

Standard Operating Procedures (SOP) for Desert Locust Ground Survey

Objective

The objective of the Standard Operating Procedures (SOP) for Desert Locust Survey is to give concise instructions for effective and safe ground survey operations against the Desert Locust. These instructions are intended for use by the field staff who are involved in Desert Locust monitoring to help them avoid dangerous, ineffective or wasteful operations. They are based on the **FAO Desert Locust Guidelines** where more detailed information and references are available.

The instructions focus on:

- Survey equipment
- Survey types and methods
- Data collection and reporting
- Using eLocust and GPS

1. Survey process

A series of steps need to be followed before, during and after survey operations.

PREPARATIONS three months before survey operations

- Determine what type and number of vehicles are required for survey operations
- Select competent survey teams and provide them with training or refresher training
- Check and service the vehicles
- Check that the commonly needed spare parts and spare tires are available, and vehicles are equipped with a HF radio whenever possible
- Make sure that operational funds are allocated for the proposed survey period in the field to cover field allowances, fuel, etc.
- Make sure that sufficient equipment (GPS, eLocust, radios, compass, maps) are available for each survey team
- Ensure that enough copies of the *FAO Locust Survey & Control Form* are available

BEFORE survey operations

- Step 1.** Based on information from all possible sources (nomads, locals, villagers, travellers) combined with rainfall and habitat data, determine what areas need to be surveyed and when. The Locust Information Officer should provide this information.
- Step 2.** Use maps to help determine the planned survey route.
- Step 3.** Prepare the vehicles and make sure that all field and communication equipment are working. Set the GPS coordinates to degrees, minutes and seconds.
- Step 4.** Ensure that survey officers know how to use the equipment and make surveys.
- Step 5.** Decide what type of survey. If you do not know if locusts are present or not, make a rapid *assessment* survey. If significant locust populations are already present, then make a *search* survey to estimate the total infested area and delimit the areas that require control.

DURING survey operations

- Step 6.** Go to an area where locusts are likely or already known to be present and make either a foot or a vehicle transect.
- Step 7.** Before starting the foot or vehicle transect, record the date and the GPS latitude/longitude coordinates on the *FAO Locust Survey & Control Form* or in eLocust. This is usually done inside the vehicle.
- Step 8.** If you are making a foot transect, get out of the vehicle and collect data about locusts, vegetation and soil. If you are making a vehicle transect, stay in the vehicle and collect data about locust adults and vegetation.
- Step 9.** Return to the vehicle (or stop if you made a vehicle transect) and record your observations on the *FAO Locust Survey & Control Form* or in eLocust.
- Step 10.** Drive to the next survey area.

If you find significant locust populations, it is better to continue surveying over the planned survey route. You or another team can come back later to intensively search the infested areas (see page 8)

AFTER survey operations

- Step 11.** Check that all of the relevant details are on the *FAO Locust Survey & Control Form* or in eLocust.
- Step 12.** Submit the completed forms or eLocust file to the National Locust Unit HQ.
- Step 13.** Check and, if necessary, repair the equipment so it is ready for the next survey.

2. Survey team and field equipment

Survey Team: one locust officer, one driver and vehicle. Use two vehicles in remote areas.

Equipment: to be available for each team:

- Hand-held GPS ⁽¹⁾
- Maps
- Compass
- FAO forms ⁽²⁾
- Clipboard, paper and pen
- Tally counter
- Hand lens (x10)
- Sweep net
- Dissecting kit
- Sample boxes
- Tool kit & shovel
- First aid kit
- HF radio in the vehicle
- HF or UHF walkie-talkies for communication between vehicles

Additional equipment for eLocust:

- HF radio modem in the vehicle ⁽³⁾
- Psion handheld computer with eLocust and RealMaps
- Psion-GPS-cigarette lighter data/power cable

(1) extra batteries, cigarette lighter adapter, remote antenna

(2) Locust Survey & Control Form

(3) plus modem software installed on the Psion

3. Where and when to make surveys

Where

- In sandy areas where the natural vegetation is green
- Desert areas that have received recent rainfall
- Areas where locals report that locusts are present
- Areas previously infested by locusts or where control was carried out
- Areas that could receive locusts from neighbouring countries

When

During the year

- Regularly during the rainy season
- About two weeks after rain has fallen (to allow sufficient time for the vegetation to become green)
- If there is no information from a certain area about rainfall, ecological conditions or locusts

During the day

- When temperature is 20-38°C
- From shortly after sunrise to about midday
- In the afternoon for a few hours just before sunset

4. Survey types

Assessment

- Generally the first type of survey undertaken in the field to determine if locusts or green vegetation are present
- Undertaken in areas that have a history of locusts or breeding, where rain has recently fallen, or where nomads, locals, scouts, farmers or agricultural extension agents have reported locusts
- Purpose is to monitor the locust and habitat situation and to determine whether significant populations are present that may require control

Search

- If significant populations are found during an *assessment* survey, then a *search* survey should be undertaken
- An intensive survey to estimate the total infested areas and to delimit the areas that require control
- From the results of search surveys, the scale of the risk and level of required control can be estimated

If only low numbers of locusts are found during an *assessment* survey, there is no need to make a *search* survey. Instead, another *assessment* survey should be conducted at a later date, depending on habitat conditions and rainfall

5. Survey methods

Foot transect:

- Walk about 300 m into the wind or crosswind
- Observe the vegetation greenness and density
- Stop several times to check the soil moisture
- Count any locust adults that fly up, note their colour, behaviour and maturity (estimate the width of the strip in which adults are being disturbed, usually about 1-4 m on either side of you). **Temperature must be above 20°C**
- Stop occasionally and closely inspect the ground and vegetation for hoppers, noting what instar stage, colour, behaviour and number per bush or square metre. Repeat this up to 10 times
- Return to the vehicle and record your observations on the survey form or in eLocust
- Drive to the next survey stop

Vehicle transect:

- Drive upwind or crosswind for at least 1 km
- Drive at a walking pace in low (4WD) gear
- Count adults that fly up in front of the vehicle
- Keep track of the distance using the odometer
- Count only when temperature is above 20°C and wind speed is less than 6 m/s

6. What information to collect

Location

- Name
- Date
- GPS latitude and longitude coordinates
- Habitat type and area

Rainfall

- Date and amount of last rainfall

Vegetation

- Greenness and density

Soil

- Wet or dry

Locust

- Presence/absence
- Appearance (*solitary, transiens, gregarious*)
- Behaviour (*isolated, scattered, groups*)
- Maturity (*instar, fledgling, immature, mature*)
- Breeding (*copulating, laying, hatching, fledging*)
- Density and size (*locusts/transect (l/w) or /m²; No. ha*)

Control

- Insecticide, application rate, quantity used, area treated

Comments

- last time locusts were present; crop types or stages, etc.

7. How to record data

Survey data and observations can be written down on the *FAO Survey & Control Form* (or similar form) or they may be entered into a handheld computer using a custom program called eLocust (see page 12).

Survey form

- Data from six survey stops can be entered on one *FAO Survey & Control Form*
- If you make more than six stops, use additional forms
- Enter the data from the survey stop before moving to the next location

eLocust

- Information from an unlimited number of survey stops can be entered into eLocust
- Enter the data from the survey stop before moving to the next location
- A new file should be started for each survey period, not for each new day of survey. Name the file using an easy format: YYYYMMMM (e.g. 03061518 for a survey that was carried out on 15-18 June 2003)

Survey results should be reported to the Locust Unit Headquarters no later than 1-2 days after the end of the survey

8. Using eLocust

Step 1. Setup the GPS (Garmin) and the Psion.

- GPS - interface: NMEA/NMEA, NMEA 0183 2.0, 4800 baud
- GPS - navigation: DD MM SS.S
- RealMaps (GPS Moving Map): 4800 baud, NMEA Word *
- eLocust (view): show toolbar, scrollbars, record info
- eLocust (option): memo, aliases, special formats, auto recal

Step 2. Connect the Psion and GPS to the special cable and insert it into the vehicle's cigarette lighter. Turn both units on.

Step 3. Start eLocust and RealMaps on the Psion.

Step 4. In RealMaps, start GPS Moving Map (**CTRL-G**, or press **MENU** key, then Special Menu).

Step 5. When you arrive at the survey stop, press Esc key to stop GPS Moving Map, switch to eLocust (**SHIFT-K**), go to the current record, tap once with the pen on Date, Latitude, Longitude and the date, time and coordinates will be automatically entered.

Step 6. Make the survey and return to the vehicle. Enter the data and observations in the appropriate field by tapping once, make your selection and press **ENTER**. Use the scroll bar on the right to move up and down. Type in any comments, followed by **SAVE**. When you are finished, press **ADD** button.

Step 7. Switch to RealMaps (**SHIFT-K**) and start GPS Moving Map before driving away. Repeat steps 5-7.

9. Using a GPS

Setup

- Step 1.** Initialize the GPS if it is new, after moving more than 500 km since last use, or if the batteries have gone flat and position data was lost.
- Step 2.** Make sure that the time is correct (usually indicated by number of hours from GMT in the options).
- Step 3.** Make sure that latitude and longitude is in degrees, minutes, seconds (in setup options as DDMMSS.S).

Normal use

A GPS must have a clear view of the sky so it can connect to the satellites. It can be used when it is cloudy or rainy. Use it outside or with an external antenna.

- Step 1.** Switch the GPS on and wait several seconds until the it finds the necessary satellites and calculates your position. This will appear in the display.
- Step 2.** The position can be saved as a waypoint with a given name.

Other functions

- GOTO** You can use the GOTO function to navigate to any waypoint.
- SUN** The GPS can indicate the time of sunrise and sunset at any waypoint.

10. How to report survey results

Survey forms

If you recorded survey data and observations on the *FAO Survey & Control Form* (or another form), then completed forms should be returned to the Locust Information Officer at the Locust Unit Headquarters. This can be done by radio transmission, fax, email, or in person. The forms should reach the Information Officer no later than 1-2 days after the end of the survey.

eLocust

If you used eLocust for recording your survey data and observations, there are four ways of transferring the data to the Locust Information Officer at the Locust Unit Headquarters:

- Take the Psion to the Information Officer and he will connect it to the PC for downloading the eLocust file, or
- Connect the Psion to a Codan HF Modem to send the file to the computer at the Locust Unit Headquarters, or
- If you have a computer, export the eLocust file as a text file (File Menu: Export - text), connect the Psion to the PC, transfer the file. It can be opened and printed, or
- If you have a printer, connect the Infra-Red Printer Pod to the back of the printer. Place the Psion in front of the pod and print (File Menu: Printing - Print) ⁽¹⁾

(1) First go to the Control Panel - Printer and select Print via Infrared; you may want to Change the Print to setting.