

ANNUAL REPORT 1998

EMERGENCY PREVENTION SYSTEM

EMPRES

For Transboundary Animal and Plant
Pests and Diseases

DESERT LOCUST
CENTRAL REGIONAL PROGRAMME



Food and Agriculture Organization of the United Nations

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1. INTRODUCTION

1.1 This is the second Annual Report of the EMPRES (Desert Locust) Central Region Programme. It herein documents progress made by EMPRES staff and Liaison Officers during 1998. 1998 was the second year of full activities in the field, and it was the year in which the necessary background work for developing a comprehensive EMPRES Central Region approach was mostly completed.

1.2 The Food and Agriculture Organization (FAO) Emergency Prevention System (EMPRES) for Transboundary Animal and Plant Pests and Diseases is a Special Programme of the FAO. It has two components, one on certain animal diseases, the other presently focusing on the prevention of Desert Locust plagues. Many of the previous Desert Locust plagues have started in countries around the Red Sea. Therefore, the first priority was to start a programme in this region which is called the "Central Region" for the Desert Locust. EMPRES Central Region is a regional programme encompassing Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, and Yemen.

1.3 The primary goal of the EMPRES Programme is:

To minimize the risk of Desert Locust plagues through well-directed surveys and timely, environmentally sound interventions in order to minimize food security concerns in locust-affected countries.

1.4 The objective of the Programme is:

To promote and catalyze the realization of self sufficiency for averting locust plagues through strengthening existing national, regional, and international components of Desert Locust management systems.

1.5 Bearing the goal and objective in mind, it follows that EMPRES is an ephemeral programme rather than a new organization or institution. It was not designed to replace, substitute, or duplicate activities being carried out by existing national and regional institutions. When EMPRES completes its mandated tasks, national and regional capacities to provide early warning and to conduct early interventions with the aim of preventing major Desert Locust plagues should be functional and sustainable.

1.6 EMPRES promotes and catalyzes Desert locust management, including reporting, training, research, survey, control, strategy development, and implementation. All of these need to be addressed to cover the many scenarios of Desert Locust outbreaks that can arise. Training is approached from regional and national perspectives to create, enhance and strengthen survey, reporting, and control. Expertise from within the region is being relied upon to plan and accomplish training, with follow-on mechanisms for achieving sustainability receiving a high priority along with the usual technical components of the curricula. Research aims at improving

survey, reducing conventional pesticide application, ensuring environmental safety, and creating a better understanding of Desert Locust population dynamics. Knowledge gained will be interfaced as appropriate such that country specific strategies developed can be meshed within an overarching and increasingly rational regional strategic approach.

1.7 EMPRES is built on two realms of manpower; national Ministry EMPRES Liaison Officers (ELOs), one from each member country, except Somalia, and one additional Liaison Officer from the Desert Locust Control Organization for Eastern Africa (DLCO-EA); and on EMPRES staff in the employ of the FAO (listed below in para. 2.1). ELOs bridge EMPRES with the national Ministries and are responsible for planning, initiating, implementing, and assessing activities in partnership with EMPRES. Ultimately, the ELOs are pivotal elements to the programme. When EMPRES is no longer in existence, ELOs will be orchestrating the tactics, strategies and networks for Desert Locust management within and among each of their respective countries.

1.8 In addition to strengthening national capacities, the EMPRES Central Region Programme works closely with the FAO Commission for Controlling the Desert Locust in the Central Region (CRC), which is based in Cairo. The CRC, which has a role in locust coordination, the provision of assistance and the promotion of national capacities, continues work complementary to EMPRES. It is expected that the EMPRES Central Region Programme will incorporate many of its accomplishments and findings, as appropriate, into the CRC.

1.9 It is very important to understand that the EMPRES Programme is placing particular emphasis on full collaboration and cooperation among all involved parties to reach a common regional goal. Eventually, upon dissolution of the EMPRES Programme after years to come, the responsibility for locust plague prevention will rest mainly on national capacities to apply best fit tactics within the most appropriate strategic contexts, with many coordination activities expected to be taken on by the CRC. In addition, DLCO-EA will provide operational support to its member countries. Success in the Central Region will mean that outbreaks and upsurges can be prevented or terminated before they spread to other regions.

1.10 EMPRES Central Region has, in full collaboration with the Liaison Officers, developed indicators for assessing the progress of its work (Annex 1).

2. EMPRES ACTIVITIES

A. Establishment of EMPRES Central Region Field Unit and National Liaison Officers

2.1 As of 31 December, 1998, the EMPRES Central Region field unit was comprised of the following FAO staff:

- Regional Coordinator, Allan Showler: began field duty March 1997 in Asmara.
- Senior Field Officer, Christian Pantenius: July 1997 in Addis Ababa.
- International Expert/Strategies Development, Tsedeke Abate: August 1998 in Sana'a.
- National Professional Officer (NPO)-Control, Munir Butrous: October 1996 in Khartoum.
- NPO-Survey, Fuad Bahakim: May 1997 in Sana'a.
- Associate Professional Officer, Jan Breithaupt: February 1997 in Sana'a.
- Administrative Assistant, Elsa Tekle: November 1997 in Asmara.
- Additional staff recruitment for NPO-Training will be completed when possible.
- Support staff in Asmara, Ethiopia, and Yemen are currently on casual labour contracts and thus are not official FAO staff.

2.2 EMPRES Liaison Officers (ELOs) have been selected by each of their respective governments:

- | | |
|----------------|----------------------------|
| • Djibouti | Hussein Elmi Amir |
| • Egypt | Samir Simary |
| • Eritrea | Mehari Tesfayohannes |
| • Ethiopia | Abdurahman Abdulahi |
| • Oman | Mamoon bin Khamis Al-Alawi |
| • Saudi Arabia | Jaber Al-Shehri |
| • Sudan | Ali Mohamed Ali |
| • Yemen | Abbas Abdel Moghni |
| • DLCO-EA | A.H. Karrar |

2.3 A EMPRES Liaison Officer Workshop was held in May at Lake Ziway, Ethiopia, that developed increased awareness among ELOs regarding their roles and the roles of EMPRES staff, and to formulate EMPRES Central Region Programme progress indicators.

B. EMPRES Central Region Structure and Function

2.4 EMPRES Central Region has prepared an overall EMPRES Central Region Approach document that describes the approaches that EMPRES Central Region will take in 1999 and beyond.

C. Coordination

2.5 EMPRES Central Region has strengthened the existing communication network between FAO Field Offices, the CRC, FAO Headquarters in Rome, Plant Protection Departments (PPD/ELOs) and FAO EMPRES staff. Sufficient telephone, fax, and e-

mail facilities are now established and messages can be transmitted between all the concerned parties. EMPRES Central Region holds periodic meetings of FAO staff (last meeting in January 1998, next meeting in February 1999) and Liaison Officers (last meeting in December 1998 in Cairo). Where problems in maintaining communication exist, EMPRES assists by troubleshooting technical obstacles as well as offering training to ELOs and other Ministry locust control staff.

2.6 A formal Framework of Collaboration between EMPRES and the CRC was developed. Further contacts were strengthened and new linkages were established with donors, research institutions, regional organizations, and multilateral organizations with special interests in Desert Locust management in the Central Region. In 1998, discussions were held among EMPRES and various national, regional and international research entities in order to initiate research programmes in a number of fields including population dynamics, non-target impact testing and barrier treatments, biological control, early warning, environmental concerns, database construction and dissemination, aerial applications, locust population modeling, economics/locust impacts, and development of tools for improved survey and early control.

2.7 EMPRES staff participated in the Desert Locust Control Commission's Technical Group meeting held in October, 1998. In December 1998, EMPRES staff participated in the first Consultative Committee Meeting, held in Cairo.

2.8 EMPRES Central Region completed and distributed its Briefing Paper and its Centre of the Locust Control Universe document which, in summarized form, describe EMPRES Central Region and define the roles of the key partners relevant to Desert Locust Control in the Central Region. The CRC and EMPRES Central Region are collaboratively developing a glossary of locust management terminology.

D. Early Warning and Survey

2.9 In 1998, EMPRES Central Region, by strengthening links from the field to the FAO Desert Locust Information Service in Rome, contributed to improving the consistency and quality of locust reporting from EMPRES Central Region countries. A standardized survey form developed by the Information Service with assistance from EMPRES, has received use throughout much of the Central Region in 1998 after its dissemination and instruction for use in 1997. In one country, this form is now transmitted to FAO Headquarters electronically, and EMPRES Central Region is working to increase electronic transmissions by training other countries in its use. Such information, when provided systematically, is the base on which the quality of the monthly FAO Desert Locust Bulletin is built.

2.10 In January 1998, EMPRES conducted a ground verification of satellite-derived normalized difference vegetation index (NDVI) maps. It was found that there are anomalies on the current maps because of inadequate resolution, cloud cover, and technical problems pertaining to reception of the data. EMPRES facilitated a more

detailed ground verification by the Natural Resources Institute (NRI) of the U.K. in March 1998 which yielded the same conclusions. Hence, EMPRES has conducted discussions with NRI to seek improved ways of constructing survey maps that will encompass additional relevant data and not be subject to the resolution, cloud cover, and reception difficulties experienced with current NDVI capabilities. These discussions resulted in the planning of a research effort to tackle the issue. Further plans are in the development stage to improve such imaging for survey purposes in areas of the Central Region that would benefit most from its use.

2.11 In February 1998, EMPRES tasked a team to visit several Central Region countries to scope the issues of developing better survey tools built on remote sensing and meteorology data. The team produced a report with recommendations that will be further addressed in a Regional Workshop devoted to these topics scheduled for the first half of 1999.

2.12 EMPRES has initiated the development of its Country Focus Programme, which aims to establish indigenous, systematic, and sustainable scouting, reporting, training, and control systems for each country. Because of the concentrated nature of this programme, one country at a time will be initialized with the objective of beginning two Country Focus Programmes each year. EMPRES Central Region started the programme with a meeting at the Ministry of Agriculture of Eritrea in November 1998. This meeting yielded the steps to be taken in order to develop and maintain such a system, including filling material and equipment needs, training, and putting in place scouting and reporting processes in Eritrea. This programme in Eritrea began in late 1998, and will continue into 1999. A second Central Region country will then be started on a Country Focus Programme later in 1999.

2.13 Following visits to several member countries, an EMPRES consultant prepared a systems monitoring report. This details the non-governmental ways in which locust information is gathered and is being used to assist in planning and implementing the Country Focus Programme.

2.14 Material assistance for doing surveys has continued with procurement and distribution of vehicle spare parts, camping equipment, radios, maps, and other survey-related equipment to the EMPRES Central Region member countries. Some of this assistance was also mobilized by EMPRES through local donor representatives. Training courses and workshops have been conducted at regional and national levels for improving the use of survey equipment.

2.15 EMPRES Central Region assisted the Government of Eritrea to harmonize their radio frequencies by obtaining manuals for making these adjustments. Eritrea's radios are now fully functional.

2.16 Survey safety in mined areas of Eritrea was enhanced through EMPRES mobilization of donor support to procure anti-mine shields for three vehicles. EMPRES has also initiated the development of survey and control capabilities in

certain insecure areas in the Central Region that are critical to Desert Locust breeding. The CRC, in joint discussions with EMPRES Central Region, has agreed to take a lead role in formulating a process by which joint border surveys can be promoted in disputed areas.

2.17 During the outbreaks that occurred in the Central Region in 1998, EMPRES assisted in conducting surveys and provided vehicles. EMPRES Central Region staff carried out surveys in 1998 in northern Somalia which contributed to the early detection and control of breeding Desert Locust populations there.

2.18 Aerial survey is a collaborative effort among EMPRES, national Ministries of Agriculture, and aerial firms and organizations, including DLCO-EA. DLCO-EA surveys and control operations are carried out as a service to member nations. Supplementary surveys and control operations are funded and arranged by EMPRES particularly for areas that have no survey capacity such as northern Somalia or for other special purposes.

2.19 NRI developed acridid field identification cards to assist survey scouts to make accurate reports on Desert Locusts. EMPRES reviewed the cards, and used them on a pilot basis in certain EMPRES Central Region countries. EMPRES recommended that NRI develop similar cards for vegetation identification to further assist in making sound reports. Plans are underway to create these cards in 1999.

2.20 A Contingency Plan Development Workshop Programme was initiated by EMPRES in the Central Region to enable member countries to establish scenario-based contingency plans for faster reaction to infestations detected. Each EMPRES Central Region member country will receive a Contingency Plan Development Workshop and each will be fully responsible for thereafter developing adequate contingency plans for implementation as needed.

E. Early Control

2.21 A Desert Locust outbreak began along the Red Sea coast of Sudan and Eritrea in November and December 1997. Both areas were visited during the very first signs of the outbreak when locust populations were gregarizing. As a result, early interventions were implemented in Sudan through aerial and ground operations against adult locust groups and hopper bands, where such operations could be conducted, before swarms developed. In Eritrea, EMPRES also provided advice on scouting and control so that operations began against hopper bands early and no swarms developed in Eritrea in 1997 and 1998. In Somalia, EMPRES Central Region staff surveyed consistently and coordinated control operations using DLCO-EA aircraft, as well as moved ageing stocks of pesticide from the DLCO-EA base in Djibouti to Hargeisa to permit control to be done in Somalia. EMPRES also assisted in coordination of survey and control in limited parts of Yemen where swarms arrived and breeding occurred. In addition, swarms arriving in Ethiopia from Somalia were controlled,

assisted by EMPRES (survey, mobilization of pesticides, and aerial and ground control).

2.22 The 1997-1998 campaign can generally be described as follows: Gregarious locust populations, in the hopper stage only, were identified on the Red Sea coast of Sudan and Eritrea prior to swarm development in November 1997. Climatic and environmental conditions were notably favourable to further development of gregarious populations. Hopper control was initiated as a result of improved preparedness and coordination, and, as a result, swarm development was averted in those areas of Sudan where security permitted operations, and all along the Eritrean coast. Later breeding in Yemen was quickly discovered and controlled prior to major swarm escapes to other countries. The only places where notable swarms seem to have developed and escaped to invade other countries (Egypt, Ethiopia, and Saudi Arabia) were in northern Somalia where there is no functional indigenous survey and control apparatus - several swarms flew from Somalia to Ethiopia where they were quickly controlled; and along the Red Sea coast of Sudan south of the Tokar Delta as a result of insecurity. It is important to note that those swarms that arrived in Saudi Arabia and Egypt are thought to have originated from this inaccessible southern strip of Sudan's coast, and that more than 330,000 hectares in Egypt and Saudi Arabia had to be treated as a result. If this assumption is correct, it means that infestations would have spread over very large areas if early control had not occurred north of there in Sudan, and to the south in Eritrea. Fast control interventions against the invading swarms in Egypt and Saudi Arabia terminated swarm activity, and prevented significant breeding and spread to countries beyond the Central Region. In all, from November 1997, when the first signs of gregarious locust activity were identified on the Red Sea coast, until May 1998 when the need for control operations ceased, a total of approximately 430,000 hectares were treated in seven countries at no cost to the donor community during the campaign aside from \$30,000 provided to Sudan by EMPRES for vehicle repairs. In this instance, the impact of proaction is certainly evident in terms of cost, area infested and treated, and in that the outbreak was contained and terminated in the Central Region before it would extend to other regions or become a plague.

2.23 Other, lesser, outbreaks were identified and controlled early with EMPRES assistance in Yemen during the summer of 1998. Swarms in Sudan were found in central Sudan in the early fall of 1998, apparently residuals from summer breeding that had gone undetected in the early phases. Control operations were conducted with EMPRES assistance and this infestation was contained.

2.24 The spraying report form developed by EMPRES Central Region, in cooperation with NRI and FAO HQ, was distributed for use in member countries after additional modifications in 1998.

2.25 EMPRES Central Region has collected a list of aerial operators in the Central Region, which can be used to expand aerial options in case of need. This list is being

expanded further to include aerial operators outside the region that may be available for operations in the Central Region if required.

2.26 The agreement between FAO and DLCO-EA has been amended to clarify procedures for DLCO-EA operations that use FAO funds.

2.27 EMPRES Central Region assisted member countries in 1998 by making procurements of material and equipment to facilitate early control operations. EMPRES Central Region also mobilized donors in Eritrea to assist with other early control-related procurements, and has established a Norwegian fund (which was targeted specifically for Eritrea) for making final survey and control-related procurements in Eritrea as the EMPRES Country Focus Programme for Eritrea is initialized.

2.28 A comparison of the cost to donors and affected countries of past campaigns and the effectiveness of the campaigns in mitigating outbreaks is being made by EMPRES. This will enable comparative analysis of future campaigns as well.

2.29 EMPRES Central Region is, for the time being, concentrating most (but not all) of its efforts in both survey and control in “front line” Desert Locust countries with the aim of improving operations and information flow to further facilitate early control.

2.30 A Campaign Evaluation Report was developed and distributed which relates to the ways in which control was conducted in the 1992-1994 Desert Locust outbreak.

2.31 Other EMPRES Central Region activities that pertain to both survey and control are identified in sections for research and training, below.

F. Research

2.32 EMPRES is collaborating with the CRC on developing an overall approach to conducting solid research on key topics. These are described below. For convenience and for reasons connected to how the concept of promoting Desert Locust research evolved, planning has progressed under the heading “solicited research programme” and “cooperative research teams.” It needs to be emphasized that there has never been any intention of creating different types of research projects in the Central Region. Thus it is foreseen that solicited research planned for example in the field of biological control will be combined with research planned by the cooperative research teams.

2.33 Solicited Research Programme: The CRC and EMPRES have collaborated to promote the development of research proposals on selected important topics from researchers within the Central Region. Proposals were received in mid-October and a panel of CRC and EMPRES staff will make selections for further development of

these proposals. Funding will be provided by both the CRC and EMPRES. It is expected that the Solicited Research Programme will become operational in 1999.

2.34 Cooperative Research Teams: The CRT approach catalyzes the formation of special research teams comprised of leading researchers from the Central Region and from beyond the Central Region on various topics of Desert Locust management. The development of CRTs has started in the topical areas listed below, with the expectation that they match solicited research priorities in certain fields (e.g., biological control) and will be merged with these into one unit. It is also expected that different research components will merge in time, or closely interface as appropriate to begin creating an increasingly comprehensive understanding of Desert Locust, survey, and control. For further information on CRTs, EMPRES has developed a CRT guidelines paper.

- a) Population Dynamics: This topic will examine interactions among locusts as they relate to gregarization, locust/plant interactions, spatial dynamics of locust populations, and macro-scale vegetation influences on locust populations. The development of this research component is well underway.
- b) Biological Control: This component will develop practical methods for using microbial agents to control Desert Locusts, including production and regulatory aspects. Since this type of research has already reached a fairly advanced state (with suitable microbial agents already being commercially available) the component covers a border area between research and the implementation of research results into practical application. An outline of the types of activities needed has been prepared by a mission which visited four EMPRES countries in April 1998.
- c) Meteorology/Survey: This component will examine how to apply RAMSES and remote sensing technologies to develop improved imagery as tools for survey. Development is well underway.
- d) Non-target Impact Testing and Barrier Treatments: This component will study non-target impacts and assess the potential application of conventional pesticides, insect growth regulators, botanicals, and other control tactics. The development is well underway.
- e) Environmental Concerns: This research will examine ecological webs relative to Desert Locusts and a Swedish initiative for identifying and characterizing environmentally sensitive or fragile areas. The development of a this topic is well underway.

2.35 Other Research: There are other, generally more *ad hoc* types of research that can be accomplished with EMPRES Central Region assistance. Some examples follow:

- a) Neem Trials: Neem is currently commercially available for pest control in countries near the Central Region (e.g., Kenya and India). EMPRES Central Region has prepared, with cooperation from GTZ, a protocol for conducting neem trials in operations settings when appropriate opportunities present themselves.
- b) Differential Global Positioning System (GPS) Demonstration: In March 1998, EMPRES Central Region collaborated with the Norwegian Project in West Africa and other partners, to carry out a successful differential GPS demonstration in Sudan.
- c) Non-target and Efficacy Tests for Barrier and Blanket Treatments: In February 1998, EMPRES Central Region assisted the Government of Eritrea, with cooperation from DLCO-EA, to conduct blanket and barrier trials for assessing the efficacy and non-target impacts of two pesticides for locust control.
- d) Economics Study in Sudan: EMPRES Central Region has initiated an economics assessment of the 1997/1998 winter campaign in Sudan.

2.36 EMPRES Central Region has applied for the assignment of an Associate Professional Officer on Netherlands funding for generating research results on Desert Locust population measurements.

2.37 Wageningen Agricultural University (WAU) in The Netherlands has recruited a Ph.D. candidate from the Central Region to study aspects of Desert Locust population dynamics. EMPRES Central Region is closely linked with WAU to develop his programme, to assist in the field work, and to establish collaborative research links.

2.38 A team of biological control experts visited four Central Region countries to scope the existing capacities and regulatory systems that relate to the exploration for microbial agents that could be used for Desert Locust Control, development, production and application of those agents; and regulations pertaining to the use of biological control. The report generated by that mission will be used to assist in planning and implementing research carried out on biological control.

2.39 A plan by which comprehensive Desert Locust impact/economics data can be collected and analyzed in each EMPRES member country and on a regional scale is being prepared. EMPRES will make every effort to ensure that such studies are planned and conducted with complete transparency. EMPRES/Central Region's Strategies Officer has been tasked with developing the approach to examining locust impacts/economics issues and the approach is expected to be finalized by mid-1999.

G. Training

2.40 Training will take three basic forms: 1) national courses (including Country Focus Programme training components), 2) regional courses, and 3) academic programmes.

1) National Courses: EMPRES Central Region conducted a survey and control course in Sudan in October 1998 which included trainees from Djibouti. In January 1998, EMPRES Central Region provided a course in Eritrea during the winter campaign on calibration of ground spray equipment. Advanced training on RAMSES and remote sensing is being planned by NRI and EMPRES for Eritrean and Yemeni locust staff; this course is expected to be held in Asmara in early 1999. Offers for computer training were extended by EMPRES Central Region to all member countries; in 1998, computer training was requested by and provided to Saudi Arabia and Yemen. EMPRES Central Region provided a seminar on Desert Locust Plagues in Africa and Asia in April 1998 for the University of Asmara's Department of Biology. A training course on non-target impact testing and barrier treatments was planned for June 1998 in Eritrea, but had to be postponed until 1999 because of the security situation at that time.

2) Regional Courses and Workshops: EMPRES Central Region, in collaboration with the CRC, developed and implemented a Regional Workshop on Aerial and Ground Pesticides Application for Locust Control held in November in Ismailia, Egypt.

The

CRC, in collaboration with EMPRES Central Region, conducted a Regional Course on survey in Hodeidah, Yemen, in the spring of 1998. EMPRES Central Region and

the CRC assisted in the implementation of a Regional Workshop on Locust Control

Technologies that was developed by NRI and held in Silwood Park, England, in early

summer, 1998. This annual workshop was collaboratively revised between EMPRES

Central Region and NRI such that in future years, beginning 1999, it will be held in the Central Region and the role of trainers from the Central Region will increase.

Planning is underway by EMPRES Central Region to hold regional workshops on Train the Trainer Methods and other topics in 1999 in cooperation with the CRC.

3) Academic Programmes: The CRC and EMPRES Central Region are catalyzing the

development of a post-graduate degree programme on Desert Locust management at

the University of Khartoum. It is expected that this programme's proposal will be

fully developed in 1999. Other advanced degree programmes for students from the

Central Region will likely be elements of some of the CRTs.

2.41 EMPRES Central Region initiated the idea of developing a survey and control training package for use in future national training courses; this initiative will be implemented in collaboration with NRI.

H. Residue Analysis Laboratory Development

2.42 Discussions with the Government of Yemen on developing a pesticide residue analysis laboratory in Yemen have commenced. The Government of Yemen plans to re-activate a laboratory established with GTZ assistance, and EMPRES Central Region has tentatively agreed to furnish the Government of Yemen with an expert to detail the material and equipment requirements of such a laboratory in 1999 if the laboratory will serve the Central Region as well as Yemen.

I. Acetylcholinesterase Blood Testing Programme

2.43 Discussions with the Government of Mauritania, LOCUSTOX, and Norway have begun in order to determine if the acetylcholinesterase testing programme in Mauritania can be developed in the Central Region member countries. EMPRES Central Region staff will travel to West Africa in 1999 to develop concrete plans for this.

J. Database Construction

2.44 The process of compiling information for building a database (for locust, logistical, and environmental information) and library files continues. Plans are underway to adopt RAMSES as a foundation for this database, and this will be transferred to the CRC after further progress has been made. RAMSES is also being considered for transfer to each EMPRES member country.

2.45 EMPRES Central Region has developed a timeline for selected topical submissions to the EMPRES website operated by FAO/HQ. Several articles have already been submitted.

K. EMPRES Central Region Brochure

2.46 An EMPRES Central Region brochure is being developed for finalization and distribution in 1999.

L. Strategies Development

2.47 In July 1998, EMPRES Central Region recruited a Strategies Expert who is currently conducting background research relevant to the development of strategies. He is working in connection with the WAU Ph.D. candidate who is becoming involved in certain aspects of Desert Locust population dynamics. The development of strategies has begun with Contingency Plan Development Workshops, but will be expanded upon as new tactics become available. Strategies development is a long

term process which will continue throughout much of EMPRES Central Region's lifetime.

2.48 A chapter, tentatively titled "An Introduction to Desert Locust Control Strategies"

for a book that is in preparation by the CRC, has been drafted. The book will be published in Arabic, but EMPRES Central Region will seek ways to present the strategies chapter in other languages for broader distribution.

3. UNFORESEEN EVENTS

3.1 There have been, unfortunately, several unforeseen events that have affected security in the Central Region during 1998 and have had particular impacts on the ability of EMPRES Central Region staff to carry out their duties during parts of the year. This has resulted, in some cases, in the postponement of certain activities that were planned for implementation in 1998. Unforeseen events which have heightened United Nations security levels have occurred in Eritrea, parts of Ethiopia, Yemen, and Sudan. Some of these events are ongoing and may continue into 1999 and could further impact on EMPRES Central Region's ability to carry out activities as planned.

4. 6TH EMPRES LIAISON OFFICERS MEETING

4.1 The 6th EMPRES Liaison Officers' Meeting (ELOM) was held from 6-8 December

1998, at the FAO Regional Office in Cairo. All Liaison Officers attended, and Mr. Gebremedhin Woldewahed from WAU sat as an observer.

4.2 EMPRES progress, locust situation reports, and aspects of the EMPRES Central Region approach were presented by the appropriate participants, and discussions followed. Salient recommendations that emerged from these discussions included:

- Joint activities between the CRC and EMPRES Central Region in support of improved locust management should continue.
- Further Liaison Officers Workshops to review and refine progress indicators and to explore EMPRES activities in a variety of areas should be considered. It was subsequently decided that future EMPRES Liaison Officers Meetings should be held in a workshop format to better facilitate this recommendation. Future EMPRES Liaison Officers Meetings will also jointly prepare EMPRES Central Region workplans for the upcoming year.

- EMPRES should complete the Systems Monitoring study and its collation for the remaining countries (2), as appropriate.
- It was recognized that the plan to link Cooperative Research Teams and Solicited Research Projects is appropriate and that further efforts to catalyze the development of suitable proposals for locust research from researchers within the Central Region be continued.
- EMPRES should continue to explore how best to continue investigations of the socio-economic impacts of locust damage and the cost/benefits of locust control, such that the studies would be supported by locust-affected countries and lead to improved locust management strategies.
- A workshop should be held to establish regional and national training needs, that forthcoming EMPRES training/workshop events be announced in the Desert Locust Bulletin and that, where appropriate, major training workshops allow participation by one or two locust officers from the other EMPRES regions.
- Any post-graduate course on locusts developed in the region should allow for the possibility that the course could be extended into a M.Sc. programme.
- The next ELOM was then tentatively scheduled for October 1999 and the venue will be Yemen.

5. DONOR SUPPORT FOR EMPRES CENTRAL REGION

5.1 In 1998, the Central Region component of EMPRES was supported financially by six donors in addition to funds received through the FAO Regular Programme. The expenditures for 1998 through these different funding sources are shown in Table 1 and compared with those of 1997. In addition, support was received in kind and through the EMPRES-West Africa component.

Table 1. Contributions to the EMPRES Central Region Programme in 1998 with 1997 expenditures given for comparison (in US\$)

<u>Donor</u>	<u>1997 expenditures</u>	<u>1998 expenditures</u>
Belgium	222,341	121,011
FAO Regular Programme	255,488	338,500
Germany	182,207	332,700
Netherlands	-	201,276
Norway	-	52,257(+support through EMPRES West Africa)
Switzerland	19,116	81,882
United Kingdom	(support in kind)	(support in kind)

U.S.A.	132,528	143,510
Total	867,236*	1,271,136

*includes support through the Japan contribution to EMPRES

5.2 The Belgium-funded project Improving Monitoring of Desert Locust Habitats by Remote Sensing (GCP/INT/596/BEL) was concluded in 1998. During its last year of operations activities were again mainly focused on the Central Region, in particular on Eritrea, where the project collaborated with NRI on the calibration and ground truthing of vegetation maps based on remote sensing images, as well as on database development.

5.3 FAO Regular Programme resources were mainly used in the Central Region for staff salaries, for travel and for meetings.

5.4 The German contribution to EMPRES (GCP/INT/655/GER) is exclusively devoted to the Central Region and provided broad support for a variety of EMPRES activities.

5.5 A new EMPRES project funded by the Netherlands started operations around mid 1998. The project Improvement of Desert Locust Survey Operations and Control Strategies (GCP/INT/670/NET) is based in the Central Region, but may support activities in other regions if this would facilitate achieving the main project objective of developing improved preventive control strategies. The project collaborates closely with related research at the Wageningen Agricultural University, which also falls under EMPRES but is directly funded by the Government of the Netherlands.

5.6 Another new EMPRES project funded by Norway (Norway Contribution to EMPRES, Desert Locust, Strengthening Locust Control Capacity in Eritrea, GCP/ERI/004/NOR) has provided equipment for survey and control operations in Eritrea. It is expected to be concluded in early 1999. Another Norwegian-funded EMPRES project (Improving Pesticide Application Techniques for Desert Locust Control, GCP/INT/651/NOR) is based in Mauritania but has conducted application trials in Sudan during 1998.

5.7 The Swiss contribution to EMPRES (GCP/INT/654/SWI) continued to support research activities and the translation of research results into operational use.

5.8 The United Kingdom continued collaboration with the Belgium-funded EMPRES component and provided support in kind for developing the use of remote sensing images and the construction of the RAMSES database.

5.9 The U.S.A. contribution to EMPRES (under GCP/INT/622/USA) continued to provide broad support to various EMPRES activities in selected African countries.

6. EMPRES ACTIVITIES RELATED TO LOGICAL FRAMEWORK

The following Results/Outputs and Activities are correlated to the Means of Verification shown in the EMPRES Programme Document's Logical Framework. Details of the specific activities referred to in this section are available in previous sections of this report. Section A describes the progress achieved in relation to the six major outputs foreseen under the EMPRES Central Region programme. While the EMPRES logical framework contains progress indicators for these major outputs, these have been now developed in more detail in collaboration with the EMPRES Liaison Officers during a workshop held at Lake Ziway, Ethiopia, in 1998 (see Annex 1). The indicators listed in Annex 1 are therefore considered more suitable for judging overall progress of EMPRES Central Region. Section B of this chapter compares the activities listed in the logical framework of EMPRES with those implemented during 1998. However, the logical framework has been prepared in 1995 when EMPRES approaches and directions were still little developed. Since then, discussions with the EMPRES member countries during various meetings have resulted in priorities being changed and new activities being established. In order to facilitate monitoring and reporting, it is therefore necessary to update the list of EMPRES activities in the logical framework. This will be done during 1999.

A. RESULTS/OUTPUTS

A1. Coordinated EMPRES Activities

Bilateral and regional entities are participating with the EMPRES Central Region programme in regional and national training courses, strategy development, and research initiatives. Some examples of entities that are participating include Wageningen Agricultural University, Oxford University, Natural Resources Institute, University of Wyoming, University of East Anglia, ICIPE, FAO/Headquarters, CABI, LOCUSTOX, Swedish Agricultural University, Montana State University, GTZ/BBA, Belgium Project on Remote Sensing, Norway, and the University of Khartoum. Linkages within and beyond the region are expected to expand further.

EMPRES Liaison Officers meet annually; in 1998 there were two such meetings: one was a workshop held in Lake Ziway, Ethiopia, and the other was an EMPRES Liaison Officers Meeting held in Cairo, Egypt. Donors and EMPRES member country representatives also met at the Consultative Committee Meeting in Cairo.

EMPRES Annual Reports have been widely distributed and other reports on specific EMPRES activities are available upon request.

Indicators for EMPRES Central Region (see Annex 1) were developed during a Liaison Officers workshop in Lake Ziway, Ethiopia, in 1998; these indicators were developed to provide means of measuring progress and for establishing a framework for EMPRES direction.

A2. Improved Survey and Early Warning

As a result of training, improvements to the survey forms, and the establishment of a communications network, locust information is passed from the field to the FAO Desert Locust Information Service in Rome. Regularity and quality of survey reports has improved. The SWARMS database is being used by the Service. The effectiveness of EMPRES work on improving early warning for plague prevention is described in section 2E 2.22 and 2.23.

The monthly FAO Desert Locust Bulletin has been improved as a result of enhanced quality and regularity of reporting from the Central Region: Reports on non-governmental locust reporting systems, and survey and meteorology, were prepared following EMPRES missions in the region. NRI and EMPRES have also reported on ground truthing of NDVI; the results of these reports have enabled researchers to identify possible weaknesses in the current capabilities for improvement.

A3. Regional Information Exchange System Linked to FAO Headquarters

The communication network established by EMPRES has been linked to FAO Headquarters since 1997. In some cases, survey forms are now being transmitted to FAO Headquarters regularly by e-mail in addition to the other means of communication (i.e., fax, other types of e-mail reports). The network is in place for all nine EMPRES countries, though in Somalia there is no Plant Protection Department yet, so this information is transmitted to FAO/HQ by EMPRES staff posted in Hargeisa.

This output has now been achieved, although further improvements are still desirable and will be attempted in coming years.

A4. Improved Early Control Capacity

The best measure of this output is in that there have been no upsurges or plagues since the beginning of EMPRES/Central Region Programme. Early control has been carried out in each case where locust infestations have been identified regardless of the country. There have been several instances where locust infestations were found in Eritrea, Somalia, Sudan, and Yemen and in most cases, interventions were effected during the earliest stages of gregarious locust activity. Detailed analyses are planned for the Desert Locust population dynamics during these instances, in order to determine to what extent the interventions have suppressed population expansion.

Perhaps the best indication of progress is the campaign of 1997-8. Environmental conditions were very favourable to locust breeding along the Red Sea coast of all EMPRES member countries. Breeding began on the coasts of Sudan and Eritrea in November 1997. Early detection and early control managed to suppress those populations to the extent that no swarms were reported from Eritrea, and the only swarms to have emerged from Sudan came from the insecure area south of the Tokar Delta to the Eritrean border. In that limited area, a large number of swarms did develop and fly to Saudi Arabia and Egypt. These two countries conducted control

operations over approximately 500,000 ha. Those operations, however, were conducted quickly such that crop damage was not reported and the swarms failed to move on to other countries. Limited populations were encountered in Yemen; these were also detected and controlled before they could escape. In Somalia, because of the lack of national capacity for survey and control, all survey and control was coordinated by one EMPRES staff posted in Hargeisa in cooperation with DLCO-EA. Though control operations were carried out in Somalia, two swarms managed to escape to eastern Ethiopia where they were rapidly controlled in cooperation with DLCO-EA. It is important to reflect upon the situation which could have occurred had control not been effective in the secure areas of the Sudan and in Eritrea. The large number of swarms that emanated from the very small insecure area of Sudan's coast and the large number of hopper bands that were found and controlled elsewhere on the Sudan coast and the coast of Eritrea suggest the magnitude of the outbreak which could have occurred had no control taken place. In contrast to the \$310 million spent by donors during the 1986-9 campaign and the \$18.75 million spent by donors during the 1992-4 campaign, the cost of the 1997-8 campaign was only \$30,000 (from EMPRES funds only). This is likely a direct result of early detection and control. See also section 2E 2.22 and 2.23.

The EMPRES Country Focus Programme will permit concentrated study and improvement of survey, reporting, training, and control systems in each EMPRES member country beginning with those countries that harbour key Desert Locust breeding areas. The first country, Eritrea, began its Country Focus Programme in late 1998 and this will continue until late summer of 1999 at which time a Country Focus Programme will commence in Yemen. The overall aim of the Country Focus Programme is to refine national systems such that they can be sustainable in terms of survey, refresher training, reporting, and control (though, in some cases, expendable items will likely need to be furnished periodically).

During outbreaks that have occurred after the beginning of the EMPRES Central Region field programme, control operations have begun early and have terminated population development before upsurge or plague status was reached. The 1997-8 winter campaign on the Red Sea coast, in particular, is a good example of this.

A5. Improved Methods and Strategies for Desert Locust Management

The development of strategies is a long-term process that must build from several approaches: contingency plan development, research to yield new tactics and methods, locust impacts assessment, and training. Without these building blocks, strategy development will begin and end with contingency planning that centres on presently available resources and methods. EMPRES has begun the process of strategies development by tackling each of the above components. Some of them are covered under different outputs. Output 5 deals with analysis, data collection and research.

Research initiatives are being catalyzed in the form of Cooperative Research Teams (CRTs, section 2F 2.35) that will study population dynamics, biological control, non-

target impact testing and barrier treatments, environmental concerns, and survey improvement. Further research catalysis is occurring in the form of a Solicited Research Programme (section 2F 2.34) that aims at generating research from within the region. These smaller projects will be linked directly with the appropriate CRTs once the CRTs are up and running (expected in 1999). Research yields will permit EMPRES to work with national Ministries to construct strategies at both the national and regional scales. Locust impacts, including economics, will be assessed from a comprehensive standpoint with the aim of using results to construct increasingly sensible strategies from an economic perspective. EMPRES staff have already begun the process of designing an approach to assessing locust impacts; it is expected that this will be ready for implementation by mid-1999. While it is early yet to hold strategies workshops (research yields are required and contingency plans need to be developed for most or all countries first), the development of strategies for early intervention is of paramount importance to EMPRES, and virtually everything the EMPRES Programme achieves builds toward the construction of strategies.

A6. Rapid Deployment Plans and Contingency Arrangements

It was decided, by the donors, at the recent Consultative Committee Meeting in Cairo that an international contingency fund was not desirable in light of bilateral readiness to provide rapid assistance. Contingency plan development workshops are being carried out by EMPRES. A first contingency plan development workshop was held in 1998 in Sudan, and such workshops will be held in each EMPRES member country. The EMPRES Country Focus Programme (section 2D 2.13) aims at preparedness. The 1997-8 campaign shows that progress has been made by EMPRES early on (section A4).

B. ACTIVITIES

1.1 Establishment of EMPRES Field Unit

Completed to the extent that EMPRES can run as an operational field unit. Vehicles are not procured yearly (this depends on donor funds made available for this and the need of additional vehicles) though a vehicle for EMPRES for Ethiopia was procured in 1998 as well as two vehicles for Eritrea contributed by Italy (this support was mobilized by EMPRES). Communication equipment is in place.

1.2 Regional Coordination of EMPRES Activities

Purchase of computer equipment and communications equipment is complete, though refinements will be made on a continuing basis. Training has been conducted and sub-contracts issued for certain activities (section 2G).

1.3 Coordination with Relevant Activities of Other Organizations

See part A1 of this section for synopsis. Detailed references to specific collaborations can be found in sections 2A - L.

1.4 Evaluating Progress and Providing Overall management Directions and Political Support

An EMPRES Liaison Officers Meeting and a Consultative Committee Meeting was held in 1998 as well as an EMPRES Liaison Officers workshop at which progress indicators were established. Various visits by EMPRES staff among member countries, donors, research institutions, and regional organizations occurred in 1998 which all helped to strengthen consensus for EMPRES activities. Funding has been stable.

2.1 Provide Surveyors with Better Access to Information on Rainfall and Vegetation Distribution

Ground verification of NDVI was conducted in 1998 and it was found that current NDVI was problematic for a variety of possible reasons (in terms of accuracy and ability to access the maps, section 2D 2.11). It was decided that survey maps need to be improved such that they do not rely solely on NDVI imagery, and that the NDVI imagery that is used in future is of higher resolution. One of the CRTs is tackling this need (section 2F 2.35), but a large amount of data must first be collected from the field and archives before such improved maps can be made available. New maps should incorporate rainfall information, vegetation distribution (including species patterns), soil type, and historical locust information.

Because current NDVI technology requires substantial improvement, the FAO Desert Locust Bulletin and systematic survey provide the only information for further survey for the time being.

EMPRES sent a team composed of meteorology, survey, and remote sensing experts to four Central Region countries to assist EMPRES in developing an approach for improving access to vegetation and meteorological information (section 2D 2.12).

2.2 Improving Survey Operations

Specific activities relating to this are detailed in sections 2C - E, and G of this report.

2.3 Develop a Detailed Programme for Systematic Surveys in Key Breeding Areas

Systematic survey in each member country will be improved and implemented mainly through a combination of the Country Focus Programme (section 2D 2.13) and contingency development workshops in each country (section D 2.21). Please see also sections on these two approaches in the EMPRES Approach Paper that was distributed at the 1998 Consultative Committee Meeting. Other training courses in the region (section 2G) and many of the research activities presently being catalyzed (section 2F) aim at enabling increasingly systematic and effective survey. Survey and reporting processes external to national governments were detailed in a mission by a consultant to five EMPRES member countries (section 2D 2.14). Information on such reporting processes has also been made available by two other member countries.

2.4 Support for Survey Operations When Required

Survey equipment (compasses, tachymeters, etc.) and maps were distributed to all EMPRES member countries. EMPRES also provided direct assistance to Sudan

during the 1997-8 campaign for vehicle repair and camping equipment that were essential for survey operations. In Eritrea, EMPRES provided radios and mobilized local donor support for the procurement of anti-mine blankets and two vehicles. As part of the Country Focus Programme, procurements will be made to improve the capability in each country for conducting survey. Because the Country Focus Programme has already begun in Eritrea, additional radios are being ordered, existing radios have been repaired, and spare parts for vehicles have been procured. Eritrea indicated no further material needs for survey. EMPRES procured a vehicle for use in Ethiopia. EMPRES vehicles were used by MoAs for survey and control in Sudan, Djibouti, Eritrea, and Ethiopia.

2.5 Promoting the Learning Process During Survey Operations

National training courses were held for Djibouti and Sudan that emphasized survey. The CRC, in collaboration with EMPRES, conducted a regional course on survey in Yemen. EMPRES assisted NRI in a national workshop on RAMSES and remote sensing in Asmara; this course is going to continue in early 1999 with participants from Yemen, Saudi Arabia, and DLCO-EA as well as Eritreans.

2.6 Establish Standardized Procedures for Storing, Analyzing and Exchanging Survey Data

This will primarily be accomplished through two means: the Country Focus Programme which has begun in Eritrea (section 2D 2.13), and the construction of a database for survey and other information (section 2J). A survey form is being used in the Central Region and reporting processes are in place. The training courses indicated in 2.5 (above) all emphasize use of the standardized forms. In 1998, several EMPRES countries freely exchanged information during critical times (especially Saudi Arabia, Egypt, and Sudan) to better facilitate preparedness during the 1997-8 campaign.

2.7 Improve National Forecasting Activities

National forecasting capabilities have been improved, particularly through better reporting from the region to the FAO Desert Locust Information Service. The Desert Locust Bulletin assists each member country to prepare for locust activity. Forecasting capabilities are also being addressed through RAMSES and remote sensing training that has occurred in Eritrea. Eritrea has included a locust information and forecast section in its national early warning bulletin. Exchange of information among member countries has further assisted each country involved in those exchanges to forecast locust events. Forecasting at the national level will receive its greatest improvement when the CRT for Survey Improvement (section 2F 2.35) makes progress in developing better survey maps. The Country Focus Programme (section 2D 2.13) will also ensure that each member country has a Locust Information Officer who will assemble information and advise the MoA on forecasts. EMPRES will train each Locust Information Officer such that he/she can carry out these tasks effectively.

3.1 Design of Communication Network

Communication network is in place.

3.2 Installation of Communication Network

Communication network is in place. Computer training has been provided to Saudi Arabia and Yemen. Other member countries were offered training assistance but either declined because they already had sufficient capability or did not respond. The offer for such training remains open to all member countries and this offer was re-iterated at the December 1998 EMPRES Liaison Officers Meeting in Cairo.

4.1 Review Campaign Organization and Campaign Execution

EMPRES completed a campaign evaluation which is available in a report. Further actions are underway to establish the effectiveness of early interventions by comparing the outcomes of campaigns that have occurred during the past 12 years. This is an important and fundamental step toward developing strategies.

4.2 Training on Control Operations

Aside from the national training for Djiboutians and Sudan that emphasized control operations, there was also a regional training course in Egypt, carried out in collaboration with the CRC, in aerial and ground pesticides application. EMPRES collaborated with NRI and CRC in a regional workshop on control technologies in Silwood Park, England, which will in future be conducted in the Central Region.

4.3 Support Ground and Aerial Control Operations when Required

Support to Sudan and Eritrea was provided by EMPRES by provisioning equipment and material necessary for control operations in those countries during the 1997-8 campaign and after in preparation for a possible summer campaign. Further control material and equipment was procured by donors after being mobilized by EMPRES in Eritrea. EMPRES and donors made available sprayers and pesticides to Eritrea and Sudan in 1998. EMPRES also coordinated DLCO-EA operations in the Central Region during the campaign, especially in Somalia, Ethiopia, and Eritrea. EMPRES vehicles were used for control operations in Djibouti, Eritrea, Ethiopia, and Sudan.

4.4 Monitoring Efficacy of Control Operations

Forms have been developed for monitoring the effectiveness of control operations and these are to be introduced in 1999; once these forms are in use, control effectiveness can be measured with increasing accuracy. Training courses will be held during the life of EMPRES that relate specifically to assessing control efficacy, though research work must first be completed to design methods by which to measure locust populations. EMPRES has developed, in cooperation with The Netherlands, and submitted a request for an APO to carry out this work, but recruitment depends solely on donors support and the availability of suitable candidates. Other research is needed to better understand how control operations impact on locust populations, and a CRT is under construction to study Desert Locust population dynamics. Work is also underway to assess the overarching effectiveness of the 1997-8 campaign in

relation to previous campaigns that occurred during the last 12 years. A campaign evaluation report was constructed in 1998 that examined the 1992-4 campaign in particular in the Central Region.

4.5 Adapting Control Procedures by Learning

All EMPRES training courses, workshops, and research activities stress capacity building and the participatory approach. This applies to survey as well as to control. See section 2G for training activities carried out in 1998.

4.6 Monitoring the Safe Use and Environmental Impact of Pesticides

The control forms developed by EMPRES, in cooperation with NRI and FAO/HQ, will greatly enhance the ability to monitor safe use of pesticides and environmental impacts. Some studies have been conducted to assess non-target impacts in Eritrea during 1998, and plans are in readiness to test neem or IGRs. EMPRES has catalyzed the formation of two CRTs that will each examine environmental impacts of pesticides: one is on non-target impacts and barrier treatments, and the other is on environmental concerns (section 2F 2.35). Each CRT will have training components, and one of them has planned a course in Eritrea on non-target impact testing in the first half of 1999. Both CRTs will, in future, participate in regional workshops on their respective topics. EMPRES is also in the process of assisting the MoA/Yemen with developing a new pesticides residue lab that will be available for regional use, by providing a consultant (tentatively from LOCUSTOX) to advise on equipping such a laboratory. This consultancy is planned for the first half of 1999. EMPRES began plans for development of an acetylcholinesterase blood testing programme for the Central Region (section 2H).

5.1 Analysis of Impact of Control Operations

This is covered in 4.4 of this section.

5.2 Collection of Field Data

Field data have been collected on certain aspects particularly relevant to economics (i.e., in Sudan) of the 1997-8 campaign. Other field data have been collected and reports are available on Systems Monitoring (non-PPD ways of obtaining locust information from the field, section 2D 2.14), biological control (a mission was sent to four EMPRES countries to scope the various aspects related to developing biocontrol agents in the Central Region, section 2F 2.35), and another mission reported on meteorology and remote sensing aspects of survey (see section 2D 2.12). EMPRES also conducted ground verification of NDVI and facilitated NRI's subsequent ground verification of NDVI in Eritrea (section 2D 2.11). Survey forms are in use in all EMPRES member countries, and control forms have been prepared for collection of data on control operations (these control forms will be put to use in 1999). Logistical information is being collected by EMPRES and will be incorporated into the database. Collection of additional field data will be accomplished to a large extent through the CRTs which are expected to be implemented in 1999 (section 2F 2.35). Much data already exists in the RAMSES database which will be adapted by EMPRES to become a larger database that will include not only environmental and locust activity

data, but logistical data as well. It is expected that the database will have an applied use in producing improved survey maps through the CRT on survey improvement. The CRTs will each have a strong training and capacity building element such that data collection can be accomplished by EMPRES member countries during the CRT activities and beyond.

5.3 Cost/Benefit of Control Operations

EMPRES has completed the initial economics study and the report has been made available in 1998. A study was made in Sudan by a consultant to assess the costs of the 1997-8 campaign. Another study was completed that assessed the 1992-4 campaign in the Central Region which will be useful for developing a comprehensive study on impacts. EMPRES is also engaged in comparing the campaigns within the last 12 years to determine the economic benefits of early intervention. Finally, EMPRES is developing an overall approach to assessing locust impacts from a comprehensive perspective in cooperation with other interested entities (e.g., GTZ and Hannover University). A locust impact approach is expected to be finalized by mid-1999 and implementation of that approach shall commence thereafter. The overall aim of the economic studies is to build upon prior attempts to characterize locust impacts and to generate a comprehensive picture of impacts in order to construct economically rational control strategies.

5.4 Supporting Field Research in Traditional Locust Breeding Areas

Field research is supported in three ways (sections 2F 2.34, 2.35, 2.36). The Solicited Research Programme has been problematic in that the initial interest shown in the topics presented to research entities in the Central Region was not reflected by the number of pre-proposals received (about 27 letters of interest were sent, but only less than 10 pre-proposals). Furthermore, the pre-proposals largely did not conform to the guidelines provided to the researchers or were of generally inadequate quality. Only about 3 of the pre-proposals could potentially be modified to enter into the full proposal stage. This difficulty reflects a certain inability on the parts of researchers in the region to prepare acceptable proposals (planning and budgeting for research targeted toward achieving clear objectives is something that researchers in the region need to be trained on). The CRT approach is a remedy to this in that through partnerships with entities that are experienced in designing clearly targeted research as well as being experienced in conducting research on relevant facets of Desert Locust populations, survey, and control, researchers in the region will learn how to prepare quality proposals that can more readily be supported by donors, design experiments, collect data, and analyze the results properly. CRTs and those Solicited Research Project pre-proposals that have shown potential will be implemented in 1999. Other research (section 2F 2.36) will be conducted with EMPRES or other expert supervision.

5.5 Improving the Routine Collection and Storage of Data on Locust Populations and Control Operations for Research Purposes

This is being accomplished in several ways. EMPRES staff is compiling its database which will include research findings of the past and future. A library file on locust

research is as well being compiled by EMPRES and a Ph.D. candidate currently working with EMPRES at Wageningen Agricultural University. The CRT on population dynamics will accumulate old and new data on Desert Locust populations, and if the APO for locust population measurements can be recruited, he/she will generate and provide data for storage. Data on control operations will be collected through the use of a control form developed collaboratively among EMPRES, NRI, and FAO/Headquarters. This form will be implemented in 1999, and information generated will be stored in the database that EMPRES is constructing.

5.6 Workshops Reviewing Survey and Control Operations

See section 2G 2.42.

6.1 Contingency Arrangements at the National Level

EMPRES staff have conducted scoping missions in Eritrea, Ethiopia, Sudan, Saudi Arabia, Somalia, and Yemen to gain a strong idea of what resources are available in those countries. Scoping missions for Djibouti, Egypt, and Oman will be conducted in future. A first contingency plan development workshop was held in Sudan in 1998, and the 1999 EMPRES workplan includes contingency plan development workshops for Egypt, Saudi Arabia, Eritrea, and Ethiopia. The EMPRES Liaison Officer Workshop in 1998 also emphasized the importance of planning and measuring progress as regards operations. Further to this, the Country Focus Programme which has begun in Eritrea aims at establishing preparedness in each member country through training, improving survey, reporting, training, and control systems, as well as furnishing gaps in material and equipment required to make such systems sustainable after the Country Focus Programme is completed in each country (see section 2D 2.13).

6.2 Establishment of Strategic Stocks of Equipment and Supplies

The Country Focus Programme will ensure that each member country can sustainably (within limits - expendable material may, in some countries, need to be re-supplied by donors and EMPRES) run their survey, reporting, training, and control systems (see section 2D 2.13).

6.3 Establishment of International Contingency Fund

It was agreed at the 1998 Consultative Committee that such a fund is not required at this time because donors indicated that they have bilateral mechanisms in place.

ACRONYMS

APO	Associate Professional Officer
CRC	Commission for Controlling the Desert Locust in the Central Region
DLCO-EA	Desert Locust Control Organization for Eastern Africa
EMPRES	Emergency Prevention System
FAO	Food and Agriculture Organization
GPS	Global positioning system
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IGR	Insect growth regulator
HQ	Headquarters
LOCUSTOX programme	This is not an acronym, but the full name of an FAO programme
NRI	Natural Resources Institute
NDVI	Normalized difference vegetation index
NPO	National Professional Officer
RAMSES	Reconnaissance and Management System of the Environment for Schistocerca
UN	United Nations
WAU	Wageningen Agricultural University

EMPRES Central Region Progress Indicators

The following indicators were developed at the EMPRES Central Region Liaison Officers' Workshop in May 1998.

General Indicators:

1. At least five member countries of the Central Region practice improved survey strategies and forecasting as regular procedure by 2006.
2. At least five member countries of the Central Region have implemented at least one improved control tactic or methodology as part of their regular control strategy by 2006.
3. At least 80% of all Desert Locust control officers in the Central Region know and practice improved and environmentally friendly Desert Locust control methodologies by 2006.
4. A Desert Locust control strategy(s) reflecting environmental and economic principles of improved Desert Locust management is part of the official CRC's policy and implemented in at least five of the member countries of the Central Region by 2006.

Programme Outputs:

Output 1: EMPRES Central Region activities coordinated.

Indicator 1A: EMPRES Central Region activities are well and regularly coordinated by implementing proper programme planning and conducting regular meetings (steering committees, EMPRES Liaison Officer Meetings, and workshops) among regional organizations, EMPRES Central Region, EMPRES Liaison Officers, FAO/HQ, the CRC, and appropriate donors in the Central Region starting 1997.

Indicator 1B: Bilateral projects initiated annually and implemented in the Central Region starting from 1998.

Output 2: Survey and early warning systems improved.

Indicator 2A: At least sixteen local trainers from up to eight member countries are qualified through regional train the trainer courses to organize and conduct national training courses on a regular basis for at least 80% of all Desert Locust survey/control officers on improved survey methodology, data processing, reporting, forecasting and survey planning by 2006.

Indicator 2B: Improves survey guidelines formulated and introduced to the member countries as regular survey procedure by end of 2006.

Indicator 2C: Survey and communication equipment specified, procured and made available to at least eight of the member countries by end of 2004.

Indicator 2D: Improved planning, reporting and communications schemes for survey operations introduced and implemented by at least five Ministries of Agriculture of the member countries by the end of 2004.

Indicator 2E: Effective forecasting systems through improved cooperation with meteorological institutions on national and regional levels in place in up to five member countries by 2006.

Output 3: Regional information exchange system linked to FAO/HQ

Indicator 3A: Communication facilities are in place in all of the member countries and are effectively used by the EMPRES Liaison Officers and EMPRES staff for information exchange on Desert Locust issues with FAO/HQ by end of 1998.

Output 4: Early control capacity improved

Indicator 4A: At least sixteen local trainers from up to eight member countries are qualified through regional train the trainer courses to organize and conduct national training courses on a regular basis for at least 80% of all Desert Locust survey/control officers on application techniques, impact assessment, new developments, safety and environmental aspects by 2006.

Indicator 4B: Up to three economically sound and ecologically safe Desert Locust control tactics (e.g., mycopesticides, insect growth regulators, botanicals, pheromones, and new chemicals) are recommended, registered and introduced as part of the national (in up to five member countries) and regional Desert Locust control strategies by 2006.

Indicator 4C: Up to three effective, economically sound and environmentally safe control methodologies and approaches are jointly developed between EMPRES and other institutions and are implemented in up to five member countries of the Central Region as part of their official strategies by 2006.

Output 5: Desert Locust management methods and strategies improved

Indicator 5A: Up to eight national and one regional control strategy(s), comprising different scenarios, survey and control tactics developed and in place for improved Desert Locust management in the Central Region by 2008.

Indicator 5B: The management and planning capacity of the heads of Desert Locust control units/senior Desert Locust control officers in up to eight member countries enhanced through at least two regional management and planning courses by 2006.

Output 6: Rapid deployment plans and contingency arrangements in place

Indicator 6A: Contingency arrangements comprising principles of preparedness and pre-positioning of necessary resources developed and introduced in up to eight of the Central Region member countries by 2006.