FAO                                   | NSP & TA                      |
| Paulson         | Rein       | FAO                                   | OER & Resilience hub          |
| Rigamonti       | Francesco  | RDLA/Oxfam                            | Donor & RDLA                  |
| Saif AlShaibani | Ali        | Yemen Ministry of Agriculture, PPD    | National agriculture ministry |
| Samatar         | Abdulkadir | Somalia Ministry of Agriculture, PPD  | National agriculture ministry |
| Thompson        | Tremayne   | BAC helicopters CC                    | Aerial contractor             |
| Ul Hasan        | Waseem     | Pakistan Ministry of Agriculture, PPD | National agriculture ministry |
| Wanjohi         | James      | Kenya Ministry of Agriculture, PPD    | National agriculture ministry |
| Weale           | Jim        | Scriptoria                            | Innovation partner            |
| Williams        | Melissa    | World Bank                            | Donor & RDLA                  |

## Appendix 2. Evaluation matrix

The following matrix maps each of the evaluation questions and their associated sub-questions addressed across the three phases of the real-time evaluation. These are mapped against data collection tools deployed and the evaluation phases in which they are addressed.

|            |   | Lit rev. | KIIs | Secondary data | Survey | Phase I | Phase II | Phase III |
|------------|---|----------|------|----------------|--------|---------|----------|-----------|
| <b>EQ1</b> | <b>To what extent did FAO's leadership, management and technical capacity support a relevant, timely and effective system-wide response to the desert locust upsurge?</b>   |          |      |                |        |         |          |           |
| 1.1        | To what degree did FAO's strategic positioning support a rapid and timely scale-up of the donor and partner response?   | X        | X    |                | X      | X       |          | X         |
| 1.2        | To what extent were donor and partner organizations successful in scaling-up the response in a timely manner with sufficient support for surveillance, control and preparedness activities?   | X        | X    | X              |        | X       |          |           |
| 1.3        | To what extent were the early surveillance, control, forecasting and communication efforts supportive of increased preparedness, pre-positioning and planning in both frontline and invasion countries?   | X        | X    |                |        | X       | X        |           |
| 1.4        | How have FAO's organizational structures and decision-making processes helped or hindered effective preparation and response?   | X        | X    |                |        | X       |          |           |
| 1.5        | To what degree have the actions of FAO and its partner organizations supported a targeted and appropriate response for different stakeholder groups including pastoralists, agriculturalists, refugee populations, all genders, ages and abilities, and those facing specific protection risks? | X        | X    |                |        | X       | X        | X         |
| 1.6        | How have FAO and its partners integrated learning from previous outbreaks, and evaluations and studies thereof?   | X        | X    |                |        | X       |          |           |
| <b>EQ2</b> | <b>To what extent was the response coherent with FAO's other operations and those of other actors?</b>  |          |      |                |        |         |          |           |
| 2.1        | How successfully did the response to the desert locust upsurge complement pre-existing pest management operations in affected countries?  | X        | X    |                |        |         | X        | X         |
| 2.2        | To what degree have the actions of FAO and its partners support successful integration of emergency relief, development, sustaining the peace and stewardship of the natural environment?   | X        | X    |                |        | X       |          | X         |
| 2.3        | How effectively did FAO's partnership approach support the response of the regional commissions, national governments, NGOs and other relevant actors responding to the upsurge?  | X        | X    |                | X      | X       | X        |           |
| 2.4        | How well did FAO coordinate its activities with those of other actors?  | X        | X    |                | X      | X       | X        | X         |
| <b>EQ3</b> | <b>What were the positive and negative, intended and unintended results of FAO's actions in terms of food security, livelihoods and resilience of affected households and communities?</b>  |          |      |                |        |         |          |           |
| 3.1        | How has FAO contributed towards reducing food insecurity in affected countries?   | X        | X    | X              |        | X       | X        | X         |
| 3.2        | How has FAO contributed towards protecting livelihoods of farming communities affected by the locust upsurge?   | X        | X    | X              |        | X       | X        | X         |
| 3.3        | How has FAO contributed towards building resilience of affected countries, communities and households in affected regions?  | X        | X    | X              |        | X       | X        | X         |
| 3.4        | To what extent did FAO succeed in integrating – and encouraging partners to integrate – health, safety and environmental concerns in the response to the desert locust upsurge?   | X        | X    |                | X      | X       | X        | X         |

|            |   | Lit rev. | KIIs | Secondary data | Survey | Phase I | Phase II | Phase III |
|------------|---|----------|------|----------------|--------|---------|----------|-----------|
| 3.5        | What additional, unintended consequences can be observed in relation to FAO's actions?  | X        | X    | X              |        | X       | X        | X         |
| <b>EQ4</b> | <b>What have been the enabling factors and limiting constraints on the effectiveness of FAO's response?</b>   |          |      |                |        |         |          |           |
| 4.1        | What factors have enabled FAO to respond in a more timely and effective manner to the upsurge?  | X        | X    |                | X      | X       | X        | X         |
| 4.2        | What constraints have been faced by FAO in the areas of data collection and analysis, procurement, stock management and human resource capacity?                          | X        | X    |                |        | X       | X        | X         |
| 4.3        | How did the COVID-19 pandemic and insecurity in locust-affected countries affect the locust response operations, and how did FAO and its partners mitigate these impacts? | X        | X    | X              |        | X       | X        | X         |
| <b>EQ5</b> | <b>To what extent did FAO's processes support innovation and learning across the affected regions?</b>  |          |      |                |        |         |          |           |
| 5.1        | How effective were FAO's learning mechanisms in transferring lessons across countries and regions?  |          | X    |                | X      | X       | X        | X         |
| 5.2        | What challenges were faced by FAO and partner organizations in deploying, using and scaling-up innovative solutions to the desert locust upsurge in 2020–2021?            | X        | X    |                |        |         | X        | X         |

Office of Evaluation  
[evaluation@fao.org](mailto:evaluation@fao.org)  
[www.fao.org/evaluation](http://www.fao.org/evaluation)

**Food and Agriculture Organization of the United Nations**  
Rome, Italy