

## FEDERAL REPUBLIC OF SOMALIA

## MINISTRY OF AGRICULTURE AND IRRIGATION SOMALIA CRISIS RECOVERY PROJECT (SRCP) PEST MANAGEMENT PLAN (PMP)

**April, 2020** 

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## ACRONYMS AND ABBREVIATIONS

CBD	Convention on Biological Diversity
CC	Compensation Committee
CRW	Crisis Response Window
DL	Desert Locust
DLIO	Desert Locust Information Officer
ERL	Emergency Recovery Loan
ESF	Environmental and Social Framework
FAO	Food and Agriculture Organization of United Nations
FEWS NET	The Famine Early Warning Systems Network
FGS	Federal Government of Somalia
FMoAI	Federal Ministry of Agriculture and Irrigation
FMS	Federal Member states
FSNAU	Food Security and Nutrition Analysis Unit
GHGs	Greenhouse gases
GIS	Geographic Information System
IA	Implementing Agency
IDA	International Development Association
IGRS	Insect Growth Regulators
IPPC	International Plant Protection Convention
IPM	Integrated Pest Management
GRM	Grievance Handlng Mechanism
MoF	Ministry of Finance
SCRP	Somalia Crisis Recovery Project
PMP	Pest Management Plan
PPE	Personal Protective Equioment
PAPs	Project Affected Persons
RAP	Resettlement Action Plan
ULV	Ultra Low Volume
WB	World Bank
WHO	World Health Organisation

#### **Executive Summary**

The World Bank intends to provide funding for an Emergency Recovery Loan (ERL) from the IDA CRW and the National IDA 18 to the federal Ministry of Finance (MoF) for the Somalia Crisis Recovery Project (SCRP), preparedness for a rapid response to the evolving desert locust crisis. This document serves as the Pest Management Plan (PMP) to guide and help monitor and mitigate negative environmental, health and social economic impacts arising from use of pesticides to control the current Desert Locust upsurge.

Response to the desert locust crisis in Somalia aims to achieve three main goals:

- Control the desert locust's population, through scaled up surveillance and monitoring, spraying of nymphs and hopper bands, and impact assessment, with local capacity building to carry out these operations safely and effectively;
- Protect livelihoods of food-insecure rural households at risk of locust invasion, by pre-positioning and delivering supplies, including back-up seed stock for immediate replanting, supplementary feed cubes for small milking animals and cash assistance where required; and
- Rebuild a modern and effective early warning and control system, which relied before the war on two centers in the northern regions.

Control measures will include continuous surveillance countrywide, via 250 community focal points trained to report locust sightings to Government (by phone), direct government surveillance of 30,000 ha in Somaliland, Puntland, Galmudug (eLocust3), scaled up training of 50 government staff, including 7 DLIOs, and procurement and use of surveillance vehicles (seven in total, with six already under procurement) and equipment (eLocust3, hand-held GPS, radios, entomological kits, binoculars, camping supplies). Its cost is estimated at \$3.4 million.

Planning for ground and aerial spraying includes 12,300 kg of bio-pesticides and 90,000 litre of chemical pesticides against nymphs, hoppers and adults to treat 360,000 ha with trained government staff and 180,000 ha with local partners and communities equipped with adequate safety equipment 540,000 ha in total. Other activity items include community sensitization, use of knapsack sprayers and vehicle-mounted sprayers, air operations based out of Hargeisa and Galkayo (and an additional logistic basis in Mogadishu), intensive training on safe (future) administration of chemical pesticide, and pre-positioned control supplies for the second half of 2020. The cost to meet this need is estimated at \$17.8 million.

The emergency part of this SCRP Component will be carried out by FMOAI with technical support from FAO, following FAO environmental safeguards policies and in line with FAO's Desert Locust Guidelines on Safety and Environmental Precautions.

To anticipate and mitigate the risks to rural livelihoods by the desert locust upsurge, FAO will equip farmers and pastoralist to withstand the DL invasion, including seed supplies to replant invaded fields and supplementary feed to protect core livestock assets, as well as cash assistance to cope with inevitable losses. FAO will support and protect farmers' production and food security during both seasons and target 38,350 households for Gu/ Karan and for Deyr 2020 with risk-reduction and re-engagement farming packages. The total cost of this need is \$26 million. To mitigate the loss of assets by pastoralist household due to the DL damage to pastures, FAO will provide supplementary animal feed to target 30,000 poor pastoral households. An integrated Cash assistance will be directed and rapidly scaled up

only to vulnerable households that will either face an extended lean season (if able to replant), or little to no harvest at all, and/or significant losses of their animals to feed shortage or distress sale. FAOSO will prioritize 6,150 pastoral households that are already in IPC 2-4 and with limited food stocks with the Cash+ assistance. The total cost of pastoral livelihood assistance need is \$8.3 million.

The Ministry of Agriculture and Irrigation (MOAI) who will implement project activities with FAO fully appreciates the importance of putting in place measures and policies that will ensure the required Safeguards during the implementation of the project. The MoAI has been in the forefront in advocating for the use of IPM as a standard approach to managing pests and diseases for farmers across the country as it fully appreciates the negative consequences that pesticide can have on the environment and the rural communities who are the most vulnerable. For this reason, the MoAI will be largely be using approved biopesticides. The first phase of control will rely solely on the use of Metarhizium biopesticide and already over 4,000kg has been imported into the country for ongoing operations and additional amount are on the way. In the second half of the year a contingency plan is in place to acquire products approved for DL control by FAO, in the event adults swarms will have to be directly control, the intention is to use Fenitrothion to supplement the use of Metarhizium, as the later mainly targets the immature Desert Locust. The MoAI has also ensured adequate availability of PPE for all persons involved in the control activities at the field level. Training has also been planned for the applicators at State level to ensure they will be fully compliant with WB policies and guidelines along the lines of ESF. Safety of the communities in the DL affected area is paramount and though only Biopesticides will be in used, the MoAI and respective State MoAI will launch awareness campaigns using various media outlets including TV, Radio, print media, phone messaging, these actions serve to supplement the physical visits made by Government officers amongst the communities and serve as a constant reminder to the communities. The recently endorsed drafts of the Agrochemicals as well as the Plant protection acts by the cabinet minister fully advocate for the adoption of IPM and the use of safer agrochemical products and once passed by parliament will go a long way to ensure legal enforcement of measures designed to support IPM in the country. Large scale application of any pest control product, even those consider "safe" may have some limited unforeseen side effects on non-target organisms, MoAI will carry out post treatment assessment through interviews with local communities in areas where control operations will take place this will included visual observations on any effects the biopesticide may have on non-target insects such as bees and other pollinators. In addition to that, after the campaign of the control of the DL, the project will conduct a national stakeholders' public consultation on the assessment of the efficacy of control operations carried out against the DL as well as the environmental impact assessment to determine if there are any negative impacts of the control intervention on not target organisms. This activity is factor in the control strategy and is being supported by FAO.

The PMP provides guidelines for use by stakeholders involved in the initiative and eventually contribute towards achievement of sustainable development.

#### **Relevant National and International Policies, Legislative Framework and Guidelines:**

The following national and international policies, legislations and regulations are relevant to these emergency activities:

- i. The Somalia Constitution, 2012
- ii. Somali National Pesticides Policy, 2019

- iii. Plant Protection and Quarantine Act, 2019<sup>1</sup>
- iv. Agricultural Chemicals Control Law, 2019
- v. Convention on Biological Diversity (1992)
- vi. International Plant Protection Convention of FAO (1952)
- vii. United Nations Framework Convention on Climate Change (1992)
- viii. World Food Security and the Plan of Action of November 1996
- ix. FAO guidelines on Good Practice for Aerial Application of Pesticides, 2001
- x. FAO guidelines on good practice for ground application of pesticides, 2001
- xi. FAO directive on safety and environmental precautions, 2003
- xii. FAO guidelines on locust Campaign organization and execution, 2003
- xiii. FAO guidelines on control desert locust,2003
- xiv. FAO guidelines on management of empty containers, 2008

#### Pest Management Plan (PMP):

This document serves as the Pest Management Plan (PMP) to guide locust control response. The PMP has been prepared due to: (i) the project will finance procurement of potentially hazardous pest control products; (ii) the proposed financing of the locust control pesticides represents large component of the support requested by Federal Government of Somalia; and (iii) there are potential concerns on the impacts of the pesticides on the environment and human health.

The Ministry of Agriculture and Irrigation will be the lead and implementing agency of the government for this operation. The government has partnered Food and Agriculture Organization to provide technical support in managing and coordinating the efforts to manage the locust infestation emergency in the Country. FAO and the Ministry will work closely with the respective state ministries responsible for the management of the Desert Locust, as they will be the ones directly spraying the pesticides and supporting aerial spray operations. Under this project government officers will be trained on safe application of locust spraying and deployed to the field. Community member in the targeted spray areas will also be sensitized on the ongoing spray operations as well as be informed on the risks associated with the pesticides being deployed.

#### **Potential Impacts:**

The potential impacts identified include:

- i. Spillage and pollution of water resources and aquatic resources from pesticide us
- ii. Poisoning from improper use or administration of the pesticides
- iii. Impact from improper disposal of pesticide containers (drums)
- iv. General health and safety of communities and environmental hazards

#### 1. Mitigations to meet the PMP requirements:

v. Desert Locust Units operating out of Hargeisa, Garowe and Dhusamareb will be provided technical training, mobility and equipment to scale up rapidly to conduct field surveys, certified DLIOs to locally analyse incoming information, and enough well-trained scouts to carry out fieldwork with local communities.

<sup>&</sup>lt;sup>1</sup> The agrochemicals, plant protection and quarantine laws have been endorsed by the cabinet on 28<sup>th</sup> February 2020. Pending is parliament approval and signature of the president. Exclusive of CO19 crisis and circumstances it is expected these pieces of legislation have been passed into laws by the parliament in the second half of the year.

- vi. PMP will guide Spraying, ground and aerial operations will take place in Somaliland, Puntland, and Galmudug using only bio-pesticides during the first half of 2020, related spray and safety equipment.
- vii. Action Plan to include training and setting up basic facilities to monitor and address any issue that may arise from the control campaign. FAO will also support government to follow appropriate product and container disposal guidelines and provide environmental impact assessment kits.
- viii. FAO will closely monitor the early development of beneficiaries' crops through dedicated field monitoring, real-time implementing partner updates with geo-tagged photos of the damage, Hotline and Call Centre inquiries. Traders will release replanting packages to households severely affected by desert locust, within or outside of the initial target areas. Farmers who lose their crop too late for replanting will be prioritized for cash assistance under this Plan or FAO's wider emergency cash programme.
  - ix. FAO will closely monitor pasture depletion to adjust targeting as the situation evolves, but it is urgent to pre-position these feed cubes in a few strategic locations to reach beneficiaries quickly with 20 kg (6 bags) per household
  - x. MOAI commits to apply approved FAO chemical pesticides in the second half of the year where necessary with adoption of relevant supporting legislation framework.

#### **Public Participation**

The PMP will be subject to public consultation as per the World Bank safeguards policies requirements. The MOAI will carry out stakeholder mapping and will hold a consultative forum on the PMP before disclosure.

## **PMP Budget:**

A budget of **USD 56,900,000** (Fifty-Six million, Nine Hundred Thousand US Dollars) has been set aside for implementation of this PMP.

## 1. Introduction

#### 1.1. Background

Since late 2019, Cyclone Pawan and severe floods in the Horn of Africa have created a perfect storm for the breeding of desert locusts, that are endemic to war-torn Yemen, the northern regions of Somalia and the eastern regions of Ethiopia. The locusts have now multiplied and spread in Somalia across 44 districts along the Djibouti, Ethiopia, and Kenya borders, as well as to all other East African countries. Trillions of locusts are currently feeding and breeding in the region, with each new generation producing a 20-time increase. Without a coordinated and rapid scale-up in locust control, there could be over a 400-time increase in desert locusts between now and June. The current upsurge risks becoming a plague before yearend.

The damage caused so far by the locusts in Somalia has been very localized to central regions and so small to remain unquantified. The good rainfall since October have helped the limited affected pastures and browse to regenerate and, similarly, localized damages to the 2019 Deyr harvest are very limited to late-planted crops (at milking stage). In fact, post-Deyr 2019 seasonal assessment findings indicate an improvement in food security (FSNAU/FEWS NET, 3 February 2020).

With the current scale of locust breeding, however, this luck will unlikely repeat between now and the end of 2020, with millions of farmers and herders at risk of losing their crops, pasture and income. The majority will be subsistence producers, with little or nothing to fall back on. The next main wet season (Gu) in Somalia is around the corner, with planting scheduled to start by mid-April. This will coincide with the new generation of swarms, presenting a massive food security threat in already vulnerable areas. Even in a best-case scenario of limited and localized locust damages, Gu crop losses are estimated at 25-30 percent, with an additional 117,000 rural people at risk of falling into IPC 3-4 between April and June (Source: FAO-FSNAU Alternative Scenarios of Desert Locust Damage). In the worst-case scenario, crop losses would be around 50-75% and 616,000 rural people would become food-insecure.

Thanks to early funds from DFID, the scale up in surveillance and control began in late 2019 and kick-started control operations in Somaliland. During January, Government control operations in Puntland also treated an estimated 15 000 hectares against laying swarms and early instar hopper bands. In the south, swarms laid eggs north of Garbahare (Gedo region) and near the borders of Kenya and Ethiopia. In February, however, swarms continued to arrive in breeding areas of Somalia and widespread hatching and band formation to occur. Hopper bands were present in the northeast near Garowe and Galmuduug, with other infestations in the northwest, central and southern areas where breeding is also expected to be in progress. Favourable conditions for locust breeding will extend to June 2020. Average to above average rains forecast for Somalia's upcoming Gu rainy season could extend the breeding period further. The risk of desert locust damages to pasture and crops, therefore, will remain high and critical throughout 2020.

#### **1.2.** Aims and objectives of the Pest Management Plan

The aim of this Pest Management Plan (PMP) is to enable stakeholders involved in the Desert Locust control to monitor and mitigate negative environmental and social impacts associated with use of pesticides.

The specific objectives of PMP are:

- a) Establish clear procedures and methodologies on the procurement, transport, distribution and storage of the pesticides to be financed under the Project
- b) Develop a monitoring and evaluation systems for pesticide use on the locust management practices
- c) Assess the potential economic, environmental and social impacts of the pest management practices
- d) Mitigate against negative impacts of pesticides on the crops, vegetation and livestock
- e) Identify capacity of the country's regulatory framework and institutions to promote and support safe, effective, environmentally and socially sound pest management practices and provide appropriate technical assistance for successful implementation of the PMP
- f) Ensure compliance with national laws, regulations, World Bank safeguards policies and FAO directives on locust
- g) Propose a budget required to implement the PMP

## 2. Key activities

Continuous surveillance countrywide, via 250 community focal points trained to report locust sightings to Government (by phone), direct government surveillance of 30,000 ha in Somaliland, Puntland, Galmudug (eLocust3), scaled up training of 50 government staff, including 7 DLIOs, and procurement and use of surveillance vehicles (seven in total, with six already under procurement) and equipment (eLocust3, hand-held GPS, radios, entomological kits, binoculars, camping supplies). Its cost is estimated at \$3.4 million.

Ground and aerial spraying of 12,300 kg of bio-pesticides and 90,000 litre of chemical pesticides against nymphs, hoppers and adults to treat 360,000 ha with trained government staff and 180,000 ha with local partners and communities equipped with adequate safety equipment 540,000 ha in total. Aerial spraying is necessary to supplement ground spraying, given the large total area to be treated in the next few weeks and the limited trained personnel per vehicle available. Other activity items include community sensitization, use of knapsack sprayers and vehicle-mounted sprayers, air operations based out of Hargeisa and Galkayo (and an additional logistic basis in Mogadishu), intensive training on safe (future) administration of chemical pesticide, and pre-positioned control supplies for the second half of 2020. The cost to meet this need is estimated at \$17.8 million.

Livelihood protection activities. The first such activity is geared to about 24,000 farmingagropastoral households already in IPC2-4 in areas whose production of maize/sorghum, cowpea and vegetables is likely to be impacted by locusts (northwest and south-central). It entails the delivery of two farming input packages to support production and mitigate losses: a Gu planting package (seeds, tools, services and training ahead of Gu) and a Gu replanting seed package (released within 2-7 days of locust damage; this latter package needs prepositioning). Other items include bulk SMS communication with farmers and cash where needed and possible (Cash+). During the Deyr short rains, FAO plans to assist 14,350 food insecure households that experienced sever Gu 2020 production losses. Total cost of this need is \$ 26 million.

The second activity under livelihood protection includes preventing loss of animals in areas whose pastures will be likely affected by locusts, by pre-positioning and providing supplementary feed (rangeland cubes containing protein, vitamins and minerals), plus related training and sensitization, for up to 600,000 heads of livestock belonging to about 180,000 people (30,000 households at risk of falling into IPC 3-4, with feed quantity enough to feed core livestock for about 60 days). An integrated cash assistance will be provided to help about 6,150 already food-insecure, poor rural pastoral households (most already registered in FAO's emergency cash assistance programme) affected by the locust infestation purchase food. Total cost of pastoral livelihood assistance need is \$8.3 million.

#### 2.1. Public Complaints and Grievance Redress Mechanism

SCRP has developed a grievance handling mechanism, which is to be applied for all activities, and which will be used for this locust control as well. SCRP will conduct separate sessions at each affected area to inform the affected communities about the desert locust control, expected impacts of the proposed chemical and safety measures to be observed, and to solicit inputs from the stakeholders. During the implementation FMoAI will maintain a complaint record database to enable complaint tracking and review and establish a complaint handling committee and involve grievance handling committees in grievance handling procedures are depicted in annex 2.

#### **2.2. Public Consultation and Disclosure of the PMP**

The control of the Desert Locust cannot be achieved without the involvement of local communities in the campaigns. Therefore, sensitization and communication are essential elements in the control of the Desert Locust. Information/sensitization activities will be undertaken for the benefit of the populations, aimed at attracting attention to the risks linked to the use of pesticides and to provide the populations with details on the evolution of the locust threat, and on the zones to be treated. For this purpose, within the framework of the information and awareness campaigns, multiple and diverse means will be used, including radio and television (programmes in national and official languages), imams in the mosques, criers at markets and teachers in schools, as well as the press and print notices, fliers, brochures and posters. In addition, staff of the plant protection or extension services, and of the members of the monitoring and control teams, will also passed the necessary instructions to the local populations.

Communities will receive advance notification of the aerial application of bio pesticides. For planned aerial spray application the team guiding (flag men) the helicopter/air spray who are very mobile will work with community scouts to notify communities in target areas a day in advance. A week in advance prior to spray operation the government through the Ministry of Agriculture will also send out notices through the media (TV and radio) and SMS services in the specific control areas for planned aerial spray. The targeted messages will cover location of treatments, general information on risks of pesticides, precautionary measures etc. Further, from late last and January this year the government through the ministry of Agriculture have also been doing sensitization with the communication in the survey areas on pesticide safety and planned control activities. FAO will also contract a third-party agent to work in areas invaded by locusts (non breeding ground cropping areas) to sensitize the community about

control operation, assess the impact locust impact on crop production and impact of control operations.

The PMP will be disclosed at the website of the Ministry of Agriculture as well national television for wider coverage and local FM radios. Details of the consultation process and disclosure will be updated in the PMP once they are done including national consultation with representatives of target states and representatives from national government. During preparation of the PMP key actors in the Desert Locust arena were consulted including FAO and the respective state MoAI as well as various actors consider to be crucial in the success of this initiative. These consultations will continue into the life of the project and TF have been formed to ensure a formal channel will exist for the consultation. The TF is at three levels (i) National TF; made up of Federal and state MoAI technical experts (ii) State TF; made up of key official managing the DL at State level and FAO experts, (iii) Special TF consisting of MoAI-FGS and FAO only. The TF are to meet at weekly interval and their deliberations shared amongst all key stake holders. MoAI in the respective states is already engaging community focal points to spot and report occurrence of the DL in their location. To improve on this existing channel and as a way of motivating the communities to continue with the contributions to the effort monthly village/ community meeting will be held as a forum to present the PMP and update the communities on ongoing activities and also to collect their contributions and better appreciate the impact the DL is having on their livelihoods.

#### 3. Policy and Legal Framework for Pest and Pesticide Management

The use of integrated pest control measures in Desert Locust Control has to adhere to various policies and laws in Somalia as well and World Bank Environmental Safeguard Policies with the aim of managing the pests rather than seeking to eradicate them. Examples of agricultural related policies and laws in Somalia include Pesticides Policy (2019), as such pesticides can play an important role in meeting plant health requirements and therefore facilitating international trade in agricultural products if appropriately used. On the other hand, pesticides can be harmful to non-target organisms, and can have unintended adverse effects on human health and the environment. Moreover, they have shown to disrupt the balance of natural ecosystems, often killing beneficial organisms such as natural predators of pests and pollinators. Therefore, pesticides can drastically alter the natural balance of the ecosystems and also negatively impact agricultural productivity if used inappropriately. Agricultural Chemicals Control Act (2019) is an act that was developed to control the import, export, Sale, Manufacturing and Safety as well as the protection, conservation and preservation of the environment with regards to Agricultural Chemicals; Plant Protection and Quarantine Act, 2019 its objective is to ensure the stabilization and development of agricultural production through the prevention of the introduction and spread of Pests and the facilitation of international trade and market access of Somalia's Plant and plant products, all of the above mentioned policy and laws have been unanimously endorsed by the cabinet ministries on February 2020.

ESS 3 (Pest Management) is the main World Bank ESF ESS standard that guides integrated pest management plan for projects which triggers pesticide usage. Refer to section 4.2.2 of this report.

This section discusses and summarize the provisions of key policy and legal framework government pest management in Somalia in general and use of pesticides in particular, and indicate how this PMP meets those requirements. The section also discusses other international policies/ regulations on use of pesticides as well as WB ESF application on pest management and its key requirements.

Somalia's government institutions ceased to function during the civil war that started in 1990. Key regulatory functions such as official controls of agricultural input such as pesticides ended abruptly as state collapsed. In addition, the technical and administrative capabilities to develop policies and enact and enforce laws were lost, together with supporting infrastructure and service such as technical and legal expertise, laboratory facilities, research and extension services, and documentation archives. This has left farmers, consumers, general public and environment unprotected against potential risks associated with the unregulated trade and use of pesticides.

The technical and administrative capabilities to develop policies and enact and enforce laws were lost, together with supporting infrastructure and service such as technical and legal expertise, laboratory facilities, research and extension services, and documentation archives. This has left farmers, consumers, general public and environment unprotected against potential risks associated with the unregulated trade and use of pesticides. On this regard, the Federal Ministry of Agriculture and Irrigation (FMoAI), in collaboration with states ministries and the local and international partners, has developed a policy for pesticides with view of enacting legislation to regulate the trade and use of pesticides in Somalia.

Developing an effective and efficient pesticides policy requires coordination in both design and implementation of such policy. Somalia has a relatively new federal governance system, in which central government is envisaged to work with federal states to develop, implement, monitor and evaluate regulatory policy interventions across the sectors of the economy. However, constitutional arrangements for this multilevel governance system is still under development. Without clearly defined roles and responsibilities including processing of applications; registration of producers, importers and distributors; inspection of imports at the port of entry; in-land enforcement activities to monitor use and handling, the pesticides policymaking may be challenging. Meantime, Somalia has an appropriate legal framework and administrative structure to coordinate enforcement and therefore, it is advisable that the pesticides policy is coordinated under ad hoc memorandum of understanding between federal and state governments to clarify the roles and responsibilities in enforcement and supporting services.

Historically, the Ministry of Agriculture had sole responsibility for importation and distribution of pesticides in Somalia, often free of charge or at a low cost to large commercial or government owned farms. As Somali state collapsed private market for pesticides emerged under unregulated environment. In the absence of official controls, the trade and use of pesticides continues to pose the considerable economic, environmental and public health risks. Government therefore need to have in place the necessary institutional infrastructure for registering traders of pesticides, products and enforcing legislation. Further, it will require effective supporting policies and tools to promote sustainable pest and pesticide management. This may include promotion of Integrated Pest Management (IPM) through training programmes and incentive schemes, enhancement of the availability and use of low risk products, fostering scientific research, carrying out public education campaigns and providing training for inspectors, retailers and professional users. A solid legal framework should underpin the set of necessary institutional framework, policies and tools.

The use of chemical pesticides in agriculture has increasingly become a matter of concern in the absence of appropriate regulatory controls of their trade and use. While undoubtedly, an increasing trend of pesticide use and incidents of pest infestation, as well as high level of reported pesticide poisoning, together suggest there is an in appropriate use of pesticides in Somalia with potentially significant health and environments risks. Pesticides usually kill pests and their natural enemies alike, and as result pose risks to environment.

The section also discusses other international policies/ regulations on use of pesticides as well as WB ESF ESS requirement on pest management, noting that the development of this PMP responds to those requirements

## **3.1. Legal Framework**

## 3.1.1. Somalia Agricultural Chemicals Control Act

Agricultural Chemicals Control Act provides for the control and management, manufacture, distribution and use of hazardous chemicals and pesticides as well as the fertilizers, and to make provisions for the matters connected therewith<sup>2</sup>. The Act is divided into 5 Chapters with 26 Articles as follows:

Chapter 1: Foundation of the Agricultural Chemicals Control Law (Article 1 - 3).

Chapter 2: General Provisions (Article 4 - 8).

Chapter 3: Analysts and Inspectors (Article 9 - 15).

Chapter 4: Offences and Penalties (Article 16 -21).

Chapter 5: Final Provisions (Article 22 - 26)

## 3.1.2. Somalia Plant Protection and Quarantine Act

The purpose of this Act is to quarantine imported and export plants, and domestic plants, and to control plants injurious to plants, and to prevent them from spreading and thereby ensure the safety and promotion of agricultural production. Duties and responsibilities of the Phytosanitary Inspectors are as follows:

- Inspect Agricultural Land, Plant and plant products, beneficial organisms and regulated articles in storage or in transit in order to report the existence, outbreak and spread of regulated Pests.
- Inspect consignments of Plant, products, beneficial organisms and regulated articles destined for import or arranged for export from the country.
- Require the treatment of consignments of Plant, Plant products or regulated articles designed for import into or export from the country as well as their containers, packing material storage places conveyances.
- Ensure the safe disposal of waste from:
- Conveyance arriving in the country;
- Premises which process or waste imported plant products;
- Issue phytosanitary certificates;

<sup>&</sup>lt;sup>2</sup> The agrichemicals and plant protection and quarantine laws have been endorsed by the cabinet minister on 28<sup>th</sup> February 2020, and they waiting for the approval of the parliament and signature of the president.

# **3.2.** National and international policies, regulations and guidelines on use of pesticides

#### **3.2.1.** Somalia National Pesticides Policy

Pesticides are used to improve or safeguard agricultural yield and the quality of agricultural produce as they can play an important role in meeting plant health requirements if appropriately used. However, pesticides can be harmful to non-target organisms, and can therefore have unintended adverse effects on human health and the environment. Pesticides have been shown to disrupt the balance of natural ecosystems, often killing beneficial organisms such as natural predators of pests and pollinators. Moreover, they have shown to disrupt the balance of natural ecosystems, often killing beneficial organisms such as natural predators as a result this can drastically alter the natural balance of the ecosystems and also negatively impact agricultural productivity if used inappropriately Therefore, developing a regulatory policy governing the trade and use of pesticides is crucial for Somalia. Indeed, creating an enabling regulatory environment to promote the safe use of pesticides is critical for achieving the overarching Somalia's National Development targets of (a) 20% increase in cereal production and (b) improved food security and alleviation of widespread rural poverty through income stabilization.

#### 3.2.2. World Bank Environmental and Social framework (ESF) and applicable Environmental and Social Standards (ESS1, ESS2, ESS3, ESS 4, ESS6 and ESS10)

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The following ESSs will be applicable;

• Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts; anticipated E&S risks and impacts of the project associated with the ground and aerial spraying operations and protection of livelihoods through the provision of farming inputs to locust-affected vulnerable households require holistic assessment of the environmental and social risks and mitigation. A Pest Management Plan (PMP) has therefore been prepared. PMP will outline the various elements and actions needed to be taken to adequately address the operations environmental concerns during project implementation. The addresses: Pest management approaches, Pesticide use and management, Policy, regulatory Framework and institutional capacity, and Monitoring and evaluation. FAO Directives on Desert Locust Control which meets the Banks ESF Policy requirements on Pest Management (as per ESS3) has been integrated in the PMP. FAO will also support Government to responsibly handle and administer pesticide, reduce the associated risks and assess the positive and negative impacts of control interventions. This includes training and setting up basic facilities to monitor and address any issue that may arise from the control campaign, in line with FAO's Desert Locust Guidelines on Safety and Environmental Precautions. FAO will also support government to follow appropriate product and container disposal guidelines and provide environmental impact assessment kits. The project will also work in parallel

with other regional locust interventions activities to share knowledge base and linkages to avoid duplication and maximize sharing of resources

- Environmental and Social Standard 2: Labor and Working Conditions; Field officers who are directly involved in spraying operations tend to be the most exposed to insecticides, and thus also run the highest risk of being poisoned. Other field staff can also be exposed, either accidentally or during the normal course of their work based on task assigned or a number of tasks (e.g. an applicator who carries out the loading of the pesticide, and also does the efficacy verification after treatment). Necessary personal protective equipment will be provided to all field officers directly involved in spraying. PMP includes Safety measures, environmental precautions and monitoring as a standard contingency plan for the locust control campaign. Experts on pesticide safety and environment, as well as senior medical staff, will be involved in locust campaign planning and organization from the start. The PMP also includes FAO Desert Locust Guidelines on safety and environmental precautions.
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention • and Management; Section D para 21 to 25 of ESS3 covers management of pesticides<sup>3</sup>. Pesticides use may cause Surface and ground water pollution, leading to potential (temporary) reduced availability of drinking-water. Pesticides can get into water through accidental spillage during use or transport, washing of spray equipment's after spray operation and aerial spray. The PMP includes recommendations and suggestions to reduce the environmental and health risks of locust control. Safety measures, environmental precautions and monitoring will be a standard part of the contingency plans for the locust control campaigns. Biopesticides will be used for the initial phase. Selection of phase 2 pesticide will be based on FAO's environmental criteria through an evaluation done by FAO pesticide referees' group. The PMP includes measures on disposal of empty containers where it will be returned to the locust control base and not to be burned or buried on site, since this is dangerous to both humans and the environment. After the control campaign, the empty containers collected at the locust control base(s) will be dealt with in an appropriate manner, as described in the PMP. Where appropriate, the purchasing contract will stipulate that the pesticide manufacturer will take back the drums for reconditioning. The PMP also includes spill management measures and monitoring.
- Environmental and Social Standard 4: Community Health and Safety; community health and safety risks may be through local populations exposure to pesticide through potential involvement in Desert Locust control (help localize spray targets) or through consumption of contaminated food grown in sprayed areas. Settlement nearby spray area may also be affected by activities around pesticide storage, accidental spillage, contaminated equipment, over spraying, entry into sprayed area and exposure to empty pesticide containers. Often these impacts have a direct impact on the lives of local people in locust-affected areas. Environmental risk reduction will be done on a case-by-case basis by choosing the right insecticide for a given situation or environment, using the appropriate control strategy and method, and strictly applying environmental protection measures where possible.

<sup>&</sup>lt;sup>3</sup> Para 21 preference to integrated pest management (IPM) or integrated vector management (IVM). Para 22 Assessment of the nature and degree of associated Risks with procurement of any pesticide the Borrowers. Para 23 Gives additional criteria to apply in selection and use of such pesticides. Para 24 Measures applied to pesticides use, manufacture, formulation, packaging,labeling, handling, storage and disposal. Para 25 Requirement of the borrowe to prepare a PMP

- Most rural people depend on wells or surface water to provide drinking-water; if these are polluted by insecticides, no alternative water supply may be available to them. Livestock will graze on green pastures just like locusts but no insecticide residues should end up in meat and milk after locust control operations. The PMP includes a communication plan to keep the public informed about possible environmental and health effects of insecticides, before, during and after locust control operations. This is to ensure that precautionary measures are taken whenever needed but also to reduce any misunderstandings that may exist about the risks of locust control. A specialized communication and information officer will be assigned to this task.
- Inhabitants of the zone in which the treatments take place will be informed of the operation beforehand, and warned not to come close to it. Since Desert Locust spray targets are often identified during late afternoon, to be treated the following morning, inhabitants will be warned the evening before spraying. Control teams will ensure that nobody is present in the area to be sprayed. Villages or habitations, open water and nature reserves will be off limits for all insecticide treatments against locusts. Wells or waterholes that lie in the area in which treatments take place will be covered up. Beehives will also be covered up temporarily to protect them further from any unexpected spray drift
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; The locust crisis intervention support through spraying may affect important water source areas, natural resources or ecological functions on which local populations depend. For example, bees provide honey, wax and the essential pollination of many crops but they are also very susceptible to insecticides. Many wasps, flies, spiders and beetles' prey on crop pests; if these natural enemies are killed by insecticides, pests may become a problem for farmers. The PMP includes efficacy assessment of pesticides to evaluate potential environmental impact of the insecticides. Use of obsolete pesticide stocks will also be restricted in the country. During campaign planning all areas in the country that are ecologically and agronomically important or particularly sensitive to insecticides will be identified for exclusion. For each sensitive area, locust management options will be evaluated, based on the type of organisms at risk and the likely locust targets that may appear in the area. Subsequently, appropriate locust control techniques will be identified for each area. These include the decision to allow chemical control or not, the choice of acceptable insecticides, periods when treatments are or are not allowed, appropriate control methods, etc. Sensitive areas will be mapped with overlays of previous (or newly expected) locust infestations to create buffer zones to protect sensitive areas such as watering points (springs, wells, pans, ponds, dams) and open water to homesteads, grazing areas to protect sensitive environment, human and animal health.
- Environmental and Social Standard 10: The PMP includes budget for communication. Stakeholder Engagement and Information Disclosure. Safety of the communities in the DL affected area is paramount and though only Biopesticides will be in used, the MoAI and respective State MoAI will launch awareness campaigns using various media outlets including TV, Radio, print media, phone messaging, these actions serve to supplement the physical visits made by Government officers amongst the communities and serve as a constant reminder to the communities. Communities will

receive advance notification of the aerial application of bio pesticides. For planned aerial spray application the team guiding (flag men) the helicopter/air spray who are very mobile will work with community scouts to notify communities in target areas a day in advance. A week in advance prior to spray operation the government through the Ministry of Agriculture will also send out notices through the media (TV and radio) and SMS services in the specific control areas for planned aerial spray. The targeted messages will cover location of treatments, general information on risks of pesticides, precautionary measures etc. Further, from late last and January this year the government through the ministry of Agriculture have also been doing sensitization with the communication in the survey areas on pesticide safety and planned control activities. FAO will also contract a third-party agent to work in areas invaded by locusts (non breeding ground cropping areas) to sensitize the community about control operation, assess the impact locust impact on crop production and impact of control operations. The PMP will be disclosed at the website of the Ministry of Agriculture as well national television for wider coverage and local FM radios.

#### 3.2.3. Agricultural Pest Management

The Bank uses various means to assess pest management in the country and support integrated pest management (IPM) and the safe use of agricultural pesticides: economic and sector work, sectoral or project-specific environmental assessments, participatory IPM assessments, and investment projects and components aimed specifically at supporting the adoption and use of IPM.

In Bank-financed agriculture operations, pest populations are normally controlled through IPM approaches, such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest. The Bank may finance the purchase of pesticides when their use is justified under an IPM approach.

#### 3.2.4. Pest Management in Public Health

In Bank-financed public health projects, the Bank supports controlling pests primarily through environmental methods. Where environmental methods alone are not effective, the Bank may finance the use of pesticides for control of disease vectors.

#### **3.2.5.** Criteria for Pesticide Selection and Use

The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users. With respect to the classification of pesticides and their specific formulations, the Bank refers to the World Health Organization's Recommended Classification of Pesticides by Hazard and Guidelines to Classification (Geneva: WHO 1994-95). The following criteria apply to the selection and use of pesticides in Bank-financed projects:

- a. They must have negligible adverse human health effects.
- b. They must be shown to be effective against the target species.
- c. They must have minimal effect on non-target species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health

programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them.

d. Their use must take into account the need to prevent the development of resistance in pests.

The Bank requires that any pesticides it finances be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards acceptable to the Bank. The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

## **3.2.6.** Convention on Biological Diversity (1992)

The Convention on Biological Diversity adopts a broad approach to conservation. It requires Parties to the Convention to adopt national strategies, plans and programs for the conservation of biological diversity, and to integrate the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programs and policies. The proposed programme is expected to conserve biodiversity, especially the rare and endangered species in the project area and its environs. In addition, United Nations Convention on Biological Diversity (CBD) provides a regulatory framework for the conservation of biological resources at the international level.

## **3.2.7.** International Plant Protection Convention (IPPC) of FAO (1952)

The IPPC is an international treaty to secure action to prevent the spread and introduction of pests of plants and plant products, and to promote appropriate measures for their control.

## **3.2.8.** World Food Security and the Plan of Action of November 1996

This declaration seeks to secure effective prevention and progressive control of plant and animal pests and diseases, including especially those which are of trans-boundary nature, such as desert locust, where outbreaks can cause major food shortages, destabilize markets and trigger trade measures. It promotes regional collaboration in plant pests and animal disease control and the widespread development and use of safe pest management methods such as integrated pest management practices.

## **3.2.9.** United Nations Framework Convention on Climate Change (1992)

The convention seeks to regulate levels of greenhouse gases (GHGs) concentration in the atmosphere, to avoid the occurrence of climate change at levels that would harm economic development, or that would impede food production activities. In essence, the locust thrives on vegetative and forage parts of plant and therefore depleting carbon sinks. Abating the invasion menace will not safe vegetation cover but allow for rejuvenation of the damaged forage.

# 3.2.10. FAO Guidelines on Good Practice for Aerial Application of Pesticides (2001)

When using an approved pesticide, the objective is to distribute the correct dose to a defined target with the minimum \of wastage due to drift using the most appropriate spraying equipment. Acceptable spray distribution is relatively easy to achieve with most ground-based directed spraying, but spray application with fixed and rotary wing aircraft presents

more complex problems. The purpose of this guide is to identify some of the problems and to suggest means of addressing them. Although the number of aircraft licensed for aerial spraying has decreased recently, where large uniform areas have to be rapidly treated, aircraft application is usually considered to be more fuel-efficient than ground spraying. Aircraft are used to apply both liquid and solid materials as well as to broadcast seed when soil conditions prohibit the use of ground equipment.

# **3.2.11.** FAO Guidelines on Good practice for ground application of pesticides (2001)

The guidelines are aimed at decision-makers, managers, field supervisors and spray operatives. However, it must be emphasized that in some countries, legislation is already in place to control safe and efficient pesticide use and application. Accordingly, local legislation, or voluntary codes must be the first point of reference with this set of guidelines offered as additional information. This is an important point, as compliance with local legislation may have legal significance in the event of a claim against the poor field performance of a pesticide.

#### **3.2.12. FAO Guidelines on Management Options for Empty Pesticide Containers**

This guideline provides advice on the management of one-way pesticide containers following the deployment of their contents. Unless empty pesticide containers are managed correctly, they are hazardous to both mankind and the environment. There is a danger that empty containers could be reused for storing food and water, which could result in pesticide poisonings. Containers abandoned in the environment can lead to pesticide pollution in soil and groundwater. A container management scheme can minimize these risks and is part of the "life-cycle concept" as addressed in the International Code of Conduct on the Distribution and Use of Pesticides.

A container management scheme should ensure that:

- > the containers are decontaminated directly following the use of their contents;
- > inappropriate use of the empty containers is prevented; and
- Drum crusher should be used to ensure that the empty containers are crushed immediately after use

The safety of pesticide users and the public is of paramount importance when designing a container management scheme.

# 3.2.13. FAO Guidelines on Desert Campaign organization and execution, FAO Rome 2001

This guideline is intended for use by those individuals who have the responsibility of organizing a locust control campaign in their country. Field staff, administrators, donors and other international organizations may find some of the information useful in understanding what is involved in the organization and implementation of locust campaigns. The guideline deals almost exclusively with aerial control campaigns because only aerial control can cope with large numbers of locusts in which the aim is not only to protect crops but to reduce the size of the total locust population and bring an end to the upsurge or plague. It concentrates on the resources required for a campaign as well as the organization and deployment of these resources.

#### 3.2.14. FAO Guidelines on Desert Locust Control (2003)

This guideline is intended mainly for use by field staff involved in Desert Locust control operations, including field officers supervising control operations and pilots and engineers of spray aircraft. Some parts will be useful reference material for training new staff and providing refresher training for experienced locust officers. The information and reference data may also be useful for senior managers planning and overseeing campaigns and for donor representatives assessing technical needs. The guideline contains practical advice on equipment and techniques used to carry out locust control which is safe (minimum negative effect on humans and the environment), effective (controls locusts successfully) and efficient (effective with minimum cost).

# 3.2.15. FAO Desert Locust Guidelines on Safety and environmental precautions (2003)

This guideline is primarily intended for use by decision-makers, field officers and monitoring staff involved in the organization and execution of Desert Locust control operations. Some parts will be important reference material for training new staff as well as providing background information for experienced locust officers. Two subjects are addressed in this guideline. First, the reduction of environmental and human health risks from insecticide use during locust control is discussed. Practical recommendations are given on how to address risk reduction during the campaign preparation phase, how to implement it during the control operations, and how to evaluate it in post-campaign follow-up. The second subject is environmental and human health monitoring during locust control operations. Monitoring of control operations is necessary to assess whether adverse effects occur and under what circumstances. Such information is essential for improving control techniques and approaches. The guideline will only address operational, short-term monitoring activities and will not discuss more in-depth or long-term monitoring and research.

#### 4. Pest Management Plan for Control of Desert Locust

#### 4.1. Control Strategies and Management Approaches

The principal aim of strategies designed for locust control is to reduce the size of the total population of insects in the breeding grounds and not merely to attack insects in or near crops. This is deemed the most appropriate way to achieve crop and pasture protection with such mobile pests, while preventing occurrence of plagues. This also recognizes that desert locust upsurges leading to plagues are believed to occur through sequences of successful breeding by initially solitary-behaving populations, followed by gregarious populations. While the gregarious populations are the obvious targets for spraying, their destruction does not necessarily make significant inroads into the critical mass of the population. Solitary locusts, which are not targets in practical or economic terms, migrate and continue to multiply. These locusts expand into an ever-increasing area for several generations and it is only when they come together into swarms and become recognizable targets that effective control can be achieved. The strategy will therefore target both the solitary and gregarious populations.

## 4.2. Choosing Pesticides for Locust Campaign

FAO guidelines outline the following factors to consider when choosing an appropriate pesticide for locust control:

- Efficacy the more toxic the active ingredient (the poisonous part of the insecticide) is to the locusts, the smaller the amount of active ingredient needed.
- Safety the product should ideally have a low toxicity to mammals (humans, livestock) and to other animals such as birds and fish.
- Specificity ideally the product should be toxic to locusts but not to other types of arthropod. If they are toxic to many other types of arthropod, they are called broad spectrum compounds.
- Persistence the longer the product remains biologically active in the field, the more effective it is because it can kill locusts later as they emerge from eggs or arrive in the area. However, there may be a more serious effect on other organisms, i.e. greater environmental impact, from a persistent product.
- Route of entry whether it is a contact or stomach action product will determine its suitability for different targets, e.g. flying swarms need a product with contact action.
- Speed of action the faster the product works, the less crop damage will be caused and the better the feedback the control team has on the effectiveness of operations. However, sometimes speed of action is not important, e.g. for hopper bands far from crops.
- Shelf life the longer a product can be stored before use the better. If it is not needed immediately it will still be effective in future years.
- Availability locust insecticides must be available as ULV formulations in large quantities at short notice.
- Cost insecticides are one of the most expensive elements in any control campaign so cheaper products will greatly reduce control costs.

## **4.3. Integrated Pest Management Experiences**

The need to use new and alternative methods in order to protect human health and the environment such as Insect growth regulators, botanicals, semi chemicals and bio-pesticides should be developed and introduced. Some of the envisaged advantages of these alternatives are:

- a) Bio-pesticides (e.g. *Metarhizium anisopliae* var. *acridum*) are highly specific, have low mammalian toxicity, with possibility to produce formulation locally in small quantities and is safe to the environment.
- b) Botanical insecticides (e.g. Neem) is available locally and can be prepared at village level in small quantities, and have low environmental impact.
- c) Semiochemicals (e.g. pheromones) may be highly specific and safe products can be used to reverse the process of gregarization, disperse bands and swarms. Experimental results on reduced feeding, marching increased predation, cannibalism, susceptibility to insecticide and pathogen are encouraging. None is available commercially.
- d) Insect Growth Regulators (e.g. Diflubenzuron and Triflumuron), which interfere with the production of chitin. IGRS are persistent, very low environmental impact, and selective due to its stomach action. However, they are highly toxic to aquatic invertebrate organisms, so it is important to avoid spraying near or around water bodies

Though the above are considered safer options their cost is usually higher per unit area and for this biological product such as *metarhizium*, which are highly specific to Desert Locust global production capacity is very limited and cannot cope with the high demand during upsurges. Another major disadvantage of these safer products is the slow activity once applied as well as their limitation of use to the nymphal stages. Their use is therefore limited to early developmental stages in the breeding areas where a quick knockdown effect is not critical.

## 4.4. Pesticides to be purchased by the plant protection unit

The products to be purchased by the project will be limited to only those that have been recommend by FAO for the use in Desert Locust control, no class 1A or 1B will be procured. Formulation will be ULV formulations to limit the amount of product released in to the environment, two categories of products are to be acquired;

- Biopesticides: For control of immature stages in the breeding grounds in northern Somalia *Metarhizium* will be acquired a total of 12,300kg of dry spore valued at 3.9 million USD. This quantity through targeted application will be enough to treat 246,000 ha.
- Chemical pesticides: 90,000 liters of chemical pesticides valued at 2.3 million USD will be used to supplement the biopesticide applications in the breeding grounds as well as control swarms expected to invade the bread basket in the south of the country. This 90,000 liters will be used only in the second half of the year for the control operation and it is expected that the parliament will approve the agrichemical and plant and protection and quarantine laws in their meetings of the second half of the year unless it is affected by COVID-19. As recommend by FAO only ULV formulations of either Fenitrothion, Chlorpyiripos, Malathion, Deltamehrin will be considered for procurement based on availability of stock from prequalified suppliers. Procurement of the 90000 litres will be split in 3-4 consignment to avoid accumulation of obsolete stocks.

#### 4.5. Risks Associated with Pesticide Management

Evaluation of the desert locust control program and campaign identified potential environmental and occupational health risks associated with importation, shipment, transportation, storage, distribution to points of use and use of the incidences. Some of the risks are depicted (see Table 1).

Risks at various handling stages	Potential environmental Risk	Potential Social Risk	Occupational health risks	Others
Importation	Damage during shipment, leakage/spillage	Fatigue associated social stress arising from	Expose people, aquatic and wildlife to intoxication	Low pesticides quality due to prolonged storage
Transportation	Spillage and leakages, fumes' and fire. Spills if not cleaned or	pressure and Long working hours for	The operator hazards during spillage and decontamination	Lack, uncompleted protective gear and absorbent

## Table1: Risks associated with importation, transportation, storage, distribution and use of pesticides

<b>Risks at various</b>	Potential	Potential	Occupational	Others
handling stages	environmental	Social Risk	health risks	
0 0	Risk			
	decanting and	timely		materials
	replacing	delivery of		
		product		
Storage	Site location,	Insecurity	Spillage,	Obsolete
	design,	prone areas	Corrosive	pesticide Lack
	construction		containers, loose	of Shelves,
	requirements for a		bags and	
	pesticide store not		containers, cake	
	compliant with set		formulations	
	noorly built store		of store lack of	
	lack of ventilation		good store	
	and floor space		keeping &	
	leading to		sanitation	
	containers		practices	
	wrongly stored,		•	
	spillage, corrosive			
	containers.			
	Prolonged storage			
	of products causes			
	caked			
	formulations.	т 1'.'	T 1 C	<b>T</b> 1 C
Distribution	wrong	-Inequalities	Lack of knowledge by	Lack of
	exposing products	social biases	nesticides	protective gear
	to human and	-Insecurity &	distributors	
	environment.	theft leading		
		to loss of		
		pesticides		
Use	Improper disposal,	-Sex abuse	Improper	
	spillage and left-	from	labeling leading	
	over pesticide.	Interaction	to wrong usage,	
		of, spray	cleaning of	
		teams and the	sprayers and	
		the willeges	decontemination	
		- Loss of	of stores	
		livelihood	01 510105.	
		due to		
		damages		
		- Low		
		participation		
		of the		
		affected		
		people (top-		
		down		
		interventions)		

Risks at various handling stages	Potential environmental Risk	Potential Social Risk	Occupational health risks	Others
		hampering feed backs		
Disposal	Improper disposal of empty containers through burning. Left overs in wrongly disposed containers cause persistence and lasting in soil.	Disposal of locust carcass	Effect on food chain as a result of pollution of environment and ground water.	- Pesticides getting into the food chain through mishandling of dead insects

To mitigate the risks this PMP adopts and follows FAO guidelines on safety and environmental precautions (FAO, 2003). In line with these guidelines, the following will be observed:

#### 4.6. Quality control of pesticides

Testing of pesticide on arrival at the port of entry to establish its quality and conformity to the description on the label. This will be done by registered government officials – Pest Control Products Boards – with the support of FAO experts. The laboratory to be used will be determined by the Pest Products Control Board in consultation with the FAO. FAO pesticide specifications will be followed. Apart from verifying the concentration of active ingredient(s), quality control will also assess levels of toxic metabolites.

## 4.7. Pesticide storage

It is important to provide the general storage requirements that apply to all pesticide storage. These may include full separation of stored or displayed pesticides from food products or other consumables; adequate ventilation; impermeable floors; adequate protection against unauthorized access; availability on location of the necessary materials and equipment to deal with leakage and other emergencies; etc. Further requirements can be established for pesticide storage above certain quantities or for a specific category of stores or products. Such a provision may require further safety measures and pose restrictions on the location of stores in order to minimize risk. This could apply to locations in habitation areas and shops selling food and drink, near hospitals, schools or waterways. On the other hand, with FAO the ministry is committed to construct 2 storages in Garowe and Hargeisa under TCP project for the coming couple of months and it is part of ministry's plan to build other storages in DL breeding areas.

The plan is intends to put up pesticide stores in the two location under the TCP. The design has been developed by FAO following FAO laid down guidelines for the construction of pesticide store that adheres to set FAO/WHO guidelines for the construction of such facilities with all built in safeguards. The drawings have been done by FAO Engineers and the design has been presented to the MoAI and is currently under review.

Similarly, the site selection process is also underway and is following the guidelines set by FAO for the selection of suitable locations and is taking into account all required safety precautions to ensure there is a safe distance between the store and water sources as well as human habitation. The proposed design has factored in a high perimeter fence/ wall that will ensure controlled access into the site. Risk assessment will be factored into the site selection process and WB is welcome to participate or review the findings of the exercise.

As there are no immediate plans to setup stores in other locations, control of the DL will be coordinated centrally and rapid mobilization of control teams will be the key to success in any DL operation present or in the future. Provisions are in place for an effective EWS via FAO to ensure the control teams can be deployed to distant locations rapidly.

The MoAI also would like to ensure proper custody of pesticides and destruction of any drums and containers. Drum crushers are being procured and will be located at the two locations Hargeisa and Garowe, and adjacent to the stores to ensure the proper disposal/ destruction. Any field locations will be temporary and will only be supplied with enough product for the control operations any little amount left over will be safely transported back to the central stores along with the containers destined for destruction.

As the storage facilities fall under associated facility categorization under the World Bank ESF ESSs, FAO will undertake environmental assessment including risk assessment for the pesticide storages proposed in Garowe and Hargeisa under TCP project. This commitment has been included in the MOU between FAO and MOAI. The outcome report will be provided to the World Bank for review

#### 4.8. Ecologically sensitive areas and non target areas.

The areas that have been designated as sensitive and non-target areas by the MoAI include; watering point, wells, other water bodies, agronomically and ecologically important sites, human settlement and grazing area. All these areas will be identified well in advance of any spray operation and any communities that maybe affected will be alerted in advance. The MoAI has also put into place the following mitigation measure to ensure these areas are safe from any chemical intervention;

- Only to use bio-pesticide in these areas.
- Alert communities in advance to ensure they are not affected in anyway by the operations.
- In case of grazing lands alert the pastoralist on the planned activities and where possible delay sending out their animals on the day of operations.
- Observe wind direction and speed and ensure control is only under taken when wind is favorable to prevent unwanted drift into sensitive area.
- Deploy the most appropriate equipment to prevent drift in these areas; back mounted as opposed to vehicle mounted and aircrafts will be the equipment of choice.
- The spray teams will remain fully briefed on the approached to be used in sensitive areas.
- FAO spray application forms as well as eLocust3 system will be used as a tool to monitor compliance.

For each sensitive area, locust management options will be evaluated, based on the type of organisms at risk and the likely locust targets that may appear in the area. Subsequently,

appropriate locust control techniques have to be identified for each area. These include the decision to allow chemical control or not, the choice of acceptable insecticides, periods when treatments are or are not allowed, appropriate control methods, etc. Experience has shown that it is often most effective to try to map out the various sensitive areas, and make overlays with previous (or newly expected) locust infestations. This can be done using computerized geographic information systems, or directly on paper. In many locusts affected countries, electronic maps of important environmental areas are now available, and the locust unit should seek assistance from the relevant national agency to exploit them.

FAO will map out ecologically sensitive areas and make overlays with previous (or newly expected) locust infestations. This will be done using the GIS. The management measures will strictly adhere to FAO guidelines as illustrated in Table 2.

Ecologically and agronomically	Management measures
sensitive areas	
National parks; nature reserves;	No insecticide applications; only biological
internationally protected areas	control agents; only low hazard insecticides
Important (inland) fisheries areas;	Only insecticides with very low hazard to
mangrove forests	fish and aquatic invertebrates
Important fruit-growing areas;	No insecticide applications during flowering of fruit trees;
beekeeping areas	only insecticides with very low hazard to bees; set up
	information system to warn bee-keepers of upcoming
	treatments
Areas with important biological	No insecticide applications; only insecticides with very low
pest control programmes	hazard to natural enemies of pests
Areas with export crop or livestock	Only insecticides that do not pose problems with export
production	maximum residue limits
Areas with organic farming	No chemical insecticides

 Table2: Ecologically and agronomically sensitive areas and their management measures

By its nature the chances of DL settling in population centers is limited, this in its self will prevent and large scale operations being carried out near settlement areas. Medium to large population centers will also be off limits to spraying including village settlements and open water. This areas will be demarcated during mapping and pilots will be briefed by base manager and entered into aircraft tracking system which automatically warns the pilot to switch off spray during approach. Daily operations will also be attentive to unforeseen circumstances (People or livestock may have wandered into the spray area inadvertently, ponds or water-holes may have been missed during survey of the spray area, a flagman may forget to move upwind in time, etc). In all such cases, application will be stopped temporarily, to avoid exposure of the non-target persons or organisms and PPEs/masks, etc. Will be provided to communities in the line of exposure including health surveillance, monitoring and medical assistance to villagers and communities that could be exposed and affected.

If such areas lie downwind of the spray target, sufficient distance needs to be kept to ensure that insecticides do not drift into them. The size of these unsprayed buffer zones will depend on the type of application (air or ground), weather conditions (e.g. wind speed), topographical

conditions (e.g. density and height of vegetation) and the sensitivity of the area to be protected. See table below for aquatic habitats. Buffer zones for other sensitize sites will be recommnded based on local settings using the Fao Check List For General Monitoring Of Desert Locust Control Operations provided in annex 4.

Suggested minimum buffer zones for the protection of aquatic habitats 1 to be respected during Desert Locust control operations

Emission height	Type of sprayer 2	Minimum buffer distance 3		
1.0 - 1.5 m	Micro-ULVA	200 m		
2.5 - 3 m	ULVA-Mast (X15)	400 m		
10 m	Aircraft (Micronair AU5000)	1 500 m		
1 Buffer zones have been calculated for freshwater ecosystems. Pending verified buffer zones for terrestrial ecosystems,				
aquatic buffer zones may be used as indicative for terrestrial systems.				

2 Type of sprayer for which the buffer zone has been validated.

3 Minimum distance to be left unsprayed between the last spray run and the area that has to be protected.

#### 4.9. Pre-campaign medical examinations

The medical team attached to the control bases will work closely with local medical facilities (dispensaries, health centres and hospitals. Diagnostic and treatment of insecticides that may be used such as fenintrothion ULV 96% poisoning as stipulated in the FAO guidelines will be made available to medical team and local health facilities.

All control staff, and other persons be it members of the community who may come into contact with insecticides, will undergo a medical examination before the start of the campaign. Pre-campaign examination establishes a baseline for future health monitoring. This will be carried out by a physician with knowledge about insecticide toxicology and who is aware of the risks to which locust control staff may be exposed. Specific attention will be paid to medical conditions that may increase susceptibility to insecticides (e.g. skin lesions, liver disease, chronic alcoholism, haemolytic anaemia, malnutrition. Blood Cholinesterase (ChE) levels will be obtained for each control agent. These data can be used as a baseline for ChE monitoring during and after the campaign and a medical testing (AchE test kits) and small amounts of the antidote for Fenitrothion poisoning (Atropine)if Fenitrothion is chosen. Baseline ChE levels will be taken when the person has not been exposed to OPs or CAs for at least 30 days. Since there may be variability between laboratories or analysis methods, the same type of ChE test kit or blood analysis laboratory will be used throughout the control campaign.

The initial phase of control will only use biopesticides as there is no disruption of the nervous systems in humans it will not be necessary to carry out any test during this phase.

If and when chemical pesticide will be used the MoAI will adopt guidelines set by FAO/WHO on cholinesterase testing and recovery for spray personnel as well as exposed community members. Due to the low dosages to be used and precautions to be taken to limit expose the worst-case scenario would involve symptomatic treatment based on guidelines provided by the manufacturers of the chemicals.

Through FAO the MoAI has placed order for Cholinesterase test kits which will be available in the field of use.

The perquisite training required for use of the kits will be provide through FAO to partners, first aiders, local unsung teams available in the location to the spray teams to ensure they can

effective. A local institute Sadar has been given the responsibility via contract with FAO to support the MoAI with this initiative.

## 4.10. Storage and transportation of pesticides

- a) Drivers transporting pesticides will be trained / sensitized on accident prevention and on dealing with emergencies such as spillage or fire during transportation.
- b) The team will ensure that pesticides are not transported with any foodstuffs and that they are covered and well labelled at all times during transport and storage. Labelling will follow standard FAO procedures/ guidelines.
- c) The team will provide safe storage for the pesticides in all the proposed 6 ground base stations and will control/ document release of the pesticides. This will be done through proper siting and design of the storage facilities and providing equipment and facilities for containing possible spillage, protecting the pesticides from direct sunlight/rains, and having checklist/form to manage stock movement in and out of the stores. The project teams will adhere to the appropriate store management by applying the rule of the thumb (i.e. first in first out) and providing the right store equipment and materials to curtail or minimize storage accidents, leakages and spillages.

## 4.11. Management and use of pesticide containers

- a) The team will adhere to safe disposal of pesticide and empty/ used pesticide containers. The project will adopt the "return to the sender principle" as part of the procurement contract, and follow all other FAO guidelines.
- b) The team will ensure safe disposal of the empty (used) drums carrying the pesticides and that these are not given to communities and are crashed on the site.

## 4.12. Public awareness and communication

The general public will be kept informed about possible environmental and health effects of the pesticides, before, during and after locust control operations through radio, public gathering, religious gatherings and schools. This will ensure that precautionary measures are taken whenever needed and also to reduce any misunderstandings that may exist about the risks of locust control. The government will coordinate this task. The adopted communications strategy will ensure among others the following issues are considered and well-articulated:

- What should be the (technical) contents of the information? (e.g. location of treatments, general information on risks of pesticides, precautionary measures, reentry intervals, pre harvest intervals)
- Should there be "standard" answers to certain expected frequently asked questions on environmental and health issues? (e.g. by the public, politicians, the press)
- What is the appropriate type of communication method to reach the target groups effectively? (e.g. radio, television, newspapers, extension service, locust survey/control teams)
- How should the public be informed in case of emergencies? (e.g. insecticide spills, fish kills, human intoxications)
- How does one ensure that all control teams provide the same information to the local population? (e.g. to avoid that one team instructs villagers to close a well before spraying, and a second team operating in the same district tells another village this is not needed)

What other information sources should be involved or kept on standby? (e.g. medical information sources in case of intoxications).

Overall, the government through FMoAI will:

- a) organize awareness creation and communication activities to sensitize communities on where spraying is to be carried out and to sensitize them on ways to keep themselves and their animals and crops safe.
- b) The team will sensitize all involved government agencies on compliance with environmental and social safeguards with special emphasis to do no harm principle (sexual abuse, gender violence, inclusivity among others).
- c) The project will conduct rapid social impact assessment (sample two counties) to enable formulation and implementation of livelihood restoration programmes during and following control of the locust
- d) The team will strengthen and use Grievances Redress Mechanism (see Annex 2) to handle grievances arising from activation of the emergency response project
- e) The project will use Stakeholder engagement processes and communication strategy to reach out and consult stakeholders

## 4.13. Implementation responsibilities, required expertise and cost coverage

## 4.13.1. Implementation responsibility:

Project implementation will be the responsibility of the respective state desert locust units of the Ministry responsible for DL activity where a dedicated Desert Locust unit is not present. The national task force will guide all activities to ensure equitable allocation of resources to each state.

## 4.13.2. Required expertise:

FAO Somalia office and with support of the FAO transboundary pest unit will provide the require technical back stopping as required at all stages of implementation, this will include;

**Support to survey operations:** this will include provision of eLocust3 units, GPS equipment and other tools required to collect quality data. The Desert Locust Information Services (DLIS) will provide the required expertise and support to analyze the data and recommend appropriate interventions as required at country level.

**Training of Desert Locust Information Officers (DLIO):** DLIOs have the responsibility of collecting and processing data that guide survey and control interventions targeting the desert Locust using training tools developed by FAO the DLIOs will receive the training required to perform their duties as required.

**Training of spray and equipment operators:** FAO through its experts will provide the required specialized training for spray teams on the use of equipment acquired for the control campaigns.

## 4.14. Training of personnel on use of pesticides

a) Training of all the persons to involved in aerial and ground spraying on safety and the provisions of this PMP will be conducted. This will be facilitated by technical support of FAO. Training of all the persons including control team, transporting staff, storekeepers, flagmen, monitoring teams and medical staff is an imperative.

A tailor-made training package as provided in the FAO guidelines targeting various groups will be disseminated (Table 3).

- b) Provision of medical diagnosis services for personnel and local to determine their contamination/ toxic levels and examining them for acute or chronic poisoning symptoms when such need arises. More specifically, personnel and other stakeholders involved in the campaign will be tested for acetylcholinesterase (using blood sample test kits to be procured under the project) before, during and after the campaign. There will be medical personnel from the counties to support diagnosis and treatment
- c) All personnel involved in spraying (applicators, loaders, etc.) will be provided with approved personal protective equipment. The exact PPEs to be provided with be determined by FAO, and will be procured as part of this project

Target	Topics
Field scouts	• Survey methodology and Biology & Behavior of DL
Desert Locust Information Officers (DLIOs) & senior scouts	On biology, control, elocust3, Geoflex
Control teams	<ul> <li>Application techniques, equipment, maintenance</li> <li>Equipment calibration</li> <li>Safety measures, PPE, insecticide poisoning, first aid</li> <li>Environmental precautions</li> <li>Rapid assessments (efficacy, occupational health, environment)</li> </ul>
Insecticide transport staff	<ul> <li>Proper handling and transport of drums and containers</li> <li>Safety measures, PPE, insecticide poisoning, first aid</li> <li>Environmental precautions, clean-up of spills</li> </ul>
Storekeepers	<ul> <li>Pesticide storage management</li> <li>Safety measures, PPE, insecticide poisoning, first aid</li> <li>Environmental precautions, clean-up of spills</li> </ul>
Flagmen	• Safety measures, PPE, insecticide poisoning, first aid
Monitoring teams	<ul> <li>Monitoring techniques</li> <li>All the above topics (monitoring staff should preferably participate in the training of all other campaign staff who they may need to evaluate)</li> </ul>
Medical staff	<ul> <li>Recognition and treatment of insecticide poisoning</li> <li>Testing of allergies and cholinesterase</li> <li>Administering the proper antidotes (i.e. Atropine for Fenitrothion)</li> </ul>

#### Table 3: Target campaign personnel and topical training areas

#### 4.15. Monitoring

The overall responsibility for monitoring and supervision of PMP will lie with the FMoAI At Federal level as a national TF chaired by FGS is in place with the responsibility of coordinating desert Locust related actions in the country.

Designated officers will be deployed and facilitated to monitor and enforce the irregularities by monitoring storage areas, inspecting field applications and advising on strict management, import control and quality control to ensure protection of human health and the environment. The project will consult with relevant government departments, institutions and local leadership

to create buffer zones to protect sensitive areas such as watering points (springs, wells, pans, ponds, dams) and open water to homesteads, grazing areas in a bid to further protect sensitive environments, human and animal health. Procurement of the insecticide will only enough quantities of the pesticides and sensitizing communities not themselves to conduct any spraying. Further, frequent monitoring will be conducted for both internal and external exposure to the pesticides by testing communities and those involved in spraying using the blood test kit to be procured. To ensure various aspects of the process are conformed to a multifaceted monitoring approach will be employed in tandem with FAO guidelines:

#### **4.15.1.** Monitoring approaches:

The following approaches will be employed to attain thorough monitoring, environmental safety and effectiveness:

#### i. Monitoring – rapid assessments

This is monitoring carried out by the control teams themselves. The following activities will entail part of a rapid assessment.

#### ii. Efficacy assessment

Efficacy assessments are made to verify whether the insecticide and the control technique are effective. Efficacy will be checked regularly, even for such an insecticide with which one has experience. Further advice on locust mortality assessments is provided in FAO guidelines.

#### iii. Dedicated operational monitoring

FAO guidelines which spells out among others suggestions for priority setting. The rule, for monitoring is to address those issues that are considered to be a potential problem, either by the campaign staff or by the general public. Among other parameters they will monitor; spray for an independent verification of equipment calibration and the execution of the treatment by control teams using The FAO Spray monitoring form can be found in Annex 4; Efficacy assessments to done based on FAO guidelines; Monitoring human health for Occupational exposure and External exposure, Internal exposure which is an indicator for organophosphate absorption is the depression of acetylcholinesterase (in red blood cells) and pseudocholinesterase (in blood plasma). This can be tested after taking a blood sample and subsequent analysis using a field test kit For Desert Locust control, cholinesterase field test kits preferred because these avoid transport of samples to a laboratory (which may be far away from the control site) and allow immediate corrective action, if needed. Good, robust and easy to use field test kits will be procured and made available for use. Monitoring insecticide residues useful to monitor insecticide residues after locust control treatments to evaluate whether the withholding periods recommended by the insecticide manufacturers are valid under local conditions or to confirm that no contamination of protected areas occurs when recommended buffer zones are respected. Emergency sampling; emergency situations, e.g. if wildlife mortality has been observed, accidental spillage has occurred; beekeepers have claimed that locust control has caused them damage, etc. In these cases, the monitoring team may need to take samples immediately, for later residue analysis. It is important that sampling is carried out as soon as possible as well as to rotating operators that show signs of overexposure or decrease in AchE levels. Sampling will be guided by FAO indicative sample sizes.

## iv. Finalizing monitoring activities

Various activities related to environmental and health monitoring will continue for some time after the control activities have stopped.

## v. Post-campaign health examinations

All control staff will undergo, as soon as possible after the control campaign, a medical examination. When deemed necessary, a final ChE analysis will be carried out (e.g. if the staff member has shown ChE inhibition late in the campaign). The results of these check-ups shall be compared with the pre-campaign data. Any staff showing signs of (chronic) insecticide poisoning will continue to be monitored. Based on these results, staff may need to be assigned other tasks during the next control campaign

## vi. Long-term monitoring

Residue or ecological monitoring needs to be continued after the last control operation to check for any adverse ecological effects and impacts. Thus, a few members of monitoring teams will task immediately after a campaign.

## vii. Sample treatments

Often, both residue and biological samples will be analysed after the control operations (e.g. because relevant staff were involved in field monitoring). It is important that the campaign organization takes into account the time needed for such analysis, as the results may be important for the technical evaluation of the campaign.

## viii. Reporting

The preparation of a detailed report of the results of the monitoring exercises will be the final, but essential, task. The report will contain all the results of the various studies and field evaluations. In addition, an analysis will be made of the (potential) environmental and health risks of the locust control campaign, based on these results, and concrete and practical recommendations made for improvements. The report is expected to form bases for monitoring in other countries.

## ix. Human health

Monitoring human health for Occupational exposure and External exposure, Internal exposure which is an indicator for organophosphate absorption is the depression of acetylcholinesterase (in red blood cells) and pseudocholinesterase (in blood plasma). This can be tested after taking a blood sample and subsequent analysis using a field test kit For Desert Locust control, cholinesterase field test kits preferred because these avoid transport of samples to a laboratory (which may be far away from the control site) and allow immediate corrective action, if needed. Good, robust and easy to use field test kits will be procured and made available for use.

Where chemical pesticides have been used trained medical practitioner working with the respective state control teams will carry out test on members of the spray teams to monitor the exposure level to the pesticides, this will be done using standard cholinesterase kits procured by the project.

## x. Effected on not target vertebrates and invertebrates:

While assessing the efficacy of the control of the chemical sprays on the Desert Locust, the spray teams will observe if any insects, birds or other reptiles have also been killed as a result of the spray operations. These observations will be included in the control assessment reports.

## xi. Spray monitoring

The efficacy of pesticide application depends on precise targeting and dosing; this applies for both ground and aerial control operations. The selections of areas to be sprayed will be determined by survey report with precise GPS coordinates spray applications have to match these same coordinates. As comparison will be made during the efficacy assessment to ensure targeting was precise based on survey reports. A post spray application assessment will be done to confirm the equipment setting dispensed the recommended dose of pesticides as recommend for DL control. Since the application of insecticides is the most expensive part of a locust control campaign, incorrect spraying may be very costly. Spray monitoring is therefore essential, both from an economic and an environmental point of view. Control teams will fill it out for each sprayed target (See annex 3)

## 5. Capacity Building

FAO will take deliberate actions to adhere to pest management guidelines as stipulated in this PMP. The participating institutions given requisite internal capacities and experience to implement and develop associated structures to operationalize PMP. Other stakeholders at district level to be trained PMP technical support managers will be equipped and their capacities enhanced to monitor and carryout prompt and appropriate management interventions to prevent and minimize economic damage and food losses. The grass root teams will also mobilize communities and eventually form village level lead farmer working groups. At the grassroots, lead farmers to be mobilized into facilitators.

Institution	Roles/Responsibilities
FAO	Coordination, capacity building and
	resource mobilization
FAO, MoAI-FGS, MoAL-Galmudug, MoEACC-	Control operation and capacity building
Puntland, MoAI-Jubaland, MoAI-Hirshabele &	
MoAI-Southwest	
MoAI-FGS, MoAL-Galmudug, MoEACC-	Ground control operation
Puntland, MoAI-Jubaland, MoAI-Hirshabele &	
MoAI-Southwest	
FAO	Provision of surveillance and spray
	aircrafts
MoAI-FGS, MoAL-Galmudug, MoEACC-	Provision vehicles for ground spray
Puntland, MoAI-Jubaland, MoAI-Hirshabele &	
MoAI-Southwest	
MoAI-FGS	Research and technology development

## **5.1. Institutional Arrangements**

MoAI-FGS, FAO	Registration and recommendation of pest
	control products
MoAI-FGS, MoAL-Galmudug, MoEACC-	Surveillance/ monitoring, sensitization and
Puntland, MoAI-Jubaland, MoAI-Hirshabele &	provision of control personnel
MoAI-Southwest	
WB, MoF-FGS	Financial support
MoAI-FGS, FAO, MoAL-Galmudug, MoEACC-	Capacity building on safe use of pesticides
Puntland, MoAI-Jubaland, MoAI-Hirshabele &	
MoAI-Southwest	
MoAI-FGS, FAO	Supply of appropriate pesticides

## 5.2. Coordination Responsibilities

The Ministry of Agriculture and Irrigation will be the lead and implementing agency of the government for this operation. The government has partnered Food and Agriculture Organization to provide technical support in managing and coordinating the efforts to manage the locust infestation emergency in the Country. The MoAI-FGS will work in close coordination with the implementing state Ministries responsible for the Desert Locust interventions in Puntland, Galmudug, Hirshabele, Jubaland and Southwest state. Planning and implementation will be the direct responsibility of the National Desert Locust task forces which draws representation from all affected states and chaired by the MoAI-FGS.

## **5.3.** Workplan and budget

Continuous Surveillance		
Activities	Duration	Total cost
		(USD)
250 community focal points trained to report locust sightings to	9 months	3.4 M
Government		
Government surveillance of 30,000 ha in Somaliland, Puntland,		
Galmudug (eLocust3)		
Scaled up training to 50 government staff, including 7 DLIOs		
Procurement and use of surveillance vehicles and equipment		
(eLocust3, hand-held GPS, radios, entomological kits, binoculars,		
camping supplies		
Sub-total		3.4M
Ground and Aerial Control		
Community sensitization	9 months	17.8M
12,300 kg bio-pesticide, 90,000 litre chemical pesticide & related equipment		
Use of knapsack sprayers, vehicle-mounted sprayers, aircraft		
Treatment of 360,000 ha, with trained government staff		
Intensive training on safe administration of chemical pesticide		

Sub-total 17.8M		.8M
Impact assessments, and Environment, Health and Safety		
Impact of the infestation	9 months	1.4M
Efficacy of control		
Impact on environment and human health		
Management and safe disposal of empty pesticide drums, related		
facilities & training		
Environmental impact assessment kits, and related training		
Training and facilities to test for adverse health effects (allergies, mild		
poisoning, and Cholinesterase testing where chemical pesticide is		
applied)		
Sub-total	1.4M	
Protect lives and livelihoods		
Risk reduction and re-engagement farming packages.	9 months	26 M
Pastoral livelihood assistance	9 months	8.3M
Sub-total	34.3M	
Grand Total	56.9M	

## 6. References

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FAO (1985b) Guideline on Good Labeling Practice for Pesticides

FAO (1985c) Guideline for the Disposal of Waste Pesticide and Pesticide Containers on the Farm

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#### 7. Annexes

Annex 1: Possible Insecticides for Management of Desert Locust

No.	Active ingredient/Trade Name	Formulation type	Chemical Group	Registration Status in Somalia	Countries where registered for locust control
1	Clorpyrifos (Dursban 4 EC)	ULV	Organophosphate		Australia, Morocco
2	Deltamethrin	ULV	Synthetic Pyrethroid	Not yet	Australia, Senegal
3	Fenitrothion	ULV	Organophosphate		Australia, Western Sahara, Morocco
4	Malathion	ULV	Organophosphate		Australia, Morocco, India
5	Metarhizium anisopliae	SC,ULV	Biological Control Agent		Australia, India, West Africa

**Note:** This is a provisional list as per Natural Resource Institution (NRI) locust handbook oversees development administration provided by Desert Locust Control Organization for East Africa (DLCO-EA). As recommend by FAO only ULV formulations of either Fenitrothion, Chlorpyrifos, Malathion, Deltamethrin will be considered for procurement based on availability of stock from prequalified suppliers.

## Annex 2: Grievance Handling Mechanism (GRM)

Under the new World Bank ESSs, Bank-supported projects are required to facilitate mechanisms that address concerns and grievances that arise in connection with a project.<sup>4</sup> One of the key objectives of ESS 10 (Stakeholder Engagement and Information Disclosure) is 'to provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow borrowers to respond and manage such grievances'.<sup>5</sup> This Project GRM should facilitate the Project to respond to concerns and grievances of the project-affected parties related to the environmental and social performance of the project. The SCRP will provide mechanisms to

<sup>&</sup>lt;sup>4</sup> Under ESS 2 (Labour and Working Conditions), a grievance mechanism for all direct or contracted workers is prescribed, which will be laid out in a separate Labour Management Plan (LMP). The World Bank's Good Practice Note on 'Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works'<sup>4</sup> spells out requirements for a GBV grievance redress mechanisms, which will be defined in a separate GBV/SEA and Child Protection Risks Action Plan.

<sup>&</sup>lt;sup>5</sup> World Bank, 2018, p. 131.

receive and facilitate resolutions to such concerns. This section lays out the grievance redressal mechanisms (GRM) for the SCRP.

As per World Bank standards, the GRM will be operated in addition to a separate GBV/SEA and Child Protection Risk Action Plan, which includes reporting and referral guidelines (see GBV/SEA and Child Abuse Action Plan). It will also operate in a addition to specific workers' grievance redress mechanisms, which are laid out in the LMP.

The GRM are designed to capture the high potential for conflict in Somalia. There is concern that there may be disagreements over local level planning and implementation processes. Furthermore, the project itself may cause grievances, or existing community and intercommunity tensions may play out through the project. The source of grievances in regards to project implementation can also sometimes be the very nature local governance or power distribution itself.

It will therefore be key in the fragile environment of South Sudan to ensure that grievances and perceived injustices are handled by the project, and that the project aides mitigating general conflict stresses by channeling grievances that occur between people, groups, government actors and beneficiaries and project staff, NGOs, CSOs or contractors. Aggrieved parties need to be able to refer to institutions, instruments, methods and processes by which a resolution to a grievance is sought and provided. The GRM provides an effective avenue for expressing concerns, providing redress, and allowing for general feedback from community members.

The GRM aims to address concerns in a timely and transparent manner and effectively. It is readily accessible for all project-affected parties. It does not prevent access to judicial and administrative remedies. It is designed in a culturally appropriate way and is able to respond to all needs and concerns of project-affected parties.

#### Assess and Clarify

Through radio, mobile phones, community meetings, email and websites information about the Project and its sub-component activities will be publicly disclosed (see above).

The type of information disclosed includes details about the Project structure, activities, budgets, consultation and information disclosure plans (SEP), the Environmental and Social Commitment Plan (ESCP), the Environmental and Social Management Framework (ESMF), activity-specific Environmental and Social Assessments (ESAs), activity-specific Environmental and Social Management Plans (ESMPs), the GBV/SEA and child protection referral systems, as well as detailed information about the Project GRM.

Based on the information made available, aggrieved parties can decide whether they have a case to report or whether the available information clarifies their concern. This will allow the aggrieved party to decide on the appropriate next step in order to report a grievance, comment, or provide feedback to the Project.

The provision of multiple grievance channels allows an aggrieved party to select the most efficient institution, accessibility, circumvent partial stakeholders, and creates the ability to bypass channels that are not responsive.

#### Intake, Acknowledge and Follow-Up

Grievances received through the GRM reporting mechanisms will be taken in by the respective IP. The Hotline Operator reviews information received and transfers it to the respective IP; Community Project facilitators will file grievances and pass them to the respective IP at state or national level. Community facilitators will also man the help desks or be responsible for suggestion boxes. All cases received through these; the community facilitator reports to the IP. All cases will thereby be treated confidentially.

<u>Incident reporting</u>. Severe incidents (an incident *that caused significant adverse effect on the environment, the affected communities, the public or workers*, e.g. fatality, GBV, forced or child labor) will be reported by the IP - within 48 - to the PIU and the World Bank.

Where grievances are of sexual nature and can be categorized as GBV/SEA or child protection risk, the IP has to handle the case appropriately, and refer the case to the GBV referral system, defined in the GBV/SEA and Child Abuse Action Plan.

For all other grievances, the respective IP will decide whether the grievance can be solved locally, with local authorities, implementers, NGOs, CSOs or contractors, and whether an investigation is required. The first ports of call will have in-depth knowledge of communal socio- political structures and will therefore be able to address the appropriate individuals, if the case can be solved at the local level.

At all times, the IP will provide feedback promptly to the aggrieved party, for example through the phone or through the community facilitator. Feedback is also communicated through stakeholder meetings and beneficiary meetings during Project activities. For sensitive issues, feedback is given to the concerned persons bilaterally.

Records of all feedback and grievances reported will be established by the IP. All feedback is documented and categorized for reporting and/ or follow-up if necessary. For all mechanisms, data will be captured in an excel spreadsheet. The information collected, where possible, should include the name of the person provided feedback, district, State, cooperating partner where applicable, project activity, and the nature of feedback or complaint.

#### Verify, Investigate and Act

The IP will investigate the claim within 5 working days and share findings with relevant stakeholders. Where an incident was reported, the IP will, in addition, follow the incident management protocol.

Where a negotiated grievance solution is required, the IP will invite the aggrieved party (or a representative) and decide on a solution, which is acceptable to both parties and allows for the case to be closed – based on the agreement of both parties.

After deciding a case, the IP has to provide an appeals mechanism to the aggrieved party, which is constituted through the PIU. This is important in cases in which the aggrieved party is dissatisfied with the solution provided by the IP. In these instances, the PIU will step in and provide an appeals mechanism. The appeal should be sent to the PIU directly (a phone number will be provided), where it will be reviewed by the PMU Risk Management Unit and will be decided on jointly with the Head of the PIU. Where aggrieved parties are dissatisfied with the response of the PIU, they can report cases directly to the World Bank (see below).

#### Monitor, Evaluate and Feedback

The IP will provide first feedback on the case to the aggrieved party within one week, if the case was not filed anonymously. Further feedback and action will depend on the nature of the case, and whether cases are decided upon within the respective IP. The IP will show to the PIU that action has been taken within a reasonable amount of time.

Most importantly, all cases filed need to be logged and monitored by the IP. The IP will analyze all complaints and feedback on a quarterly basis, and share a synthesis report of the analysis with the PIU.

## SCRP Grievance Redress Mechanisms Flowchart



## Monitoring and Reporting of GRM

The PIU, specifically the Social Specialist, will be responsible for the monitoring of the availability and implementation of the GRM by all IPs. The Specialist will include the GRM into his supervision and monitoring missions to the field and conduct spot checks in regards to its implementation, or, where access is difficult recruit IVA to do so.

IPs will provide analytical synthesis reports on a quarterly basis to the PIU, which include the number, status and nature of grievances. These reports will form the basis of all regular reports from the PIU to the World Bank.

IPs will further provide an excel sheet summary of the feedback and grievances reported, which will be linked to the Project's Management Information System (MIS) and to the M&E Results Framework. They will further maintain a documented record of stakeholder engagements, including a description of the stakeholders consulted, a summary of the feedback/grievances received during community consultations.

The PIU will further extract lessons learnt from the GRM and implement analysis on the overall grievances, and share them with all IPs.

#### WB's Grievance Redress Service (GRS)

Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's 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 WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB 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 Grievance Redress Service (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

## Annex 3: FAO Spray Monitoring Form

1	CONTROL LOCATION	1		2	1	3	•	4		5	5		5
1-1	Date												
1-2	name (from DL Survey Form)												
2	VEGETATION DATA												
2-1	vegetation type												
	(Grass, Bushes, Trees, Crop)	G B	T C	G B	T C	G B	Т С	G B	т С	G B	т с	G B	ТС
2-2	height (m)												
2-3	crop names and damage (%)												
3	INSECTICIDE DATA												
3-1	trade name												
3-2	concentration (g a.i./l or %)												
3-3	formulation (EC, ULV, Dust)	E U	D	E U	D	E U	D	E U	D	ΕU	J D	ΕŪ	JD
3-4	expiry date												
3-5	is insecticide mixed with water or solvent?	Y	Ν	Y	Ν	Y	Ν	Y	N	Y	Ν	Y	N
3-6	if yes, what solvent and mixing ratio												
4	WEATHER CONDITIONS		<b>P</b> 1		,		· .		1		· .		1
4.1	start and end of control operations:	start	End	start	end	start	end	start	end	start	end	start	end
4-1	time												
4-2	relative humidity (%)												
4-3 4-4	wind speed (m/s)												
4-4	wind speed (III/S) wind direction (degrees from N)												
4-6	spray direction (degrees from N)												
5	SPRAY APPLICATION										1		
5.1	spraver type	R A	E	R A	E	R A	E	R A	E	R A	E	R A	A E
<b>J</b> -1	(Rotary, Airblast, ENS, Hydraulic, Other)	HC	)	НО	)	НО	)	НО		HC	)	Н	0
5-2	sprayer operator	ΡD	L	P D	L	P D	L	P D	L	P D	L	ΡI	) L
	(Pilot, Driver, Locust officer, Hired, Other)	Н	0	Н	0	Н	0	Н	0	Н	0	Н	0
5-3	sprayer manufacturer												
5-4	sprayer model												
5-5	sprayer platform (Aerial, Vehicle, Handheld)	A V	И Н	A V	И Н	A V	И Н	A V	Н	A V	/ Н	A V	V H
5-6	date of last calibration												
5-7	atomizer height above ground (m)												
5-8	ROTARY SPRAYERS: speed setting												
	(blade angle, pulley setting, no. batteries)												
5-9	speed of atomizer (rpm)												
5-10	flow rate setting												
	(which nozzle or restrictor used)												
5-11	flow rate/atomizer (l/min)												
5-12	number of atomizers												
5-13	track spacing (m)												
5-14	BARRIERS ONLY: width and spacing (m)												
5-15	forward speed (km/h)												
5-16	AERIAL SPRAYING:	GP = gr	ound pa	rty availa	ble RO	C = radio	commu	nication w	vith airc	raft TG	= DGPS	track gu	idance
- 1-	support supplied	GP RO	<u>2 TG</u>	GP RC	<u>2 TG</u>	GP RC	<u> </u>	GP RC	<u> </u>	GP R	<u>C TG</u>	GP R	<u>C TG</u>
5-17	ground marking	GF	M	GF	M	GF	M	GF	M	GF	M	GF	
6	CONTROL EFFICACY	<u> </u>	N	<u> </u>	N	<u> </u>	IN	<u> </u>	IN	<u> </u>	IN	5 1	IN
0													
0-1 6 2	locust mortality (% dead)												
0-2 6 2	time after treatment (nours)	ОТ	V	ОТ	V	ОТ	V	О Т	V	0 7	- W	0.7	ΓV
0-3	(Quadrats Target size Visual Cages Other)		0 0		0 0		Ň		Ň		0 0	V C	
7	SAFFTV AND ENVIRONMENT	C	0	C	0	C	0	C	0	C	0	C	0
7	protoctive elething			C - «	aglas	M - maa	1 T -	alovas C	) - over	ulla <b>D</b>	hoots		
/-1	what did the operator wear?	GMI	O B	G M I	O B	G M I	$\overline{\mathbf{D}}$	GMI	O B	G M I		GM	I O B
7_2	what did the operator wear:	V	N		N		N	V	N			V	
7-3	who was informed of spraving?	F N	V	F N	V	F N	V	F N	V	F N	I V	F N	JV
	(Farmer, Nomad, Villager, Official, Beekeeper)		B		B		B		B		В		В
7-4	effect on non-target organisms	Ŷ	N	Y	N	Y	N	Y	N	Y	N	v	N
7-5	if ves, what	-	. 1	-	. 1		- 1	-	*1	-	. 1		- 1
7-6	details of anyone who felt unwell or if other												
	problems were encountered:												
	<b>*</b>												

## Annex 4: FAO check list for general monitoring of desert locust control operations 1 DATE & LOCATION OF MONITORING EXERCISE

1_1	date:	1-2	locatio	n (name: lati	itute/longitur	40).		
2	INSECTICIDE DATA (of pro	duct involved in	locatio		ituto/ioligitut			1
- 2-	trade name:		2-2	common	name:			
- - 2-	concentration $(a \ge i/l \text{ or } %)$ :		2-4	formulati	ion type:			
2	SPRAY MONITOPING		<u> </u>		ion type.			
3-1	spray monitoring form filler	d in (tick one box: if ves w	ito rofo	rence to rele	vant form/na	ae number).		
0-1				form/r	page referen	ige number). nce:		
2	came area sprayed for locus	t control boforo				oomnoign		1
3- 2	same area sprayed for locus			0, 1101		campaign		
<b>4</b> 4-	EFFICACY MONITORING	ıt.		∏ no				
	mortality/survival how accord	sod.				d post spray a		
4-	novida dataila an mathadal	acu, ranliaataa raaulta ata				noteboo	lounis	
5				TIOLEDOOK		noteboo	k page	
ວ 5-	case(s) of occupational poise	oning observed						
5.2		pident form filled in (tick one	bov: if	voo writo ro		alovent form/ne	an number):	1
5-2		dent form thied in (lick one	DOX, II	yes, while re		elevant iom/pa	age number):	
6								1
6-	human habitations nearby (w	vithin 5 km of sprav site air	strin					
6-2	name(s) of nearest human	habitations and distance(s	) to spr	ay sites; wer	e they inform	med about cont	trol operations:	•
		habitation	n 1		habi	tation 2		
	-	habitation	n 3	1			1	
	name:							
	distance (km):							
	nformed about spraying:	L yes L no		∐ yes	L no		L yes	
6-3 yes	open drinking water source □ no	es nearby (e.g. wells, rivers	, within	2 km of spra	ay site):			
6-4	buffer zones applied:	i - between human habitat	ions an	d spray	□ yes	🗆 no	buffer distance	used (m):
		ii - between water sources	and sp	oray site:	□ yes	🗆 no	buffer distance	used (m):
6-5	populations informed abou	t re-entry interval into sprag	yed site	s:		🗆 no		
6-6	any crops sprayed:	□ yes □ no	if yes,	specify which	h crops:			
			if yes,	farmers infor	med about	pre-harvest	□ yes □	no
7	ENVIRONMENTAL RISK	ASSESSMENT		•				
7-1	ecologically sensitive areas	s nearby (< 2 km of spray s	site) (e.	g. protected	areas, bioco	ntrol sites):	□ yes □	no
	if yes, specify what type of	areas:						
if y dist	es, buffer zones applied betv ance used (m):	veen such areas and spray	site:	□ yes	🗆 no	bi	uffer	
7	2 aquatic ecosystems near	rby (e.g rivers, lakes, ponds	6)		□ yes	□ no		
_if	ves, buffer zones applied bet	tween aqautic ecosystems	and spi	ay site:	□ yes	🗆 no 🛛 b	puffer	
dist	ance used (m):	v (within E line of a second in )	\ \					
	Dives D no if ves	y (within 5 km of spray site,	) duce ris	k of bee				
	kills:	what measures taken to re		K OI DEE				
7	4 any grazing land sprayed		if ve	herders inf	formed abou	it livestock with	olding period	
, _	yes		ii yot				iolaing period.	
7	5 mortality or abnormal be	haviour observed after trea	tment, i	n: if yes, v	which groups	s (also note det	ails of	
0	pservations,	L	a	l olity hohowing		ac ata \;		I
	ii - mammals:		.y. mon	anty, Denavio	ouraichange	es, eiu. <i>)</i> .		
	iii - birds:							
	iv - fish:							
								-
			32					
						•	1	
	1							

_		v - aquatic arthropods:					
	7-6	experiments or more detailed observations carried					
		provide details on methodology, results, etc. in field notebook page					
ĺ	8	RESIDUE SAMPLING					
1	3-1 □ ye	residue samples taken (tick one box; if yes, write reference to relevant form/page number): es □ no					
		if yes, provide details on type, number, methodology, etc. in field notebook notebook page reference:					
	9 REPORTING						
	9-1	9-1 name of person who filled out this form:					

9-1 name of person who filled out this form:

1	DATE & LOCATION OF POISONING	INCIDENT				
1-1	date of the incident:					
1-2	location of the incident (name; latitute/longitude):					
1-3	reference to Spray Monitoring Form (if relevant; page number):					
2	INSECTICIDE DATA (of product invo	lved in poisoning case)				
2-1	trade name:		2-2	common nar	ne:	
2-3	concentration (g a.i./l or %):		2-4	formulation t	ype:	
2-5	batch number:		2-6	production a	nd/or expiry date:	
2-7	solvent and mixing ratio (if relevant):		·			
3	PERSONAL DETAILS (of suspected	poisoned person)				
3-1	name:					
3-2	sex: 🗆 male	□ female	3-3	age (years):		
3-4	staff position (e.g. applicator, flag man,	driver):				
4	INCIDENT DETAILS					
4-1	activity while exposed to insecticide (e.	g. spraying, filling aircraft h	hopper,	etc):		
4-2	personal protective equipment used (tie	ck one or more boxes):				
	□ boots	□ hat			□ apron	
		□ face shield / goggles			□ respirator	
4.0		dust mask			□ other (specify):	
4-3	way of exposure (tick one or more boxe	es):				
1-1	On skin     estimate of quantity of exposure (e.g. s		alle ont	irely drencher	drank 1-litre bottle, etc.)	•
4-4 4 5	duration of our course (hours until door					•
4-5	duration of exposure (nours until decor	itamination / treatment):				
4-6	other persons also exposed to insection			⊔ yes	L no	
4-7	other relevant details about the inciden	t (describe):				
5	SIGNS AND SYMPTOMS					
5-1	observed signs and symptoms of poisc	ning (tick one or more box	(es):			
	skin irritation / rashes	□ tingling or numbness o	of face of	or hands	□ abdominal pain (stom	ach, belly)
	$\Box$ sweating		on incr	ordination	☐ nausea, vomiting	
	L tearing of eye(s)		on, inco or	ordination	□ diarmea □ respiratory failure co	ma
	contraction of pupils		101		□ seizures, convulsions	
	□ salivation	□ abnormal breathing			□ death	
5-2	first onset of symptoms (hours or days	after last exposure):				
5-3	cholinesterase measurement carried o	ut:		□ yes	🗆 no	
5-4	type of cholinesterase measurement ca	arried out (tick one box):		🗆 plasma	□ red blood cells	whole blood
6	TREATMENT					
6-1	treatment given:			□ yes	🗆 no	
6-2	type of treatment or antidote given (pro	vide details):				
6-3	person taken to hospital or medical pos	st:		□ yes	🗆 no	
6-4	period that person will be taken off inse	ecticide application (days):				
7	REPORTING					

## Annex 5: FAO Poisoning Incident Form (Locust control)

7-1	name of person who filled out this form	:		
7-2	staff category (tick one box):	medical	paramedical	non medical (specify)

## Annex 6: FAO Validation (Spot-VGT) Form

1	SURVEY STOP	1	2	3	4	5	6
1-1	date name						
1-2	latitude (N)						
1-3	longitude (O or E)						
1-4							
2	VEGETATION						
2-1	area of survey (ha)						
2-2	habitat (wadi, plains, dunes, crops)						
2-3	grass layer (status)	Gng G Dng D					
	(greening, green, drying, dry)						
2-4	grass layer (density)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	(0-20%, 20-40%, 40-60%, 60-80%, 80-100%)						
2-5	Principal species of grass						
2.6	-hh. (km 1)						
2-0	(areaning arean draing drai)	Gng G Dng D					
27	(greening, green, drying, dry)	1 2 2 4 5	1 2 2 4 5	1 2 2 4 5	1 2 2 4 5	1 2 2 4 5	1 2 2 4 5
2-7	(0.20% 20.40% 40.60% 60.80% 80.100%)	1 2 5 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 3	1 2 5 4 5	1 2 3 4 3
2-8	Principal species of shrub/tree						
2-0	The put species of sindo/tee						
3	RAIN						
3-1	date of last rain						
3-2	rain amount (mm or LOW MODERATE HIGH)	LMH	LMH	LMH	LMH	LMH	L M H
4	SOIL						
4-1	type of soil						
4-2	soil moisture (wet/dry)	W D	W D	W D	W D	W D	W D
-	COMMENTS						
2	COMMENTS						

Was a GPS used to determine locations? yes no

country:

date :

Locust Officer :

cleared by:

## Annex 7: FAO Desert Locust Standard Survey/Control

Country: Date:

1	Survey Stop	1	2	3
1.1	Location name		_	
1.2	Time			
1.3	Latitude (DD MM SSS)			
1.4	Longitude (DD MM SSS / W. E)			
1.5	Surveyed area (ha)			
1.6	Locust (Present or Absent)			
1.7	4 GPS corner points of area to be treated	1:	1:	1:
	2	2:	2:	2:
		3:	3:	3:
	4 5	<u> </u>	A ·	<u> </u>
1.0			· ·	
1.8	Area to be treated (ha)			
2	Ecology			
	Habitat			
2.1	Topography (Wadi, Plain, Plateau, Hills, Dunes, Interdunes, Crops, Pasture, Oasis, Reg, Salt flat, Depression, Well, Beach, Town)			
2.2	Soil type (Sand, Silt, Clay, Stone, Gravel, Rocks)			
2.3	Soil moisture (Dry or Wet)			
2.4	Wet soil depth (cm) From - To			
	Vegetation			, 
2.5	State (Greening Green Drving Drv)			
2.5	Density (Low Medium Dense)			
2.0	Annual species (list the 3 dominant species)			
2.1	State (Greening Green Drving Drv)			
2.0	Cover (%)			
2.0	Drving (%)			
2.11	Development stage (1,2,3,4,5)			
2.12	Perennial species (list the 3 dominant species)			
2.13	State (Re-greening, Green, Drving, Drv)			
2.14	Cover (%)			
2.15	Drying (%)			
2.16	Greening (%)			
	Weather			
2 17	Date of last rain			
2.17	Approximative quantity (Light Moderate Heavy)			
2.10	Quantity (mm)			
2.10	Temperature (°C)			
2.20	Wind coming from (N_NW_NE_W_E_S_SW_SE)			
2.22	Wind speed (m/s)			
2				
5	Honners			
3 1	Stage (F-1-2-3-4-5-6-F)			
3.1	Dominant stage ( $E_{1-2,3-1-5-6-F}$ )			
3.∠ 3.3	Annearance (Solitary Transiens T/congregence T/dissocians Grogerious)			
34	Rehaviour (Isolated Scattered Groups)			
3.5	Colour (Green, Green/Yellow, Green/Rlack, Yellow/Rlack, Rlack)			
0.0			l	1

3.6	Density (Low, Medium, High)		
3.7	Density minimum, average, maximum (per tuft or m <sup>2</sup> )		
3.8	Average distance between tufts (m)		
3.9	Activity (Hatching, Marching, Feeding, Roosting, Moulting)		
	Bands		
3.10	Stage (E-1-2-3-4-5-F)		
3.11	Dominant stage (E-1-2-3-4-5-F)		
3.12	Density (Low, Medium, High		
0.40		1	
3.13	Density minimum, average, maximum (per m <sup>2</sup> )		
3.14	Size minimum, average, maximum (m² or na)		
3.13	Number of bahas		
3.10	Average distance between bands (m)		
3.17	Colour (Black, Yellow/Black, Green)		
3.10	Activity (Hatching, Marching, Feeding, Roosting, Moulting)		
	Adults		
3.19	Stage (Immature, Maturing, Mature)		
3.20	Dominant stage (Immature, Maturing, Mature)		
3.21	Colour (Gray, Brown, Yellow Wings, Pink, Yellow)		
3.22	Appearance (Solitary, <i>Transiens</i> , T/congregans, T/dissocians, Gregarious)		
3.23	Behaviour (Isolated, Scattered, Groups)		
3.24	Breeding (Copulating, Laying)		
3.25	Density (Low, Medium, High)		
3.26	Number (per transect)		
3.27	Length (m) and width (m) of transect		
	Swarms		
3.28	Stage (Immature, Maturing, Mature)		
3.29	Dominant stage (Immature, Maturing, Mature)		
3.30	Colour (Pink, Yellow)		
3.31	Breeding (Copulating, Laying)		
3.32	Activity (Settled, Takeoff, Milling, Flying)		
3.33	Density minimum and maximum (per m <sup>2</sup> )		
3.34	Density (Low, Medium, High)		
3.35	Size (ha, km²))		
3.36	Flying from (N, NW, NE, W, E, S, SW, SE)		
3.37	Flying to (N, NW, NE, W, E, S, SW, SE)		
3.38	Flying height (Low, Medium, High)		
3.39	Flying duration (h and min)		
3.40	Cohesion (Weak, Medium, Strong)		
3.41	Shape (Cumuliform, Stratiform)		
4	Control		
4.1	Application type (Full cover, Barrier)		
4.2	Area treated (ha) and area protected (ha)		
4.3	Pesticide name		
4.4	Formulation (EC, ULV)		
4.5	Concentration (g a.i./L or %)		
4.6	Application rate (L/ha or g/ha)		
4.7	Quantity used (L or G)		
4.8	Method (Handheld, Backpack, Vehicle, Air)		
4.9	Treatment duration (h and min)		
4.10	Mortality rate (%)		
4.11	Time after treatment (hours)		
4.12	Phytotoxicity (Present, Absent)		

4.13	Zootoxicity (Present, Absent)		
5	Safety		
5.1	Protective clothing used: Goggles, Mask, Overalls, Boots (L, M, C, B, G)		
5.2	Intoxication (Yes, No)		
5.3	Cholinesterase rate monitoring (Yes, No)		
5.4	Crop damage (%)		
5.5	Pasture damage (%)		

6	Comments