

Emergency Prevention System
for Transboundary Animal and Plant Pests and Diseases
(EMPRES)

Desert Locust Management in the Central Region

IMPLEMENTATION DOCUMENT

PHASE III

Table of Contents:

	Page
1. Introduction	1
2. Concept of Phase III	2
2.1. Result 1:.	3
2.2. Result 2:.	4
2.3. Result 3:.	5
2.4. Result 4:.	7
3. Regional and Inter-regional Cooperation	8
4. Organizational Framework and Budget	8
5. Reporting	9
6. Risks and Assumptions	10
7. Appendices	11

1. Introduction

The Desert Locust component of the FAO Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) was initiated as a field programme by the Food and Agriculture Organization (FAO) in 1994. Following a formulation exercise and some pilot activities, a donor-assisted EMPRES programme began in 1997 in the Central Region (CR). This region, encompassing nine countries bordering the Red Sea and the Gulf of Aden, has in the past frequently been the origin of Desert Locust outbreaks and plagues. The development goal of the EMPRES/CR programme reads:

To reduce the risk of Desert Locust plagues emanating from the Central Region of the Desert Locust distribution area in order to mitigate food security, economic and environmental concerns in the Central Region and beyond

and the programme goal:

To strengthen the capabilities and capacities of the national, regional and international components of the Desert Locust management system to implement effective and efficient preventive control strategies based on early warning and timely, environmentally sound, early control interventions.

Phase I of the EMPRES/CR programme was implemented from 1997 to 2000 in accordance with the programme document developed by FAO in 1995 in close collaboration with the locust affected countries and interested donors. The progress of Phase I was evaluated by an independent evaluation mission in July/August 1999. Shortcomings in the management of the programme were identified as an issue that required attention. The mission recommended a revision of the original EMPRES/CR Programme document, to define the goals and outputs more clearly. It also proposed that a participatory planning workshop be held to agree on the expected results, activities and indicators of Phase II of the programme.

The revised EMPRES/CR programme document was distributed to the participating countries and to collaborating organizations in February 2000. The Phase II planning workshop was held in El-Tur, Egypt from 26 – 30 March 2000. The workshop was attended by the national EMPRES Liaison Officers (ELOs), representatives from donor agencies and FAO staff. The workshop participants developed a concept for a three-year phase from 2001 – 2003 based on the revised programme document.

Phase II was defined as consolidation phase with the purpose:

Components of preventive Desert Locust control management developed and adopted.

The following eight results were anticipated to contribute to the above purpose of Phase II:

R-1: Operational mandate of different regional organizations in Desert Locust management harmonized.

- R-2: National and regional communication networking enhanced.*
- R-3: Desert Locust early warning and information systems improved.*
- R-4: Desert Locust survey procedures of the member countries improved.*
- R-5: Desert Locust technicians and officers qualified.*
- R-6: Contingency plans available and implemented.*
- R-7: Efficient and environmentally safer control methods introduced.*
- R-8: Systematic methods of campaign evaluation developed.*

Phase II of the programme was evaluated twice. The first was in August 2001 as part of a general review of the EMPRES Programme of Phase I in the Western Region and Phase II in the Central Region. The evaluation was initiated at the request of FAO's Director-General with the view to providing donors, participating countries and FAO with an independent and objective assessment of the status of programme implementation at the time of the World Food Summit – Five Years Later. The mission found that substantial improvements in EMPRES/CR programme management had been made during 2000-2001 through proper work planning, enhanced internal monitoring and evaluation procedures, and that important measures have been taken towards the development of a sustainable Desert Locust preventive control programme.

In February/March 2003, a routine EMPRES/CR Phase II evaluation took place. The mission confirmed the previous findings, in particular the observation that the governments of the EMPRES/CR countries continue to regard the preventive control of the Desert Locust as a high national priority. Likewise, regional interaction and collaboration in the form of joint surveys has increased among countries, communication channels have improved as well as planning and management of DL survey and control campaigns. Other important results achieved during Phase II included: improved collaboration between EMPRES/CR and the FAO Commission for Controlling the Desert Locust in the Central Region, the introduction of RAMSES (Desert Locust Data Management system) in most of the member countries, the installation of eLocust for wireless field data transmission, promotion and gradual introduction of environment-friendly control agents such as Metarhizium and PAN, research towards improved DL control strategies, and trials with advanced equipment for accurate aerial spraying (Differential GPS) with the potential to significantly improve control efficiency and thus reduce environmental damage, and the creation of a cadre of national master trainers that can pass on their know-how to a larger number of DL staff. In general, the mission was of the opinion that sufficient progress has been made during Phase II to warrant an extension of the programme to a third, and probably final, phase of three years, which would address some of unfinished components within the overall objective of establishing a sustainable locust management system for the Central Region.

2. Concept of Phase III

Based on the mission's findings and recommendations, a participatory Phase III planning workshop was held as part of the 5th Consultative Committee Meeting in Rome from 19 - 23 May 2003. It was attended by senior delegates from the EMPRES/CR member countries, representatives from donor agencies and FAO staff.

In general the workshop participants followed the recommendations of the evaluation mission and adopted a three years Phase from January 2004 – December 2006. The purpose of Phase III was identified as:

Improved preventive Desert Locust control management approaches reinforced on a sustainable basis

with four results leading to the achievement of the programme purpose of Phase III:

- R1: EMPRES/CR Desert Locust management components¹ gradually taken over by the CRC and the participating countries.*
- R2: Implementation of improved early warning systems supported.*
- R3: Campaign evaluation measures and contingency planning mechanisms in place.*
- R4: Alternative control technologies supported.*

The concept of Phase III of the EMPRES/CR programme is focussed mainly on gradually transferring the programme's responsibilities to the Commission and the member countries and on the development and introduction of mechanisms to improve the preparedness of the national and regional entities to prevent locust emergencies from getting out of hand.

2.1. Result 1: EMPRES/CR Desert Locust management components gradually taken over by the CRC and the participating countries

As an important component of strengthening the preventive control capacities of the member countries, the EMPRES/CR programme has given considerable attention during Phase I and II to training of various personnel involved in locust control. Standards have been set, training materials such as manuals, guidelines and curricula have been developed, new training approaches introduced, and a sufficient number of Master Trainers has been qualified to organize and to conduct survey and control training course independently at national level. The efforts made to raise the skills of the plant protection personnel were mainly sponsored through EMPRES/CR trust fund projects. In order to strengthen regular self-reliant national training programmes it was considered necessary that the programme gives further support to the member countries in developing sustainable national training programmes, with reduced technical and financial inputs. However, in order to maintain the level of proficiency it is essential that the trained staff is being maintained at the Locust Control Units.

Appropriate management of the resources and rational supervision of survey and control operations are issues that need to be addressed as part of contingency planning. National Locust Control Units require further support in management/administrative procedures, and methods need to be developed for better planning,

¹ **Components of safer control technologies:**

- Training of staff
- Contingency planning & rapid deployment
- Stakeholder interaction
- Early detection and early warning
- Economic and environmental safer control technologies

coordination and monitoring of national locust control campaigns. Several management seminars at regional and national level are planned during Phase III to raise the management skills at the LCUs.

It is understood that, during Phase III and thereafter, member countries will take on more ownership and responsibility for implementing improved Desert Locust management components within their own national systems. To support this, it is essential that CRC member countries fulfil their financial commitments to the Commission so that the CRC has the resources to be able to help the poorer frontline countries to cover the costs of maintaining EMPRES activities and the use of new technologies. Some countries are likely still to need such support after the EMPRES/CR programme has ended. Some countries may also need some small support from the donor community to maintain their preventive control capacity. To this end, EMPRES/CR will assist member countries in initiating bilateral projects on selected Desert Locust management components.

The CRC Secretariat is expected gradually to take over more responsibility for following up on EMPRES practices. Reviewing and supervising these practices will be an important task for the CRC in future. EMPRES/CR will assist the CRC in the preparation of an appropriate monitoring and evaluation system for this task.

The Country Focus Programmes (CFPs) were a key component of the EMPRES/CR approach. The CFP exercise analysed the main features within the context of the organizational and policy framework of a country's Desert Locust management system and developed strategies for future action. CFPs were therefore seen as an important analytical tool for improving survey and control procedures and also as a suitable mechanism for building ownership within the programme. The approach was considered as the best way to develop and maintain national locust control capacity as opposed to a "one size fits all" approach. Support to Countries Focus Programmes will continue during Phase III.

2.2. Result 2: Implementation of improved early warning systems supported

The overall indicator for Result 2 is that the early warning systems (routine survey, functional national information offices, etc.) should be operational in at least six Locust Control Units by 2006.

The GIS locust data management software, RAMSES (**R**econnaisance **A**nd **M**anagement **S**ystem of the **E**nvironment of **S**chistocerca), is a prerequisite for improved early warning systems and was one of the major concerns of EMPRES/CR during Phase II. The system provides a platform for checking past records of Desert Locust occurrence, viewing remote sensing images, and assists decision-making in respect of locust survey and control. During Phase I and II RAMSES has been installed in Sudan, Eritrea, Ethiopia, Yemen, Oman and Saudi Arabia. However, there are still constraints associated with technical problems and a lack of available local expertise to operate the system appropriately. These constraints require further attention by EMPRES/CR in order to make RAMSES a sustainable operational tool and to encourage the Locust Control Units to make routine use of it .

The objective of improved interpretation of remote sensing images is to facilitate more targeted locust surveys to areas that are promising for locust breeding, and thereby to reduce the cost of survey operations. During the past years there was uncertainty regarding the reliability of satellite imagery to identify green vegetation in traditional DL breeding areas for survey with a reasonable degree of confidence. Recent technical developments in satellites imagery now makes it possible to obtain and to analyse better quality and smaller scale images. Initial work on accessing these images and ground-truthing them in the field began during Phase II. This needs to be continued and expanded during Phase III if the full potential for the technology is to be achieved on a sustainable basis.

In order to ensure that locust surveys are complete, special attention has to be given to potentially important breeding areas in which access may be restricted because of civil conflicts and/or other forms of insecurity. In the Central Region, such areas are presently located between the borders between Somalia/Ethiopia, Eritrea/Sudan, Yemen/Saudi Arabia, and Sudan/Egypt. During Phase II progress has been made in organizing joint surveys with the participation of DL officers of the concerned countries. The EMPRES/CR programme will continue to promote joint border surveys during Phase III, both as a means of covering all potentially favourable locust habitats, but also to foster understanding/confidence between neighbouring national locust control units.

The ultimate objective of an improved preventive locust control strategy is to locate and control gregarizing locust populations at the earliest possible stage, preventing them from developing into a major outbreak or even a plague. Nevertheless, finding early gregarized patches or even hopper bands in vast areas is extremely difficult. It is therefore important to find better methods that will increase the likelihood for detecting "hot spots". One of them is to limit surveys to those areas that received good rainfall and have been identified as green by using RAMSES and remote sensing images. By narrowing down the potential target area, surveys and hence costs can be reduced. Yet, in many cases extensive areas will still require to be surveyed. In order to increase the detection rate for small hopper patches, taking into consideration time constraints and limited resources, EMPRES/CR will support the development of improved survey practices and technologies during Phase III through appropriate solicited research projects.

2.3. Result 3: Campaign evaluation measures and contingency planning mechanisms in place

In the framework of long-term sustainability, EMPRES-CR and the CRC will give priority to the development of national and regional contingency planning mechanisms during Phase III as well as to procedures to assess and to further improve control campaign cost-effectiveness.

Contingency planning has been identified as a vital component of the prevention of DL plagues. In order to be better prepared for emergencies, the Locust Control Units as well as the regional and international bodies need to be organized for a full range of scenarios, from recession to plague situations, and need to have appropriate instruments at hand in order to allocate additional resources quickly

enough to be effective. During Phase II, only the Sudan was in the position to develop contingency plans for the summer and winter breeding seasons in an adequately comprehensive manner. Contingency planning with the aim of having the necessary arrangements in place is a complex matter which requires well functioning coordination at the national, regional and international levels in addition to appropriate mechanisms that facilitate the process. Further attention to contingency planning during Phase III is therefore an essential step in creating a preventive control strategy that works in practice.

One of the important aspects in this matter is to encourage member countries to create national locust management committees (Steering Committees). Such committees serve to keep the concerned governmental institutions informed of locust developments and can assess the capacities of the responsible Locust Control Unit to respond to each particular situation. EMPRES/CR will provide support in this matter. In addition, past experience has shown that national partner institutions lack the necessary management expertise to make proper arrangements in advance and to solicit additional assistance in case of shortfalls. For that reason, EMPRES/CR will support the national units in developing their own contingency planning mechanisms. Guidelines will be prepared which should also include procedures for rapid deployment of resources and good pesticide management practices.

At the regional level, similar arrangements need to put in place both for the CRC and the Desert Locust Control Organization for Eastern Africa (DLCO-EA) in order to facilitate rapid deployment of additional resources and timely aerial intervention. EMPRES/CR will assist the CRC and DLCO in developing regional contingency planning mechanisms which are compatible with those of the participating countries and of FAO.

Establishing the conceptual framework for rapid deployment mechanisms is the first step, but the ability to make operational arrangements that will fit a given situation needs to be proved. EMPRES/CR Phase III will assess the “operationality” of contingency planning mechanisms in the context of practical drills and manoeuvres.

At the heart of the EMPRES programme is the objective of improving the effectiveness and efficiency of locust control. Such improvements should be measured through campaign monitoring and evaluation, but to do this realistically during recession periods has proved difficult. There are two main aspects: the first is the efficiency and effectiveness of Desert Locust control campaigns; and the second is to assess overall impact and economic justification. Regarding the former, during Phase II information on current survey and control operations in the Central Region and a Desert Locust bibliography have been compiled. In addition, a preliminary discussion paper on improved preventive control strategies has been prepared. Economic case studies have been conducted in selected countries to assess farmers' reactions, the impact of the locust threat at the farm level, and the feasibility of insurance schemes that provide compensation for locust damage at a lower cost to the community than fighting the pest. Nevertheless, it was recommended that further studies be carried out during Phase III to develop methods for quantifying the effectiveness and efficiency of the campaigns in order to demonstrate the impact of improvements driven by the

programme. In this context, it is envisaged that EMPRES/CR will produce guidelines for campaign evaluation once control operations are being conducted, for use by the national Locust Control Units. These guidelines should include mechanisms to assess the size and amplitude of the locust infestation and to collect data on crop damage. In addition to the guidelines the member countries will be assisted in developing simulated control campaigns in the field with the aim not only to estimate the effectiveness and efficiency of operations, but also to assess the technical skills of the national locust control staff and the preparedness of the Locust Control Units to face emergency situations.

The various socio-economic case studies carried out under the umbrella of EMPRES/CR during Phase II revealed that the poorest farmers were the most vulnerable to locust invasions and considered the pest as the second most important threat to their livelihood after drought. The idea of introducing insurance schemes to compensate for crop damages caused by the Desert Locust was rejected as not realistic and not viable given the uncertainty of the insurance market in most of the affected countries. The Phase III Planning Workshop recommended that a study of the comparative economic advantage of preventive Desert Locust control as against the high cost of emergency control would be a useful element in the argument of the value of the preventive approach.

2.4. Result 4: Alternative control technologies supported

National laws and regulations governing biopesticides are presently in a state of uncertainty and change. Some countries are using existing guidelines for chemical pesticides to evaluate biopesticides while others have guidelines and authorities specifically to process and encourage registration of biopesticides. The need for a pragmatic but critical approach to regulatory requirements for biopesticides is essential if opportunities for the development and utilisation of environmentally friendlier control agents are not to be wasted.

During Phase II, EMPRES/CR encouraged progress by supporting various efforts at international and national levels. The promulgation of new regulations can be a slow process. The Planning Workshop participants concluded that the EMPRES/CR programme should further participate with member countries and other collaborators in FAO efforts to harmonize biopesticide regulations. Provided that national legislations allow the registration of locust biopesticides, at least one biopesticide against the Desert Locust will be registered in at least three countries for operational use by 2006.

Low Desert Locust populations since 1998 have not allowed large-scale field trials on alternative control technologies. During Phase II, the introduction of biopesticides (such as Metarhizium and PAN) and the encouragement of the national authorities to adopt biocontrol has had to depend on using reared Desert Locust. EMPRES/CR has also promoted biopesticide research on other locust species or grasshoppers.

3. Regional and Inter-regional Cooperation

Important progress has been made during Phase II in the improved collaboration between EMPRES/CR and CRC. Harmonized work planning, development of standardized training approaches, and co-funding of various training, research and cross border survey activities has occurred. CRC and EMPRES/CR also supported a diploma course on Desert Locust management at the University of Khartoum. Countries in the Central Region that are not yet members of CRC have been encouraged to join. In 2001, Djibouti became member of the CRC. Ethiopia officially applied for membership in 2003, and the issue is under consideration in Eritrea. The Commission, as a permanent body, is being financed through the contributions of its member countries. It is therefore seen as being the appropriate body to further support the introduction of advanced components of locust management and to ensure the continuity of the regional coordination of the EMPRES/CR activities after the programme has terminated. Result 1 is mainly taking care of preparing the CRC for its anticipated role after the phasing out of the EMPRES/CR programme.

The second regional entity, the Desert Locust Control Organization for Eastern Africa (DLCO-EA), provides operational assistance during Desert Locust campaigns, mainly in the form of aerial surveys and aerial application of pesticides. Although not all Central Region countries are also member of DLCO-EA, the Organization has an important function in the context of contingency planning in particular when aerial support is needed in case of emergencies. EMPRES/CR supported DLCO-EA to raise its aerial intervention capacity by providing a Differential Global Positioning System (DGPS) equipment for one of their aircraft for more accurate and targeted pesticide application. In addition, EMPRES/CR mediated between the two regional bodies in identifying important areas of mutual concern and interest that might fall under their different mandates. Most important areas of collaboration are harmonized locust reporting, training of locust staff, harmonizing registration of biopesticides, research and contingency planning. The interaction between the two bodies will further be reinforced during Phase III as documented in the joint Memorandum of Understanding.

Since the beginning of the EMPRES programme in the Western Region in 2001, EMPRES/CR is actively supporting inter-regional collaboration and the exchange of expertise and experience. It became standard procedure that the EMPRES Coordinators participate in all the important meetings and strategic workshops of both programmes. Beyond that, national locust officers have been given the chance to participate in major field seminars organized either by EMPRES/CR or EMPRES/WR. Further strengthening of the interaction between the two programmes is envisaged particularly in the field of implementation of improved control technologies, research, survey systems, harmonized training approaches and contingency planning.

4. Organizational Framework and Budget

The workshop participants agreed that the duration of Phase III should be three years, starting on 1 January 2004 and finishing on 31 December 2006. During Phase III, the current structure of EMPRES/CR will be maintained initially. It will include the commitments of the participating countries and of the collaborating regional organizations (CRC and DLCO-EA). The two EMPRES/CR meetings involved in planning, implementation and review, the EMPRES Liaison Officers Meeting (ELOM) and the Consultative Committee Meeting will continue to function,

with annual meetings usually in the last quarter of each year. It is planned that from 2005, the ELOM will be organized by the CRC, with EMPRES/CR assistance. An independent Evaluation Mission to assess Phase III progress will be organized in early 2006. The Mission will advise whether the Phase III objectives are likely to be largely completed by the end of 2006, such that no further extensions of the EMPRES/CR Programme are required.

The Planning Workshop gave no specific advice on the staffing requirements for Phase III. The implication is that the current staffing composition of an EMPRES/CR Coordinator, based in Cairo, an international Locust Officer, based in Khartoum, and two National Professional Officers (NPOs), should be maintained as the EMPRES staff provided that sufficient funding can be found. The Locust Officer and the NPO for locust survey were funded during Phase II from a Trust Fund of the Netherlands (GCP/INT/670/NET). If a no-cost extension is agreed for this project, resources will be available for 2004, but thereafter new donor funding will need to be identified for the posts to be continued. The EMPRES/CR Coordinator and the second NPO posts were funded by FAO's Regular Programme, and these resources are expected to continue to be available during Phase III.

The workshop participants agreed on the tentative levels of funding that would be required for Phase III, at a total amount of about US\$ 3.5 million². This was based on a similar level of activity as had occurred during Phase II, plus a continuation of the same staffing. However the sources of the funding remain uncertain. Unspent balances possibly available from the Netherlands, Switzerland, and the United States, and new funds likely to be available from the Central Region Commission, the Desert Locust Control Committee and the Regular Programme were calculated to reach about US\$ 1.7 million. Even if the donors currently supporting Phase II were able to continue their support in Phase III, there is still likely to be a shortfall of about US\$ 1 million. New donors for the programme are therefore essential if the momentum of the EMPRES/CR Programme is to be maintained, and Phase III as the probable final phase is to be completed successfully.

5. Reporting

The current EMPRES/CR reporting schedules and formats will be maintained. These will include

- An annual EMPRES/CR report;
- Semi-annual reports for specific trust fund projects, where required;
- A terminal report for Phase III

² A more detailed budget estimation of Phase III is outlined in annex 3

6. Risks and Assumptions

There are a number of factors which are outside the direct scope and responsibility of the programme management, but which may have an impact on the successful implementation of Phase III:

- To reach the **Programme Goal** it is prerequisite that all EMPRES/CR member countries become part of the Central Region Commission and that the donor agencies continue to provide support to the EMPRES/CR programme. The lack of locust outbreaks in the Central Region during the last years may have reduced the motivation of the stakeholders to support the strengthening of preventive Desert Locust control capacities. But insufficient allocation of resources to cover the minimum requirements risk that the goal of the EMPRES/CR programme, as actively advocated and endorsed by the donor community as a long-term programme originally planned for a total duration of 12 years, cannot be fully attained. The donor community as well as the governments of the EMPRES/CR member countries have contributed substantially to the success of the programme up to now. It is therefore likely that the EMPRES/CR stakeholders will continue supporting smooth implementation of the Phase III.
- Frequent transfer of qualified staff has had a negative impact on the implementation of EMPRES/CR activities in some of the member countries. But to ensure that the **Purpose of Phase III** is achieved, it is indispensable that trained staff is being retained long enough at the national Locust Control Units. This is in particular important in technically sensitive areas such as operating the RAMSES- and eLocust systems, training of new personnel (***national Master Trainers***), campaign management and contingency planning.
- EMPRES/CR has been designed as a collaborative programme. In order to reach the objective of **Result 1** it is expected that the member countries further fulfil their commitments within the EMPRES/CR programme as jointly agreed in the Phase III planning workshop and during the annual EMPRES Liaison Officers meetings.
- Political instability and restricted access to insecure areas can obstruct proper monitoring of the locust habitats and risk affecting national and regional early warning systems. For that reason it is important for reaching **Result 2** that the accessibility of breeding areas in the Region is assured.
- In order to encourage the introduction and registration of environmentally safer locust control techniques, large-scale field trials and field demonstrations with biopesticides are required. But the prevailing recession period has made these impossible. The situation may remain the same during Phase III. It therefore important to take into consideration that locust infestations must be sufficient to permit field trials in order to reach the **Result 4**. Likewise, even if EMPRES/CR supports field-testing of biopesticides on alternative locust species or grasshoppers to demonstrate their effectiveness, it remains important that national legislation allows the registration of DL biopesticides so that they can become an integral part of the national locust control strategy.

7. Appendices

Annex 1: Outline of the EMPRES Central Region Programme and its achievements

Annex 2: Programme Planning Matrix, Phase II

Annex 3: Expenditures/budget of Phase III

Annex 4: Acronyms

Annex 1: Outline of the EMPRES Central Region Programme and its achievements in Phase II

The Desert Locust component of EMPRES (Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases) was initiated in mid 1994. Its purpose was to strengthen the locust management capacity of locust-affected countries with the aim of minimizing the risk that Desert Locust plagues will develop. It was designed as a collaborative programme in which affected countries, regional organizations, donors, and FAO, participate in the development of improved preventive control strategies. Pilot activities started in 1995 in the Central Region, comprising nine countries around the Red Sea (Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan and Yemen). This area is considered to be the origin of most Desert Locust outbreaks. Phase I of the programme became operational in 1997 and ended at the end of 2000 after having been evaluated by an independent mission in 1999. Phase II started in January 2001 and will end by December 2003. The programme has been evaluated twice during Phase II; the first time in August 2001 as part of an overall evaluation of the entire EMPRES programme; the second time in February-March 2003 to evaluate specifically the progress of the Desert Locust component of the EMPRES/CR Programme and the need for a Phase III.

The **primary development objective** of the EMPRES Central Region Programme was stated as:

“To minimise the risk of Desert Locust plagues emanating from the Central Region of the Desert Locust distribution area through well-directed surveys and timely, environmentally sound interventions in order to mitigate food security concerns in the Central Region and beyond.”

The **Programme goal** was defined as:

“To strengthen the capabilities and capacities of the national, regional, and international components of the Desert Locust management system to implement effective and efficient preventive control strategies based on early warning and timely, environmentally sound, early control interventions.”

The **Purpose of Phase II** was defined as:

“Components of preventive control management developed and adopted.”

The major components of improved Desert Locust control management are focused on:

- Enhanced interaction between the stakeholders;
- Early detection and early warning;
- Introduction of economic and environmentally safer control technologies including research;
- Capacity building and training;
- Contingency planning and rapid deployment.

Enhanced interaction between the stakeholders

All Locust Control Units of the member countries are fully equipped with modern communication facilities such as e-mail, internet, fax and radios to stimulate the vertical and horizontal interaction between the stakeholders. Information exchange, exchange of experience and collaboration between the participants is gaining momentum in most cases and is being documented in a number of joint activities such as inter-regional seminars, workshops and cross border surveys. The regional entities, the Commission for Controlling the Desert Locust in the Central Region (CRC) and the Desert Locust Control Organization for Eastern Africa (DLCO-EA) are fully supporting the introduction of advanced preventive locust control strategies and non-CRC EMPRES countries have joined (Djibouti), are joining (Ethiopia) or are considering joining the Commission (Eritrea). However, not all the stakeholders at national and regional level are participating equally in the regional networking

since not all national Locust Officers are familiar enough with operating modern communication facilities. Some other constraints have technical reasons. Unreliable national telecommunication systems seriously affected smooth communication in some cases and led to delayed implementation of agreed activities.

Early detection and early warning

Well organized and conducted locust surveys, skilled survey officers and efficient national information networking, that continue to work during recession periods, are essential prerequisites to increase the likelihood of the early detection of gregarious Desert Locust populations and hence of any successful preventive Desert Locust management strategy. The basic requirements are:

- Access to reliable sources of information to identify the target areas to be surveyed;
- The availability of experienced survey officers;
- Timely surveys;
- Reliable and fast communication systems;
- Operational Information Offices;
- Well organized and operational locust data bases (RAMSES).

EMPRES/CR provided various forms of support to improve the survey and early warning capacity of the member countries including the training of plant protection officers, scouts and farmers, and the provision of references, survey and communication material. As a result of these efforts, five out of nine countries are preparing targeted survey plans based on the ecological situation and forecasts. Defined information networks are being established in Ethiopia, Sudan, Saudi Arabia, Oman, Somalia, Yemen and Egypt. The quality and timeliness of the survey reports has improved steadily over the past years and, in terms of quantity, the number of locust reports received from the member countries increased by 52 % since 1997. Modern technologies such as remote sensing are being introduced in Eritrea, Ethiopia, Sudan and Yemen for more precise targeting of potentially important survey areas. In-time field data transfer technology (*eLocust*) is also in the process of being tested in Yemen, Sudan and Egypt. The Desert Locust data management system, *RAMSES*, has been introduced in Eritrea, Ethiopia, Yemen, Sudan, Saudi Arabia, and Oman. Egypt is likely to follow soon. In addition, improved survey methodologies are being developed in collaboration with the Universities of Wageningen and Khartoum and the South-West Asia Commission (SWAC).

Economic and environmentally safer control technologies

The aims of this component are:

- To make control operations more efficient;
- To reduce campaign costs;
- To reduce the environmental hazards of locust control.

DLCO-EA has been provided with DGPS equipment (Trimflight 3) to help the pilots to improve spray swath placement during aerial control operations and to allow better recording/management of spraying operations for more targeted and economic pesticide application. The DGPS system has successfully been used during large scale field-testing of the biopesticide, Green Muscle, against the Red Locust in Tanzania early 2003.

In collaboration with the CRC an interregional sprayer testing workshop has been conducted in September 2002. As a result of this workshop, guidelines for sprayer testing are in the process of being developed. In collaboration with the International Centre for Insect Physiology and Ecology (ICIPE) the adult Desert Locust pheromone, Phenyl-Aceto-Nitrile (PAN), is being tested in semi-field trials at the ICIPE field station in Port Sudan. First results demonstrated the effects of PAN on the communication system of gregarious nymphs – resulting in the loss of the cohesive behaviour and reduced immunity. Mixing PAN with organophosphates, the application rate could be reduced in these trials by 60 %. The trials on PAN also showed encouraging results on enhancing the effects of metarhizium products and reducing the costs of biocontrol products significantly.

The IPM approach of using biopesticides in Desert Locust control has largely been accepted by the EMPRES/CR countries. Concrete steps have been undertaken in Sudan and Yemen to

initiate registration of "Green Muscle". In a study carried out by the University of Aden on "Green Muscle", no effects on honey bees could be detected. The product proved to be an adequate control means in ecological sensitive areas and for protecting honey production. An inter-regional field seminar on biopesticides to demonstrate their effects to the affected countries has been conducted in collaboration with national and international researchers in Port Sudan in January 2003.

However, the prevailing recession period made it impossible to test biopesticides in the field under large scale operational conditions. Large scale trials have instead been conducted against the Red Locust in Tanzania in March and August 2003. The first operation produced poor results which were blamed on the use of an inappropriate diluent, but the second is showing much better indications, but the final result is not yet available. In addition, in most of the affected countries specific biopesticide registration guidelines are not available. For that reason registration applications are currently handled on a case-by-case basis under national regulations for chemical pesticide.

Capacity building and training

The aims of the capacity building component are:

- To strengthen the control capacity of the member countries;
- To build up self-reliant and sustainable national training structures;
- To reduce accidents with chemical pesticides;
- To increase the efficiency of the national survey and control teams.

Since 1997 more than 600 locust officers and/or plant protection staff, scouts and farmers received training on various technical locust management subjects. The total target group of persons in the Central Region directly or indirectly involved in locust control operations is about 550 staff. Taking high staff turn-over into consideration, it is assumed that at least 50 % of all plant protection officers currently in place have received training. In each of the member countries at least one national Master Trainer has been trained to conduct and organize national training courses on survey and control topics.

A standard locust training manual has been developed and will be distributed in the form of a training kit to all member countries to facilitate the Master Trainers and other national training entities to operate standard locust training courses in a more sustainable way. The manual includes session plans based on the updated FAO Desert Locust Guidelines, guidance on training methods, participatory training techniques, and the use of visual aids. It contains reference course programmes, pre- and post-course assessments, useful forms, and lists of necessary course material. A series of overhead transparencies have been compiled which can be used during training courses. They are also available on CD ROM.

The Locust Management Diploma Course at the University of Khartoum has further been supported: Six students from Sudan, Eritrea and Ethiopia successfully finished the term 2001/2002, eight additional students including one from CLCPANO, and one from SWAC graduated in August 2003. A third intake of six students for 2003/2004 has begun in September 2003..

The use made by the member countries of their improved capacity has been variable. Only some of the Locust Control Units carried out training need assessment surveys prior to national training courses. In addition, so far little effort has been observed to incorporate training on locust management subjects as a recurrent activity into the national training system. Appeals have been made to member countries to maintain trained staff long enough to pass the know-how on to a next generation. This is particularly important for the more sophisticated technologies such as operating RAMSES, eLocust, and GPS equipment, as well as survey- and campaign-organization etc.. It should be understood that in times of emergency, there is not enough time to train locust / plant protection staff to cope efficiently with the situation.

Contingency Planning

The introduction of rapid deployment mechanisms and Contingency Planning are dependent on:

- Being prepared for a possible but unlikely situations;

- Enhancing the capability of the affected countries to react as soon as possible on outbreak and upsurge situations in a most appropriate and successful manner;
- Identifying the essential procedures and mechanisms at national, regional and international level required to mobilize additional resources in time.

Based on the experience gained during Phase I, a regional Contingency Planning field seminar has been conducted in 2002. It demonstrated through a number of field exercises, the use of computer models, and desk-top simulations, that there was a need for rapid deployment mechanisms and contingency planning. The seminar revealed that upsurge situations will most likely exceed national resources rapidly. It became obvious to the participants that suitable early reaction mechanisms need to be in place at national and regional level but also at international levels in order to synchronise the efforts and to speed up the process. As a result of this demonstration, good efforts have made in Sudan to develop national contingency plans and to create a national Contingency Planning Committee. Also Oman prepared provisional plans.

The complex nature of the topic makes it difficult for the individual countries to develop meaningful and effective contingency plans when the suitable interfaces and mechanisms at regional and international level are not known or not yet well enough defined. An important basic requirement for effective contingency planning is a functional national locust reporting and information system, to keep the relevant national authorities regularly up-to-date of any Desert Locust development and the ecological situation in the country and the neighbourhood. The development of the necessary mechanisms that are needed to trigger rapid assistance in case of likely emergencies is probably a long-term effort, and needs to be addressed as an important activity during Phase III in connection with other structural and organizational questions of Desert Locust management.

Conclusion

EMPRES/CR has made satisfactory progress towards achieving its targets in almost all its aspects and components. However, the adoption rate of the various approaches and technologies offered has varied from country to country. Some of the member countries need to make greater efforts to incorporate and to make use of the improved locust management components in a sustainable way. Follow-up and reinforcement is still required in some technical aspects such as RAMSES, eLocust, the use and interpretation of satellite imageries, introduction of bio-control techniques and campaign evaluation. During Phase III emphasis should be given to structural questions of locust control operation and to raising the management capacity at the Locust Control Units in particular with regard to Contingency Planning.

Annex 2: Programme Planning Matrix, Phase III

Results/Activities	Responsibility	Indicators	Sources of verification	Assumptions
<p>Development Goal:</p> <p>To reduce the risk of Desert Locust plagues emanating from the Central Region of the Desert Locust distribution area in order to mitigate food security, economic and environmental concerns in the Central Region and beyond</p>			<ul style="list-style-type: none"> • Statistics • Reports • Studies 	
<p>Programme Goal:</p> <p>To strengthen the capacities and capabilities of the national, regional, and international components of Desert Locust management system to implement effective and efficient preventive control strategies based on early warning, and timely and environmentally sound early control interventions</p>		<p>Up to 8 of the Desert Locust Control Units in the Central Region practice at least X essential components of preventive control techniques/methods as part of their Desert Locust management strategy in a sustainable way (end of the programme)</p>	<ul style="list-style-type: none"> • Planning documents • Strategy papers • Reports 	<p><u>To contribute to the development goal:</u></p> <ul style="list-style-type: none"> • Desert Locust Control Units in the Central Region maintained and further components of preventive control strategies developed • The governments of the affected countries maintain support to the Locust Control Units during recession periods • External assistance in case of emergency provided in time
<p>Purpose of Phase III:</p> <p>Improved preventive Desert Locust control management approaches reinforced on sustainable basis</p>	<p>FAO-EMPRES, EMPRES/CR-countries, CRC</p>	<p>At least 6 countries have adopted and applied at least 3 improved preventive control components as part of the national Desert Locust management system by 2006</p>	<ul style="list-style-type: none"> • Country reports • Evaluation reports 	<p><u>To reach the programme goal:</u></p> <ul style="list-style-type: none"> • All EMPRES member countries become part of the CRC • Donor agencies support the EMPRES Programme

Results/Activities	Responsibility	Indicators	Sources of verification	Assumptions
<p>R1: EMPRES/CR Desert Locust management components³ gradually taken over by the CRC and the participating countries</p> <p>1.1 Support member countries to develop sustainable national training programmes, with reduced technical and financial support of EMPRES.</p> <p>1.2 Support the national Locust Control Units in improved management and administrative procedures and methods</p> <p>1.3 Support member countries in initiating bilateral projects on selected Desert Locust management components</p> <p>1.4 Prepare a Monitoring and Evaluation system in collaboration with the CRC⁴</p> <p>1.5 Give support to Country Focus Programmes</p>	<p>FAO-EMPRES, CRC, EMPRES/CR-countries</p>	<p>I.1.1: Improved preventive Desert Locust management component taken over by 2 countries by 2004, 3 more by 2005, 2 more by 2006</p>	<ul style="list-style-type: none"> • Country reports • Survey reports 	<p><u>To reach the purpose:</u></p> <p>Trained staff is retained at the Locust Control Units</p> <p><u>To reach the result 1:</u></p> <p>A.1.1: Member countries fulfil their commitments to the EMPRES Programme</p>

³ **Components of safer control technologies:**

- Training of staff
- Contingency planning & rapid deployment
- Stakeholder interaction
- Early detection and early warning
- Economic and environmentally safer control technologies

⁴ Assist CRC to organize annual meetings similar to EMPRES Liaison Officers Meetings from 2005 onwards

Results/Activities	Responsibility	Indicators	Sources of verification	Assumptions
<p>R2: Implementation of improved early warning systems supported</p> <p>2.1 Make routine use of the RAMSES locust database and the interpretation of results</p> <p>2.2 Facilitate the interpretation of remote sensing satellite images and their use in directing survey operations</p> <p>2.3 Support joint cross border survey</p> <p>2.4 Support development of survey practices and technologies through solicited research projects</p>	<p>FAO-EMPRES, CRC</p>	<p>I.2.1: Improved early warning systems (routine survey, functional national information offices etc.) are operational in at least 6 Locust Control Units by 2006</p>	<ul style="list-style-type: none"> Country reports 	<p><u>To reach the result 2:</u></p> <p>A.2.1: Accessibility of breeding areas in the region assured</p>

Results/Activities	Responsibility	Indicators	Sources of verification	Assumptions
R3: Campaign evaluation measures and contingency planning mechanisms in place	FAO-EMPRES, CRC, EMPRES/CR-countries	<p>I.3.1: National contingency planning mechanisms adopted and the operationally assessed as satisfactory for 2 countries by 2004, 3 more by 2005, and 2 more by 2006</p> <p>I.3.2: Regional contingency planning mechanisms adopted by the CRC and operationally assessed and satisfactory by 2005</p>	<ul style="list-style-type: none"> • Plans • Reports of Assessment • Plans • Reports 	
<p>3.1 Encourage the concerned countries to create national locust management committees (Steering Committees)</p> <p>3.2 Prepare guidelines for national contingency planning mechanisms⁵</p> <p>3.3 Support the national entities in developing national contingency planning mechanisms</p> <p>3.4 Assist the CRC in developing regional contingency planning mechanisms in accordance with those of countries and FAO</p> <p>3.5 Assess the “operationality” of the contingency planning mechanisms</p> <p>3.6 Develop guidelines for campaign evaluation</p> <p>3.7 Develop mechanisms to collect data on the extent of infestations , crop damage etc. during control campaign</p>				<p><u>To reach the result 3:</u></p> <p>None</p>

⁵ Including rapid deployment procedures and good pesticide management practices at all stages

Results/Activities	Responsibility	Indicators	Sources of verification	Assumptions
3.8 Evaluate the comparative economic advantage of preventive control vs. emergency control 3.9 Assist member countries in developing simulated control campaigns in the field				

Results/Activities	Responsibility	Indicators	Sources of verification	Assumptions
<p>R4: Alternative control technologies supported</p> <p>4.1 Participate with member countries and other collaborators in harmonizing biopesticide regulations</p> <p>4.2 Support large-scale operational trials and small-scale demonstrations of the use and efficacy of biopesticides</p> <p>4.3 Support solicited research projects</p>	<p>FAO-EMPRES, CRC</p>	<p>I.4.1: At least one biopesticide against the Desert Locust registered in at least 3 countries and ready for operational use by 2006</p>	<ul style="list-style-type: none"> Registration documents 	<p><u>To reach the result 4:</u></p> <p>A.4.1: Locust infestations permit field trials</p> <p>A.4.2: National legislation allows the registration of DL biopesticides</p>

Annex 3: Expenditures/budget of Phase III

A. Minimum estimated requirements to achieve the results of Phase III⁶

Result	Estimated funding required (US \$)
R1: EMPRES/CR Desert Locust management components gradually taken over by the CRC and the participating countries	Support to training courses: 45,000 Diploma Course: 240,000 Consultancy: 70,000 Management seminars: 60,000 ELO Meetings: 90,000 CF-Programmes (incl. Somalia): 190,000 Total R1: 695,000
R2: Implementation of improved early warning systems supported	eLocust systems (equipment): 75,000 Support to RAMSES (computers equipment and software): 30,000 Survey equipment and vehicles: 100,000 Printing of reference material: 10,000 Consultancy promotion of eLocust technology: 50,000 Consultancy introduction of remote sensing technology: 50,000 Support to joint cross border surveys: 60,000 Support to research projects on surveys methods: 100,000 Total R2: 475,000
R3: Campaign evaluation measures and contingency planning mechanisms in place	Consultancy: 60,000 Support to field exercises: 50,000 Total R3: 110,000
R4: Alternative control technologies supported	Support to ICIPE: 150,000 Support to field demonstrations and seminars: 60,000 Support to research projects: 125,000 Consultancy: 60,000 Total R4: 395,000
Total	1,675,000

⁶ Exclusive GoE and staff salaries

B. Inputs required:

Input	Estimated funding required (US \$)
Programme Coordinator	500,000
NPO-Survey	60,000
NPO-Training	60,000
Support staff	45,000
Field Staff travel	180,000
HQ Staff travel	50,000
Non-staff travel (Meetings, seminars and workshops, inc. joint surveys)	260,000
Consultancies	290,000
Operation and maintenance (GOE)	250,000
Equipment	225,000
Support to Diploma Course	240,000
Support to national training courses and field seminars	95,000
Support to biopesticide introduction	150,000
Support to research projects	225,000
Survey operations in Somalia	70,000
Support to CF Programmes	120,000
Evaluation, Phase III	40,000
Contingency	200,000
Total	3,060,000
Overheads	Approx. 293,000
Gand Total	3,353,000

C. Summary of likely and possible contributions:

Funding Source	Funds potentially available in Phase III (USD)	Remarks
FAO	750,000	
Switzerland	?	
DGIS	386,481	Not yet confirmed
USAID	?	
CRC	420,000	
DLCC	150,000	
Others	?	
Total	1,706,481	
Estimated total cost	3,353,000	
Balance	1,646,519	Additional funds required

Annex 4: List of participants, planning workshop Phase III

DJIBOUTI

Mr. Mohamed **Moussa** Mohamed
Chief of Agriculture and Forests Service
Ministry of Agriculture, Livestock and Sea
P.O.Box 224
Djibouti

Tel: +253 34 17 74
Tel: +253 34 14 96 (Office)
Fax: +253 34 17 94/341774
Email: saf@intnet.dj

EGYPT

Dr. Khalil **EI Malki**
Senior Locust Officer (Prof.)
Under Secretary of Plant Protection
Ministry of Agriculture
P.O. Box 19
Dokki, Cairo
Egypt

Tel: +20 2 5250586/0020 2 3351186
Fax: +20 2 3372193/3356175/3351186
E-mail: ppri@nile-enal.sci.eg; nresarch@merunet.net

ETHIOPIA

Dr. **Bateno Kabeto** Leramo
Head, Crop Production, Protection and
Technology Regulatory Department
Ministry of Agriculture
Addis Ababa
P.O. Box 62938
Ethiopia

Tel: +251 1 460119/460183/154911
Mobile: +251 9 254013
Fax: +251 1 460423/512984
E-mail: moa.crop@telecom.net.et

THE NETHERLANDS

Prof. Arnold **Van Huis**
Tropical Entomologist
Consultant on locust matters
Directorate General for International
Cooperation (DGIS)
Wageningen Agric. Univ / Dept. Entomol.
POB 8031
6700 EH Wageningen
The Netherlands

Tel: +31 317.484653
Fax: +31 317.484821
E-mail: Arnold.vanHuis@WUR.NL;
arnold@vanhuis.com

OMAN

Mr. Sulaiman Bin Mahfoodh **Al-Toubi**
Director of Plant Protection
Ministry of Agriculture and Fisheries
P.O. Box 467
Postal Code: 113
Muscat
Sultanate of Oman

Tel: +968 696287
Fax: +968 696271
E-mail: altoubi68@hotmail.com

SAUDI ARABIA

Mr. Ghazi Abdallah **Hawari**
National Center for Locust Control and
Research
PO Box 24423
Jeddah 21446
Kingdom of Saudi Arabia

Tel: +966 2 6204085
Fax: +966 2 6210096
Mobile: 055704500
E-mail: locust@sps.net.sa

SUDAN

Mr. Khidir Gibril **Musa**
Head of Pest Control Department
Ministry of Agriculture and Forestry
Plant Protection Directorate (PPD)
Khartoum North
Sudan

Tel: +249 13 337437
Fax: + 249 13 337495
Tel: 012912059 (private)
E-mail: ppdlocust@sudanmail.net

SWITZERLAND

Dr. Anton **Kohler**
Head of the Swiss FAO-Secretariat
Swiss Directorate of Agriculture
Federal Officer for Agriculture
Mattenhofstrasse 5
CH-3003 Bern
Switzerland

Tel: +41 31 3222562
E-mail: Anton.Kohler@blw.admin.ch

USAID

Dr. Joseph **Vorgetts**
Technical Coordinator, AELGA Project
US Agency for International Development
Bureau for Democracy, Conflict and
Humanitarian Assistance
USAID/DACHA/OFDA
1300 Pennsylvania Ave. NW, Room 8.7.92
Washington, D.C., 20523-8602
USA

Tel: +1 202 712-4954
Fax: +1 202 216-3706/7
E-mail: jvorgetts@USAID.Gov

Dr. Harry **Bottenberg**
Senior Specialist for Research and
Education
USAID-AELGA
1325 G Str. NW, Suite 400
Washington, D.C. 20005
USA

Tel: +1 202 720 2081
Fax: +1 202 720 3216
E-mail: hxb@ars.usda.gov

DESERT LOCUST CONTROL ORGANIZATION FOR EASTERN AFRICA (DLCO-EA)

Mr. Onyango Peter **Odiyo**
Director DLCO-EA
P.O. Box 4255
Addis Ababa
Ethiopia

Tel: +251 1 461477
Fax: +251 1 460296
E-mail: dlc@telecom.et.net

FAO EMPRES CENTRAL REGION

Mr. Christian **Pantenius**
EMPRES/CR Coordinator
FAO Regional Office for the Near East (RNE)
11 Al Eslah El Zerai St.
P.O. Box 2223
Dokki, Cairo - Egypt

Tel: +20 2 3316000 (ext.2414) Direct: +20 2 3316130
Fax: +20 2 7495981/7616804
E-mail: Christian.Pantenius@fao.org

Mr. Charles **Dewhurst**
EMPRES/CR
PPD
P.O. Box 14
Khartoum North - Sudan

Mobile: +249 1 123 60305
Fax: +249 13 337495
E-mail: empres@sudanmail.net

COMMISSION FOR CONTROLLING THE DESERT LOCUST IN THE WESTERN REGION (CLCPRO)

Mr. Thami **Ben Halima**
Executive Secretary of the FAO Commission
for Controlling the Desert Locust in the
Western Region
EMPRES Western Region Coordinator
30, rue Asselah Hocine
BP 270 RP Algiers - Algeria

Tel: ++213 21 733354
Fax: ++213 21 734505
E-mail: CLCPRO@fao.org

COMMISSION FOR CONTROLLING THE DESERT LOCUST IN THE CENTRAL REGION (CRC)

Mr. Munir Gabra **Butrous**
Secretary of the Commission for Controlling
the Desert Locust in the Central Region
FAO Regional Office for the Near East (RNE)
11 Al Eslah El Zerai St.
Dokki Cairo
P.O. Box 2223 Dokki
Cairo - Egypt

Tel: +20 2 3316000 (ext.2515) 3316018 (direct)
Fax: +20 2 7616804/7495981
E-mail: Munir.Butrous@fao.org;

FAO/HQ

Mr. A. **Hafroui**
Senior Officer
Head of the Locusts and Migratory Pest
Group
FAO-HQ
Rome – Italy

Tel: +39 06 570 54021
Fax: +39 06 570 55271
E-mail: Abderrahmane.Hafroui@fao.org

Mr. C. **Elliott**
Senior Officer
Locusts and Migratory Pest Group
FAO-HQ
Rome – Italy

Tel: +39 06 57053836
Fax: +39 06 57055271
E-mail: Clive.Elliott@fao.org;

Workshop Moderator

Mr. M. **El-Fouly**
Research Professor
National Research Centre
Cairo-Dokki
Egypt

Tel: +20 2 3834269
Fax: +20 2 3834269
E-mail: Elfouly@link.net

Annex 5: Acronyms

FAO	Food and Agriculture Organization of the United Nations
C	Control
CR	Central Region
CRC	FAO Commission for Controlling the Desert Locust in the Central Region
DGIS	Dutch Development Cooperation
DLCO-EA	Desert Locust Control Organization for Eastern Africa
DLCU	Desert Locust Control Unit
ELO	EMPRES Liaison Officer
EMPRES	Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (Desert Locust component)
HQ	Headquarters
ICIPE	International Centre for Insect Physiology and Ecology
LCU	Locust Control Unit
NPO	National Professional Officer
NRI	Natural Resources Institute
PPD	Plant Protection Division (Department)
RAMSES	Reconnaissance and Management System of the Environment of Schistocerca (GIS data management and aid to decision-making)
S	Survey
USAID	United States Agency for International Development
US \$	US-Dollar
WR	Western Region