Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases

- Desert Locust Component -

Central Region Programme

EMPRES/CR

Progress Report

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A Introduction

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 minimising 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. Preparatory activities started in 1995 in the Central Region (CR), 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.

The **primary development objective** of the EMPRES Central Region Programme (EMPRES/CR) is 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 overall **Programme goal** was re-defined in February 2000 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.

A full donor-assisted programme began in 1997 with the recruitment of the EMPRES/CR team in duty stations at Asmara, Sana'a, Khartoum and Addis Ababa.

Since then the EMPRES/CR activities have focussed on five main areas:

Early Detection

Desert Locust survey and forecasting methodologies and systems are being strengthened and improved. Timely action relies on efficient information networking.

Early Reaction

Technical assistance and advice is being provided to affected countries in order to increase their early intervention capacity, and to assure more effective and environmentally safer control operations

Research

EMPRES/CR provides the platform for joint national and international research programmes on improved Desert Locust control tactics and strategies. Initial topics being covered include bio-control, population dynamics, survey methodology, barrier treatment, economic impact, and environmental impact. These involve, for example, field trials on insect growth regulators (IGR), pheromones, mycopesticides and botanical insecticides.

Campaign Planning and Contingency Arrangements

Campaign planning procedures and contingency arrangements are being developed in close cooperation with Central Region countries. The aim is to improve preparedness for Desert Locust interventions so that the necessary resources can be mobilised early enough when critical situations arise.

Capacity Building

Apart from improvements in technical and organizational areas, EMPRES concentrates on the development of human capacity through intensive international, regional, and national training programmes for different target groups and on relevant subject matters. Database and information management, training of national trainers and field staff, and training of scouts, farmers and nomads, are being addressed.

Following the approval of the EMPRES Programme by the FAO Council in mid-1994, a number of donors provided support to FAO for EMPRES/CR, namely the Netherlands, the USA (through USAID), Germany (through GTZ) and Switzerland. Other development agencies such as those from the U.K., Belgium, Japan and Norway provided assistance bilaterally or to specific areas of the Programme. All in all, including FAO funds from the Regular Programme, an amount of about US$ 4.5 million was spent during the 4-year Phase I of the Programme (1997 – 2000). Following an Evaluation Mission in 1999 which recommended that there should be a Phase II of EMPRES/CR, a Programme Planning Workshop for Phase II was held in El-Tur (Egypt) in March 2000.

A 3-year Phase II of the EMPRES/CR Programme (2001 – 2003) started in January 2001, taking into account the recommendations of the Evaluation Mission and based on the Implementation Document developed by participants at the EL-Tur Workshop. The total cost was US$ 3.53 million, covering staff salaries, operational expenses, equipment and contracts, research programmes, training and support costs.

The Purpose of Phase II was formulated as:

"Components of preventive Desert Locust control management developed and adopted."

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

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 and

R-8: Systematic methods of campaign evaluation developed.

Phase II of the Programme was evaluated twice. The first evaluation took place in August 2001 as part of a general review of the EMPRES Programme of Phase I in the Western Region (WR) and Phase II in the Central Region. The evaluation was initiated at the request of FAO's Director-General with the view to provide 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.

In February/March 2003, the routine EMPRES/CR Phase II evaluation was conducted. The mission came to the conclusion that substantial progress had been made towards achieving the Programme goals, in particular that the governments of the EMPRES/CR countries continued to regard the preventive control of the Desert Locust as a high national priority. Likewise, regional interaction and collaboration increased among countries, communication channels improved during Phase II as well as planning and management of survey and control operations. 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 (CRC), the introduction of the GIS based data locust management system RAMSES[1] in most of the member countries, the introduction of *eLocust* for wireless field data transmission, promotion and gradual introduction of environment-friendly control agents such as Metarhizium and Phenylacetonitrile (PAN),research towards improved Desert Locust control strategies, field-testing of advanced spray equipment, and the creation of a cadre of national master trainers that can pass on their know-how to a larger number of Desert Locust 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 (Phase III), 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.

The results and recommendations of the Phase II evaluation were discussed in the 5th Consultative Committee Meeting in Rome, 19-23 May 2003 and a participatory planning workshop was conducted to develop the conceptional framework of Phase III. The workshop participants defined the purpose of Phase III as:

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

and identified four important results to be achieved during Phase III:

R1: EMPRES/CR Desert Locust management components[2] gradually taken over by the CRC and the participating countries,

[1] ***R**econnaissance **A**nd **M**anagement **S**ystem of the **E**nvironment of **S**chistocerca (*RAMSES)

[2] ***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*

R2: Implementation of improved early warning systems supported,

R3: Campaign evaluation measures and contingency planning mechanisms in place and

R4: Alternative control technologies supported.

The implementation of the Phase III activities started in January 2004. A 4th Evaluation Mission of the EMPRES/CR Programme was conducted in September/October 2005. Six EMPRES/CR member countries were visited, namely Egypt, Eritrea, Ethiopia, Saudi Arabia, Sudan and Yemen. The results and recommendations of the evaluation were discussed in the 6th Consultative Committee Meeting in Cairo, 19-23 November 2005. The Mission had concluded that important achievements have been made in integrating preventive management components into national programmes in a sustainable way and that the member countries attach high importance to prevention of Desert Locust outbreaks. Various achievements of the programme were highlighted, but the Mission had also identified some constraints concerning the adoption rate of some technologies and approached provided by EMPRES/CR by some of the member countries. It was noted that this variation requires further attention and follow up in the future when EMPRES/CR is being coordinated by the Secretary of CRC. The Mission strongly recommended appointing a Regional Technical Officer to assist the Secretariat of the Commission in ensuring that standards of preventive Desert Locust management in the member countries are maintained. The mission also recommended that the CRC member countries should in their next meeting determine the required level of support to be provided by CRC to EMPRES/CR participating countries.

During 2005 EMPRES/CR was supported from six sources of funds; the Netherlands, Switzerland, the United States, the Trust Fund of the CRC and the Trust Fund of the Desert Locust Control Committee (DLCC). FAO submitted a proposal to Saudi Arabia for support to a three-year EMPRES/CR Phase IV. If these funds are secured from Saudi Arabia or other donors, EMPRES activities integrated into the Central Region Commission would be fully realizable.

By the end of 2005, one FAO-EMPRES/CR staff based in Sana'a remained. The Former EMPRES/CR Coordinator left the Central Region by 24th December 2005 to join the Programme in the Western Region. As before, EMPRES/CR is supported by national EMPRES Liaison Officers (ELOs) in eight of the nine member countries and by a representative of the Desert Locust Control Organization for Eastern Africa (DLCO-EA). A new ELO for Eritrea was appointed in January 2005. In view of the situation in Somalia with no identified government, EMPRES activities were followed up by an "EMPRES Link Person" (ELP) based in Hargeisa.

B. Status Report

B.1 Achievements of Outputs

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

Indicator 1.1: Improved preventive Desert Locust management component taken over by 2 countries by 2004, 3 more by 2005, 2 more by 2006.

It is expected 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 achieve 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 frontline countries of limited resources to cover the costs of maintaining EMPRES activities and the use of new technologies. The CRC Secretariat is therefore expected gradually to take over more responsibility for following up EMPRES practices. Monitoring and backstopping will be important tasks for the CRC by the end of Phase III. EMPRES/CR will hence assist the Secretariat in pursuing the EMPRES approaches of preventive control. However, some countries are likely still to need some small support from the donor community to maintain their preventive control capacity beyond Phase III.

One of the important EMPRES/CR components is training. It is anticipated under Result 1 (R-1) that the training concept developed during Phase I and II is further supported to strengthen regular and more self-reliant national training programmes with reduced technical and financial inputs from EMPRES/CR and FAO. Also, appropriate management/administrative procedures of the resources, planning, coordination and monitoring of survey and control operations are issues that need to be addressed as part of contingency planning.

The Country Focus Programmes (CFPs) had a key function in the EMPRES/CR approach by analysing the main features of the organizational and policy framework of a country's Desert Locust management system and developing adapted 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 CFPs will therefore continue during Phase III.

Planned Activities	Status / Reasons for Deviation
1.1 Support member countries to develop sustainable national training programmes, with reduced technical and financial support from EMPRES.	Also in 2005 EMPRES/CR gave support to continuing training of locust officers, plant protection staff and other target groups. The objective was to conduct at least one training course in each of the member countries per year. In total eighteen national and local training courses were conducted in 2005 in eight out of the nine EMPRES/CR countries, namely in Djibouti (1), Egypt (6 in addition to 1 on-the-job RAMSES and eLocust training), Eritrea (2), Ethiopia (1 in addition to 1 on-the-job RAMSES training), Oman (1), Saudi Arabia (1), Sudan (5) and Yemen (1) by using the EMPRES/CR Master Trainer's Training Manual. All training courses were organized and conducted by the national Master Trainers. Only in the case of Egypt the EMPRES/CR NPO participated as observer and provided some technical backstopping to the Master Trainers. The main subjects addressed were survey and control principles and reporting. In total 335 plant protection staff, extension staff, scouts, farmers and labourers were trained and retrained. The reaction from the trainees and the national authorities on the training courses remained positive. After the experiences made during the operation of the emergency campaign in Egypt the management of Locust Control Centre in Cairo fully understood the advantages of the EMPRES training approach and undertook substantial initiatives to improve its training capacities with remarkable success. For providing training opportunity on aerial control, it was planned that DLCO-EA would prepare and announce a training programme for all countries in the Central Region. A training manual on aerial survey and control is under preparation by DLCO-EA (an incomplete draft was received in January 2005). DLCO-EA and CRC are continuing working on appropriate handouts and transparencies for the manual. Besides training on standard subjects such as survey, control and safety measurements, training on special technical matters has also been provided. One Locust Officer from Djibouti benefited from a regional Training of Trainers (ToT) course organized by EMPRES/WR in Niamey, Niger in March/April 2005. The ELO and three Locust Information Officers (LIOs) of the Crop Protection Department to the Ministry of Agriculture (MoA) in Ethiopia received training on locust information management (RAMSES) in May 2005. Training was given to the LIOs in Egypt and Sudan on the use of eLocust. A Regional Workshop[3] on RAMSES version 3 and the second version of eLocust (eLocust2), as well as on RAMSES and remote sensing interpretation, was scheduled to take place in Cairo but had to be postponed to 2006 due to other commitments of FAO Headquarters staff associated with the Desert Locust upsurge. A workshop for local information providers was held in Sana'a, Yemen, in June 2005 as a further means of strengthening their national information system. Training and backstopping on RAMSES and eLocust was given by local staff from within EMPRES/CR without external technical assistance, which shows that the capacity in the Region in more specialised technologies is becoming increasingly self-reliant. However, as also pointed out by the 4th EMPRES/CR Evaluation Mission in 2005, further efforts are needed for additional training on new technologies and raising the regional expertise. The countries are fully acknowledging this need and made own attempts to develop their capacities in this respect. Although not financed by the

[3] This workshop took place in March 2006, focusing on eLocust2, RAMSES and remote sensing interpretation. It was attended by the designated Locust Information Officers in the countries and DLCO-EA which use RAMSES.

Planned Activities	Status / Reasons for Deviation
	Programme, but through a Desert Locust emergency project[4], three Sudanese Locust Officers benefited from a GIS training given by the International Geographic Information System Academy (IGISA) in Khartoum from 3 to 30 June 2005. In order to improve and update the curriculum of the Diploma Course on Desert Locust Management at the University of Khartoum it was agreed with the University in 2004 to jointly review the Diploma course in 2005. With the help of one international and one local consultant the special academic programme for future senior locust managers was assessed in July 2005. The strengths and the weaknesses of the course have been analysed in close collaboration with the University staff and a number of recommendations were made with regard to the course contents and the sustainability of the highly specialized programme. A number of constraints have been identified by the assessment team concerning the course organization and staffing. The team also identified a deep split between theory and practical field work. In recognition of the applied nature of this course, the consultants felt that the sessions should be more practical, participatory and visual. The EMPRES Desert Locust Master Trainer Manual was provided to the University in 2004 and the team suggested it as an important resource that most lecturers were not aware of. It was further noticed that many students lacked the required English skills in plant protection to appropriately follow the course and have not always the required computer background. The team acknowledged that there are only few potential candidates on a very narrow subject, with consequently low status of the Diploma qualification, which reduces the marked chances of the course. However, the benefits of this course for the locust-affected countries were pointed out by the team who also recommended that the national governments should contribute to finance their students on the course. The consultants also suggested that the Arab Organisation for Agricultural Development (AOAD) should be approached for financial support, since AOAD considers the course as an important contribution to capacity building in the Region to support food security. With regard to its sustainability the team further recommended to identify other possible funding sources such as a multi-donor trust fund administered by the World Bank. CRC, EMPRES/CR and FAO have supported the academic programme at the University of Khartoum since 2000. The first term started in 2001 with six students from Eritrea, Ethiopia and Sudan, who graduated by August 2002. Eight students have been enrolled at the University for the academic year 2002-2003, this time including two students from countries outside the CR (one student from Libya was supported by the Commission for Controlling the Desert Locust in the Western Region (CLCPRO) and one from India by the Commission for Controlling the Desert Locust in Southwest Asia (SWAC). After six students (1 from Egypt, 1 from Ethiopia, 1 from Saudi Arabia 1 from Sudan and 2 from Yemen) graduated in August 2004, six additional students from Jordan (1), Oman (1), Sudan (2), Syria (1), and Yemen (1) were enrolled for the academic year 2004-2005. Currently six students from Egypt (3), Saudi Arabia (1), Sudan (1) and Yemen (1) have been enrolled for the academic year 2005-2006. All students had been involved in various research projects, which were carried out in Port Sudan and took part in some of the surveys conducted by the Locust Centre of Sudan. For incorporating technical Desert Locust management subjects into

[4] TCP/SUD/3003.

Planned Activities	Status / Reasons for Deviation
	technical teaching programmes, it was aimed to make agreements with the agricultural secondary schools of the member countries to include Desert Locust survey and control subjects in the curriculum. So far EMPRES/CR and CRC have not received any copies of agreements, but it was understood that advanced steps and progress in these directions were made in Sudan and Yemen.
1.2 Support the national Locust Control Units in improved management and administrative procedures and methods.	Encouraging progress in improving administrative and managerial procedures has been observed in some countries. The importance of better staff management and human capacity development has been recognized, and delegation of responsibilities, planning and monitoring of survey and control activities is gaining momentum. Several countries are undertaking more efforts in track keeping of their resources, its distribution and use and are providing CRC-EMPRES with regular updates of their inventory. To initiate timely assistance it is essential for the Commission and FAO to monitor the equipment of the member counties in order to detect shortfalls prior to a likely locust emergency. However, the progress made in managerial aspects of dealing with the Desert Locust remained behind expectations. A concept paper from a consultancy, which was performed in 2004 for looking into, and for providing member countries with practical management tools to administer locust operations was ready in November 2005, but failed to be conclusive. The reason for this is twofold. Firstly, a prerequisite for adopted operations management is full structural and financial autonomy of the national LCUs, which is not the case in all countries. The LCUs are mainly part of the general plant protection services with no or limited authority over the locust staff and the material, and with no own budgets. This makes management of locust operations unpredictable and subject to either neglect by the national authorities during recession periods or frequent interference during emergencies, both with negative consequences for the efficiency of the campaigns. Consequently, the participants of the 13th ELO Meeting held in Sana'a, Yemen in December 2005, agreed that it is important to provide the national LCUs with more autonomy particularly in financial aspects. Secondly, even in cases with extended authority the LCUs do not keep enough own resources to deal with all locust situations independently and need to be strengthened/supported by other governmental bodies particularly when facing upsurges or plagues. Nevertheless, management of emergency situations can only be addressed in the framework of national contingency plans on the basis of defined schedules and reliable agreements with various partner institutions which goes beyond the scope of classical management instruments. To exchange managerial experience with the Western Region, it was planned that three Desert Locust control managers from the Central Region visit Mauritania. But due to the Locust activities in both regions these visits did not materialize.
1.3 Support member countries in initiating bilateral projects on selected Desert Locust management components.	In case of an emergency, locust-affected countries are relying to a high degree on FAO to initiate and to provide assistance. While it is FAO's mandate to help in a crisis situation, the process before the support becomes effective takes normally several months. In order to support own initiatives to solicit bilateral assistance, EMPRES/CR drafted a handout in 2004 on how to prepare more sensible project proposals to local donors. Because of the common interest in these guidelines, the guidelines have been reviewed in 2005 and made available to all member countries. EMPRES/CR and CRC addressed the needs of Eritrea to re-establish their Desert Locust control capacities to the Government of Saudi Arabia. The initiative resulted in support worth US$ 300,000 by the end of 2005.

Planned Activities	Status / Reasons for Deviation
1.4 Prepare a Monitoring and Evaluation system in collaboration with the CRC.	It was anticipated that the Secretary of CRC would follow up the preventive Desert Locust management approach after EMPRES/CR, as a donor supported programme, ended. For this reason the Secretariat of the Commission has been involved in all aspects of day-to-day follow up and monitoring of the various activities and operations during 2005. Daily briefings were routinely held between the EMPRES/CR Coordinator and the CRC Secretary, initiatives and activities were fully harmonized and joint backstopping provided to the member countries. EMPRES/CR assisted the Commission in developing a CRC-EMPRES website which is accessible on http://www.crc-empres.org/index.aspx. The website provides the member countries and other interested parties with information on ongoing and past activities in the Central Region. It also offers a range of important technical references and guidelines on various aspects of preventive Desert Locust management and links to other relevant websites.
1.5 Give support to Country Focus Programmes (CFPs)	EMPRES/CR continued to give special support in the context of its Country Focus (CFP) approach to Eritrea, Ethiopia, Saudi Arabia, Somalia, Sudan and Yemen. **Eritrea** is being considered as one of the key countries within the Central Region. Because to its strategic importance EMPRES/CR attributed particular attention in strengthening its preventive control capacities since the beginning of EMPRES/CR in 1997. Due to various unfavourable external and internal conditions the implementation of the CFP remained behind schedule for many years. With the nomination of a new ELO in Eritrea in January 2005 the implementation of the CFP gained significant momentum again. The main focus was on re-establishing the early warning and training capacities, to encourage the authorities to joint the CRC and to provide assistance in case of emergencies. In May 2005 the Government of Eritrea submitted an official request for membership to the Director General of FAO and was accepted as 16th member of CRC in August 2005. With Eritrea all EMPRES/CR member countries (except Somalia) are members of the Commission. The LIO has been supported with new equipment and strengthened by nominating an additional assistant, who is also one of the national Master Trainers, trained by EMPRES/CR. The LIO reinitiated regular surveys and established closer links to the regional agricultural offices at Zoba (District) level. Also the training and re-training programme has been reactivated with two training courses for 45 plant protection staff from the Western and Eastern Lowlands. The joint efforts resulted in early detection of a local Desert Locust outbreak in Eastern Lowlands in the area of Mahiment in July 2005. The first control activities could be shouldered with the recourses provided under the project TCP/INT/3003 (e) (see EMPRES/CR report on progress 2004), but there was the risk that the pesticide stocks could run dangerously short in case the unusual favourable breeding conditions would persist until the rains of the winter season occurred. For that reason and the because of the extent of the infestation, EMPRES/CR, WFP, TCEO and AGPP organized rapid airlifting of additional 25,000 litres donated by the Governments of Sudan and Senegal in an unusually rapid concerted action by August and September 2005. Because of the persisting locust threat in 2005 and its limited resources EMPRES/CR and CRC undertook efforts since 2004 to mediate assistance from the Government of Saudi Arabia to Eritrea. Eritrea submitted an official request to Saudi Arabia in May 2005, which was accepted by the Saudi Government in August 2005 and funds provided worth US$ 300,000 to Eritrea in December 2005 for procurement of vehicles, spray equipment, protective clothing as well as for operations.

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However, the locust control capacities in Eritrea remain fragile. This is mainly due to absence of an identifiable unit for locust control within the structure of the MoA and the weak communication network and restrictions to facilitate rapid transmission of locust relevant information form the field to the LIO in Asmara. With regard to the latter it is hoped that the introduction of eLocust2 in 2006 would significantly improve the early warning capacity in Eritrea.

As reported in 2004, the CFP in **Ethiopia** was affected by the results of the structural reforms at the MoA and the resignation of the ELO in September 2004. The former Crop Production and Protection, Technology and Regulatory Department (CPPTRD) has been divided into two separate Departments for Crop Production and Crop Protection in mid 2004 and a Locust Unit/Locust Information Office created under the supervision of the Plant Protection Division. In the event of the reorganization, trained plant protection staff has been transferred to other duties and replaced by new staff which made new training programmes necessary. Consequently the formally well functioning locust information network almost entirely collapsed and little use was made of the RAMSES system. Although the newly nominated ELO had received comprehensive training and advice from his predecessor on how to operate RAMSES and to organize the national locust information network, he was not in the position to make appropriate use of the data base to assess the locust developments as required in the emergency situation. For that reason EMPRES/CR organized further support and RAMSES training with the help of the DLCO-EA base manager of Dire Dawa in May 2005 for four Department staff.

In June 2005 Ethiopia faced an invasion of small fast moving Desert Locust swarms from Sudan to Amhara and Tigray regions. Because of the above mentioned constraints, the regional Bureaus of Agriculture and Rural Development and the Federal Ministry of Agriculture and Rural Development faced difficulties to develop a clear picture of the situation, which lead to rapidly increasing panic at national and international level. After all, it was estimated that only 264 ha were infested by Desert Locust adults and hoppers. The detected infestation could be controlled quickly and no further breeding took place because of unfavourable conditions.

After the serious gaps in the early warning system became obvious to the Department Head, efforts have been made to improve on the situation. Comparatively more frequent reports have been received from the ELO and one S&C training course was conducted for 15 new staff in October 2005. However, further attention is required in order to bring the efficiency of the early warning system in Ethiopia to the same level as it was before. The Locust Information Office needs to be strengthened by at least one additional competent staff and more training efforts on survey and reporting are required in the near future.

The implementation of the CFP in **Saudi Arabia** remained behind expectations. The main objectives for 2005 was to improve the locust survey and control skills of the plant protection staff of the regional agricultural departments, who usually play an important role during Desert Locust campaigns, and to improve the operational use of the RAMSES data management system. Advanced arrangements have been made to provide assistance in resolving the problems faced in operating RAMSES. In agreement with the management of the LCU in Saudi Arabia the Yemeni Locust Information Officer was recruited to assist his Saudi counterparts. Despite several interventions the Yemeni Locust Information Officer was not granted an entry visa to the country. Also the training programme could not be realized as planned because of the involvement of the national Master Trainers in the locust campaign. However, at least one national S&C training course was conducted in September 2005 for 25 plant protection staff. In the 13th ELO Meeting the participants strongly recommended that the management of the Locust Centre in Saudi Arabia

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should undertake more efforts in nominating qualified staff to the Locust Information Office.

Because of the political instability and the absence of viable governmental structures in **Somalia**, EMPRES/CR gave special attention to northern Somalia to secure regular monitoring of the Desert Locust breading areas. The ELP nominated by the local MoA in Hargeisa in 2002 received substantial on-the-job-training and backstopping from FAO and EMPRES staff. EMPRES/CR contributed to the establishment of a functional EMPRES/DLCO-EA office for the ELP and supported the survey operations by taking over the costs for hiring a vehicle and driver, fuel and DSA. As a result, regular surveys were conducted and reports of acceptable quality sent to FAO-DLIS and EMPRES/CR. In addtion, the ELP succeeded in establishing a radio communication network, comprising 22 private radio operators in the locust prone areas, who received some training on locust identification, what kind of information to collect from travellers, herdsmen and nomads, and how to transmit the information to the Locust Office in Hargeisa.

In 2005 several alarming reports of serious Desert Locust infestations arrived from northern Somalia (Sahil and Bosasso regions). Thanks to presence of the ELP in Hargeisa and with assistance from EMPRES/CR and DLCO-EA staff these reports could be proved wrong and further panic avoided.

Despite the absence of a recognized government, Somalia is officially still member of DLCO-EA. But since Somalia has no locust control capacities whatsoever, EMPRES/CR encouraged the Organization to conduct aerial survey and control operations in northern Somalia in case of outbreaks/upsurges to avoid further spreading of Desert Locust populations form that area into Ethiopia and Eritrea. In response, DLCO-EA submitted a rapid deployment plan for aerial intervention in northern Somalia to CRC in August 2005. In addition, the Organization was requested to stay in close touch with the situation in Somalia and it was agreed to coordinate locust operations in Somalia from the DLCO-EA base in Dire-Dawa, Ethiopia, supported by their base-manager in Djibouti. It was further agreed that the Organization would recruit the ELP as DLCO-EA Caretaker to sustain regular surveys and quality reporting also in the future.

The survey and locust information structure established in northern Somalia remain fragile under the prevailing frame conditions, which are not expected to improve soon. But due to the importance of the Desert Locust breeding areas in Somalia for the whole Region, long-term assistance by EMPRES/CR to assure close locust monitoring is essential.

The CFP in **Sudan**, initiated in 1999, achieved its objective with the ministerial decree dated 20 March 2004 to create an autonomous *Central Institution of Desert Locust Research and Control*. (See also Report on Progress 2004). However, EMPRES/CR continued to assist Sudan in its efforts to establish a functional Locust Control Centre in terms of authority over the locust campaigns in the summer breeding areas and financial independence. In view of the dangerous locust situation since 2003, the Government of Sudan released about US$ 3 million for operations and pesticides in 2005. In addition, the Centre received support from IFAD, FAO and Saudi Arabia of US$ 1.6 million.

Under the TCP project TCP/INT/3003 (e) nine GPS hand sets and two mobile HF radios have been procured to further strengthen the survey capacity of the Locust Control Centre. In addition, the Centre has been supported with US$ 26,900 for training courses, equipment and operation. The funds have been used for setting up seasonal camps in the strategically critical states of Darfur and Kordufan, to intensify surveys in the summer breeding belt and to conduct three survey and control training courses for plant protection staff, technicians, farmers and local scouts in

Planned Activities	Status / Reasons for Deviation
	Dongola, Obeid and Damer. With the assistance of the Locust Information Officer from Yemen, two HF radios have been set up in survey vehicles and are being used for wireless transmission of field data via eLocust to the Locust Information Office at the HQ in Khartoum. Since the release of funds from the Government of Sudan was delayed, the provision of funds for operation under the TCP project was especially important to allow timely surveys in the critical summer breeding areas. In April 2005 a self-reflection workshop was organized by the Locust Control Centre. Several areas for improvement with regard to early warning and locust information management, staff training, organizational and managerial aspects during operation in the field and at the HQ have been identified, and suggestions made on how to address the weaknesses. All in all, the teams were operating the winter campaign comparatively well and were highly motivated despite the harsh conditions in the field. The identified weaknesses were certainly due to the fact that the management had not enough time to adjust to the structure of the newly created Centre to its new functions as an autonomous body for locust control. Further good progress has been made by the Desert Locust Monitoring and Control Centre (DLMCC) in **Yemen** in improving its operations and to gain full autonomy. The Locust Information Office of the Centre is well organized, issues frequent reports of good quality to DLIS. The Centre established close operational links to the regional plant protection offices, which provide the LIO regularly with updates on the ecological conditions and locust situation in the breeding areas and support the HQ teams during survey and control operations. The Centre succeeded to establish a network of a total of 45 local information providers during the past 2-3 years. In return the Centre supported the plant protection offices with funds to monitor the locust prone areas and provided regular training prior to the referring seasons to the local staff and scouts. For the preparation of the summer campaign one S&C training course was organized by the Centre in Marib for 18 trainees in June 2005. In May 2005 the Centre organized a first self-assessment workshop. Two major constraints have been identified with regard to the very limited staff at the Centre (the Survey & Control Section consists of only two Officers) and the financial limitations. Although the MoA acknowledged the importance of an autonomous Desert Locust Centre and agreed to provide funds of US$ 150,000 per year for operations, none of assurances materialized during 2005. The participants of the 13th ELO Meeting therefore strongly recommended that the Head of the DLMCC should continue pursuing the question regarding a national budget for locust control with the Minister of Agriculture and Irrigation. Equally pending is the question regarding the establishment of an independent Desert Locust Steering Committee, which was proposed in 2004 and submitted to the Legal Department in December 2005 for approval. It was further observed to provide better feedback to the local information providers so that they could develop a better understanding of their importance as part of the national information network. As a result, the Centre organized a sensitisation workshop in June 2005 for 13 information providers[5] from the summer breeding belt. The workshop turned out to be very successful and was recommended to be repeated prior to each season.

[5] Agricultural graduates from different disciplines identified and trained to provide Desert Locust information to the Locust Centre and to join locust campaigns if needs demand.

Result 2: Implementation of improved early warning systems supported.

Indicator 2.1: Improved early warning systems (routine survey, functional national information offices etc.) are operational in at least 6 Locust Control Units (LCUs) by 2006.

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 the GIS locust data management software, RAMSES and remote sensing images. By narrowing down the potential target area, surveys and hence costs can be reduced.

RAMSES, is an important prerequisite for improved early warning systems and was one of the major concerns of EMPRES/CR during Phase II. The custom geographic information system (GIS) provides a platform for reviewing past records of Desert Locust occurrence, displaying current survey and control results and viewing remote sensing images as a means of improving decision-making in respect of locust survey and control. During Phase I and II RAMSES has been installed in Eritrea, Ethiopia, Oman, Saudi Arabia, Sudan and Yemen, while RAMSES has been installed in Egypt during phase III. However, minor constraints associated with its daily operation occur every once in a while that are normally addressed by the Desert Locust Information Service (DLIS) in Rome assisted by available local expertise. These constraints require further attention by EMPRES/CR during Phase III in order to make RAMSES a sustainable operational tool and to encourage the LCUs to make routine use of it.

The objective of improved interpretation of remote sensing imagery is to facilitate locust surveys by directing them to those areas where ecological conditions are more suitable for locust breeding; hence, making better use of limited resources and reducing the costs and time associated with survey operations. During the past years there has always been uncertainty regarding the reliability of satellite imagery to identify green vegetation in traditional Desert Locust breeding areas and guiding survey teams to these places. Recent technical developments in satellites imagery, including higher resolution images such as the 250 m Moderate Resolution Imaging Spectroradiometer (MODIS) imagery, make it possible to obtain and more reliably analyse these products on an operational basis. 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 Desert Locust officers of the concerned countries. It is expected that EMPRES/CR 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 a greater understanding and confidence between neighbouring national LCUs.

Planned Activities	Status / Reasons for Deviation
2.1 Make routine use of the RAMSES locust database and the inter-pretation of results.	The custom GIS locust data management system, RAMSES, is installed, and in use by trained staff in Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Sudan and Yemen. Due to the low volume of Desert Locust and data to manage, RAMSES has not been installed in Djibouti. The same applies to Somalia where also difficulties in accessing locust habitats are a reason for less data collection. Data from standardised forms filled during surveys and control operations are stored in RAMSES and with increasing confidence and experience, most countries using the system are preparing their operations with the help of the data base. The datasheets are shared with the Desert Locust Information Services (DLIS) office at FAO HQ and neighbouring countries by e-mail. Eritrea, Egypt, Oman, Saudi Arabia, Sudan and Yemen attach maps made in RAMSES to their Desert Locust reports and national Bulletin/Newsletters (found on the mentioned CRC-EMPRES website). The countries preparing national bulletins were advised to also include a paragraph on rainfall situation. Most countries have been following this recommendation but often on an irregular basis. Egypt, Eritrea, Oman, Sudan and Yemen are examples of countries using RAMSES in a satisfactory way. There is still a need for the LIOs at the LCUs to check the data carefully, particularly the coordinates to avoid that incorrect information is entered into the GIS. This was also indicated a year ago. There is a tendency to store and submit data without critical screening, further analyse or making use of the various tools that RAMSES offers. For example creating maps of survey and control data, viewing and comparing historical data from earlier “Locust years” with recent collected data can reveal patterns of breeding and infestations and give further information of key breeding sites etc. The LCU of MoA in Eritrea has earlier faced obstacles in using RAMSES. It is hoped that when there are additional LIOs in the Office, the national information network and the use of RAMSES will improve yet some assistance and advice will stay be required from DLIS in Rome and the EMPRES/NPO in Sana’a. The RAMSES expertise of the previous Ethiopian ELO was very useful for the neighbouring countries in CR during the previous years. After the ELO left it has not been easy to identify the problems and communicate solutions for example to Saudi Arabia. Some of the obstacles in Saudi Arabia could be sorted through e-mail correspondence with the LIO in Yemen (Direct visits were not possible due to visa problems. See also 1.5). The LIO from Yemen has also supported the LIO in Egypt when obstacles were encountered. He visited Egypt in July 2005 and trained the LIOs on using RAMSES. As mentioned (see 1.1), the Regional Workshop on RAMSES, eLocust and satellite imagery interpretation was planned to take place in Cairo but was postponed. DLIS has been testing rainfall estimates developed by the Italian Bio-Metrological Institute (IBIMET). The data can be used to estimate the location and quantity of rainfall at a national level. The results from tests in the Western Region are positive and proved to be suitable for planning Desert Locust survey operations. IBIMET will not develop the product further for free. In order for it to become available US$ 91,000 are required for initial development and data provision for four years to at least 10 countries in the Central and Western Regions. It was recommended at the 13th ELO Meeting that development and subscription fees for four years should be incorporated in the proposed Saudi project for the CR (and ADB

Planned Activities	Status / Reasons for Deviation
	project for the Western Region). The rainfall estimate maps will be provided via Internet and can be displayed in RAMSES.
2.2 Facilitate the interpretation of remote sensing satellite images and their use in directing survey operations.	DLIS makes 1 km resolution *SPOT-VGT Normalized Difference Vegetation Index* (NDVI) satellite maps available to the EMPRES/CR countries in 10 days intervals. LIOs in Egypt, Eritrea, Ethiopia, Oman. Saudi Arabia and Yemen in addition to DLCO-EA have tried to use these vegetation maps for directing survey teams. Training has been provided to the LIOs in the mentioned countries on the interpretation of the maps to take advantage of this tool for early warning in connection with RAMSES. It was stressed last year that the satellite imagery need to be further validated and the actual vegetation cover verified to avoid false positive or false negative value. DLIS requested countries to provide a brief ground verification of the SPOT satellite image at the same time with their survey reports. Only Yemen submitted their results with vegetation photos. (Forms were made available on the Locust Watch website, http://www.fao.org/ag/locusts/en/info/info/index.html, for easy reference). Tools for directing survey operations and improving early warning and decision-making also include the mentioned rainfall estimates (see 2.1) and the resources Locust Mapper and Locust Chaser. The latter two, available for free on *LocustWatch*, are for mapping locusts and for estimating locust movements, respectively. These tools were presented at the 13th ELO meeting.
2.3 Support joint cross border survey.	A joint cross border survey between Egyptian and Sudanese survey teams (the fourth of its kind) in the winter breeding areas of the Red Sea coast was conducted in February 2005. A third joint border survey in the winter breeding areas of the Red Sea coast of the Tihama was undertaken in January 2005 between Yemeni and Saudi teams. The planned joint border survey between Djibouti and Somalia did not take place due to unsuitable ecological conditions and the internal situation in Somalia.
2.4 Support development of survey practices and technologies through solicited research projects.	The sponsorship of an MSc student at the University of Khartoum, which started in 2004, is now in its final year. The objectives of the two-year study are to provide more accurate estimates of Desert Locust infestation. From the member countries no referring project proposals on improved survey practices have been received in 2005.
2.5 Up-date national locust information systems.	A well organized and reliable national information set-up is the basic requirement for any functioning early warning system at all levels. The quality and timeliness of data collected in the field by survey teams, local plant protection officers or scouts are crucial to assess the locust situation, forecasting of the developments, planning of operations and evaluation of the country's needs. Also the quality of forecasts issued by DLIS ultimately depends on the reliability of the national information systems. For this reason EMPRES/CR is giving high priority to this matter and is supporting the member countries in various organizational and technical aspects as far as collecting and transferring of field data is concerned. The importance of operational information systems at the national level has clearly been demonstrated during the 2003-05 upsurge, specifically in January 2005 in containing the Desert Locust swarms invading the CR through the western Egypt-Libyan border. Also in 2005, the best managed national information system is that of Yemen. Serious gaps in the network are identified in Ethiopia (after the departure of the former ELO), Eritrea and Saudi Arabia. Internal communication within an affected country on locust and rainfall events depends mainly on HF radios. Mobile phones and fax are sometimes used for transmitting information from the field to the HQ in

Planned Activities	Status / Reasons for Deviation

parts of Oman, Saudi Arabia and Yemen. During 2005 Eritrea received three fax machines.

The national information systems in Djibouti, Eritrea and Oman were clarified through various visits by FAO-EMPRES/CR staff to the countries and advise on the basis of the Yemeni example has been provided on how improve quantity, quality and timeliness of field reports to the HQs of the LCU (See also 1.5 and 2.1).

In order to improve the mode of communication by HF radios, EMPRES/CR advocated regular and defined contacts between the LCUs/Locust Information Office and the field stations a Standard Operating Procedure (SOP) for Desert Locust mobile team's radio communication and a poster for the base stations were prepared by EMPRES/CR, DLIS and CRC, which was finalized in 2005 and will be distributed in 2006.

In general, good progress has been made in all aspects of reporting by the countries. Nevertheless, small improvements are still required, mainly regarding the quality. It has been noted that several countries (Egypt, Ethiopia, Saudi Arabia and Sudan) faced difficulties in maintaining high quality and timely reporting during periods of increased locust activity because of the increased volume of data that takes time to be managed. The FAO Locust Forecasting Officer from DLIS presented an assessment of the reporting quality and timeliness during the 13th ELO Meeting. Compared to an average of the last five years the quality of the reports had improved in Egypt, Eritrea, Oman, Sudan and Yemen. With regards to timeliness, Oman, Sudan and Yemen became better and in general, all countries had improved their frequency of reporting compared to the previous years. (Details of national information systems are also found in the 4th Evaluation Mission report).

In short, required improvements include maintaining information during emergencies, not waiting until the end of the month to report and to use RAMSES on a regular basis. It was also recommended during the 13th ELO Meeting that more efforts should be made to strengthen the Locust Information Officers with qualified staff.

For the period 1 January – 31 December 2005 DLIS received from the national LCUs a total of 417 Desert Locust reports, as follows:

Djibouti	16
Egypt	50
Eritrea	37
Ethiopia	27
Oman	16
Saudi Arabia	18
Somalia	39
Sudan	97
Yemen	117
Total	**417**

2.6 Support introduction of eLocust

EMPRES/CR in close cooperation with DLIS is supporting the countries in further improvements of the national communication network by providing the LCUs with new data recording technologies such as eLocust. This equipment consists of a handheld unit that allows the field officer to enter survey and control data at the field location. The data is then transmitted and imported directly into the RAMSES system. The original version of eLocust was developed in collaboration with the affected countries to ensure that their needs were met. It was also evaluated extensively in the

Planned Activities	Status / Reasons for Deviation
	field regarding its ability to display data and maps, to record and transmit data, its practicality, ease of use, data-checking, and durability. It was successfully demonstrated that such a system could be used by officers in the field to improve the quality and timeliness of survey and control data. Nevertheless, several weaknesses needed to be addressed in an updated version, specifically ease of use, data transmission and the issue that the hardware was no longer manufactured. Using emergency funds available during the 2003-05 upsurge, an updated version, eLocust2, was developed under the guidance of DLIS that addressed the shortcoming of the first version. eLocust2 was tested in the field by locust officers in Egypt and Yemen (as well as three countries in the Western Region). The updated version consists of a single rugged touch-screen unit with a built-in GPS and ability to transmit data in real time via satellite. In early 2006 a sufficient number of eLocust2 units will be distributed to all countries to improve monitoring Desert Locust in the CR as well as in the other regions. It was agreed during the 13th ELO Meeting that FAO would cover the transmission costs of the first year while the Regional Commissions should cover these costs thereafter. Training in the use of eLocust2 will be incorporated into the before mentioned Regional Workshop in Cairo (see 2.1) that is rescheduled for 2006. A RBGAN portable satellite modem was delivered to the LCU in Sudan in 2004 to facilitate Internet connection so that RAMSES data files can be sent by e-mail to DLIS and to allow the LCU to download remote sensing imagery. Unfortunately, several operational difficulties were faced during 2005 that hampered regular use of the equipment. To develop the regional capacity for the support of new technologies such as RAMSES and eLocust2, the LIO in Yemen and DLCO-EA were trained by DLIS and EMPRES/CR and gained a lot of practical experience during the past years in all aspects of RAMSES operation and eLocust. Their expertise is available for their counterparts in the other member countries. As mentioned (see 1.5 and 2.1) the LIOs in Egypt where trained by the Yemeni LIO and the LIOs Ethiopia by DLCO-EA staff. At the 13th ELO Meeting, DLIS provided information on other new technologies such as Locust Mapper and Locust Chaser (see 2.2 and 13th ELO Meeting Report). The newly updated eLocust2 system was also presented. Information Technology (IT) has developed rapidly over the past decade. It has become more and more reliable and less expensive with more applications. Satellite communications is likely to become the standard means for communication and real-time data transfer over long distances in remote areas that constitute the majority of important Desert Locust habitats. Although this is expected to open up new avenues for improving locust early warning systems in future, much will continue to depend on improving the Internet access (via higher speed Broad band ADSL/DSL technology) in each country which is beyond the means of the EMPRES programme. The incorporation and use of new technologies will continue to rely on the substantial support and backstopping of FAO and DLIS. EMPRES/CR will continue in cooperation with DLIS to evaluate and test new technologies and will further assist the countries in getting acquainted in applying the technologies within their national programmes.

Planned Activities	Status / Reasons for Deviation
2.7 Support survey teams.	Generally, most countries are sufficiently equipped with survey material which comprise GPS, compass, anemometer (wind measurements), psychrometer (temperature and humidity measurements), stop watch, hand-lens and maps. Due to losses or damage some equipment were delivered in 2005 to Egypt, Eritrea and Sudan. The procurement of suitable maps has been found difficult. Upon the request to the LCUs to get hold of maps (Scale 1:100,000 – 1:250,0000) within their countries, Egypt, Sudan and Yemen have managed to do so. These maps are often available from overseas suppliers but countries and donors are reluctant to procure these because of their relatively high cost; yet, they are a basic tool for any survey or control team. In order to facilitate better identification of plant species relevant for locust breeding and to distinguish the Desert Locust from other locusts and grasshopper species, pocket-size vegetation and locust/grasshopper index field cards were prepared in 2003. As they required a comprehensive revision and layout modifications this has been undertaken during 2005. The field cards on locust/grasshopper were ready, printed and distributed in September 2005. The vegetation index cards are under revision and are expected to be ready before December 2006. As a result of the Differential GPS (DGPS) field workshop conducted in 2004 in collaboration with DLCO (See report of Progress 2004) the Omani Government procured DGPS equipment for two spray aircraft. Due to the absence of Desert Locust infestations the equipment was mainly used with good results for aerial control of Dubas bug on palm trees.
2.8 Prepare national survey plans.	EMPRES/CR continued encouraging the LCUs to apply the provided tools such as NDVI maps, RAMSES and meteorological data to organise their survey operations and to routinely monitor the most important breeding sites also during recession[6] periods. This should help the LCUs to organise more targeted surveys with better chances to detect early signs of gregarization. Although Sudan and Yemen showed particular good results in developing rational survey plans during 2005, EMPRES/CR-CRC and DLIS need to continue providing backstopping, especially in the interpretation of RAMSES and NDVI maps and how to draw conclusions for preparing surveys (see 2.2).

[6] Period without widespread and heavy infestations by Desert Locust bands or swarms.

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

Indicator 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.

Indicator 3.2: Regional contingency planning mechanisms adopted by the CRC and operationally assessed and satisfactory by 2005.

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 Desert Locust plagues. In order to be better prepared for emergencies, the LCUs 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 LCU to respond to each particular situation. 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.

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.

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. 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.

Planned Activities	Status / Reasons for Deviation
3.1 Encourage the concerned countries to create national locust management committees (Steering Committees).	The strategy by EMPRES/CR and the CRC with regard to Contingency Planning is based on the following components: Constant monitoring of the locust situation in collaboration with DLIS, regional and national action plans, monitoring and assessment of the national intervention capacities, stakeholder information, rapid assistance and national Desert Locust Steering Committees. Desert Locust Steering Committees made up of governmental institutions, donor representatives and senior officers from the LCUs have proved to be useful. Generally, the committees have the objectives to create awareness, to analyse the locust situation and the immediate consequences for food security in the country, to analyse the capacity of LCU to cope with the situation, to harmonise the necessary actions and to monitor the operations carried out by the LCU. The initiative by EMPRES/CR to create such committees in Eritrea, Ethiopia, Sudan and Yemen started already in 2001. As of December 2005, Steering Committees have been established in Egypt, Eritrea, Ethiopia. Sudan and Yemen. The constitution and frequency of meetings of the Steering Committees varied from country to country and according to the Desert Locust situation. During the emergency from 2003-2005 the Steering Committee of Sudan met most often with good results regarding the allocation of national resources to the Desert Locust campaign (see also 1.5). In Yemen, locust emergency matters are handled by a National Disaster Management Committee, which is dealing with the whole range of natural calamities. But with regard to the importance of the Desert Locust to food security of the country it has been recommended to establish a separate committee for Desert Locust operations only, since it believed that a smaller and independent body is in a better position to respond more rapidly to the developing needs of the DLMCC. The Ministry of Agriculture and Irrigation proposed the creation an independent Desert Locust Steering Committee in December 2005, but the subject is still pending in the Legal Department. To keep committee members and other parties informed, the monthly Desert Locust Bulletins/Newsletters continued to be another very important instrument. In addition, also lists of available resources proved to be an important reference in the context of the Steering Committee Meetings and for FAO. These Capacity Information Spread Sheets, developed by EMPRES/CR, have been used by the countries to regularly report on their available resources (staff and material), for surveys, control operations etc. During 2005, updates have been received most frequently from Djibouti, Egypt, Ethiopia, Oman, Saudi Arabia, Sudan and Yemen. From DLCO-EA three up-dates in March, June and December 2005 were received on the situation of its air fleet.

Planned Activities	Status / Reasons for Deviation
3.2 Prepare guidelines for national contingency planning mechanisms.	The relatively small LCUs need to be quickly reinforced during periods of higher Desert Locust activity either by mobilizing additional national resources or by addressing their needs early enough to FAO and to the International donor community. The Emergency Centre for Locust Operations (ECLO), which was re-established at HQ in 2004 and comprising technical experts from the Plant Production and Protection Division and operational staff from the Emergency Operations and Rehabilitation Division, was operational throughout 2005. A consultant was appointed from DLCC for organising possible, probable and certain Desert Locust threats and which mechanisms to be used at the various levels. A draft guide for contingency planning at country level has been submitted to FAO HQ in 2004 and is in the process of being reviewed. A regional preventative control workshop, which was planned to be held in Cairo in 2005, did not take place because of the involvement of the FAO-EMPRES/CR staff and the ELOs in the emergency operations.
3.3 Support the national entities in developing national contingency planning mechanisms.	EMPRES/CR continued assisting the member countries in various aspects of national emergency management and contingency planning. Some of the mechanisms had been addresses and trained already during the previous years (see EMPRES/CR Progress reports 2001-2004). Sudan continued to be the country which submitted the plans most regularly, and thoughtfully applied the mechanisms during the campaign. Other countries which developed advanced mechanism were Egypt, Ethiopia, Saudi Arabia and Yemen. It was recommended in 2004 that the CD ROM containing computer simulations and spread sheets on assessing resources needed for various levels of Desert Locust situation should be used on regular bases. During an ad hoc emergency prevention meetings organized by EMPRES/CR in March and September 2004 the spread sheets have been used to better estimate the required resources for the summer campaign 2004 and the winter campaign 2004/2005 with realistic results. The quality of the Desert Locust Bulletins, which objective is to keep the national authorities and stakeholders informed of the locust development and the actions undertaken by the LCUs, improved during the reporting period. The guidelines for preparing the Bulletins, distributed in 2004 by CRC-EMPRES/CR is believed to be the reason for this improvement as well as their continuous assistance to the countries for the preparation. The Bulletins have become standardised and information more comparable. During 2005, in total 65 Bulletins were issued with Oman, Sudan and Yemen being in the lead with regard to the numbers. (Eritrea inserted their information in the MoA National Food Information System, NFIS Bulletin). The quality of the Bulletins was improved by time, particularly in Egypt and Saudi Arabia.
3.4 Assist the CRC in developing regional contin-gency planning mechanisms in accordance with those of the countries and FAO.	Further to the ad hoc emergency prevention meetings conducted in 2004, one additional meeting was organized in Cairo in March 2005. During this meeting a regional action plan was developed in consultation with DLIS and the affected countries, namely Egypt, Eritrea, Saudi Arabia, Sudan and Yemen for the preparation of the summer campaign 2005. Based on this regional action plan, Egypt, Saudi Arabia, Sudan and Yemen prepared more detailed national plans, which have been submitted to the government authorities and also distributed to neighbouring countries in order to inform them of the scheduled preparations to control the predicted locust infestations.

Planned Activities	Status / Reasons for Deviation
3.5 Assess the "operationality" of the contingency planning mechanisms.	A formal assessment of the operationality of the contingency planning mechanisms as developed and applied by EMPRES/CR has not been carried out in 2005. But is believed that the various instruments helped the countries to develop a more realistic picture of the likely Desert Locust movements, the expected degree of infestations, their possible short falls in terms of human and material resources, and more realistic trigger mechanisms to solicit rapid assistance. However, it would be advisable to review the approach in the context of the ECLO contingency plan currently in the process of being prepared in order to harmonise and better synchronise the national and global instruments.
3.6 Develop guidelines for campaign evaluation.	Instead of so called "pass-par-touts" guidelines for various scenarios (see EMPRES/CR Progress Report 2004) a more practical approach has been taken. In the event of the 2003-2005 upsurge it was hoped to assess the campaign efficacy in a broader context and more systematic manner. Advanced arrangements had been made in early 2004 to set up an evaluation team at stand-by to be brought in once the opportunity arises. But before the campaign evaluation could be launched, the upsurge situation in the Central Region came to an end in May 2004. However, the response actions by the concerned LCUs on the outbreak in Sudan, Yemen and later in Eritrea as well as the reaction to the locust invasions from the Western Region in 2004 and 2005 have been closely followed by EMPRES/CR through regular field visits and self-assessment sessions. Amongst others some serious gaps regarding the early warning system had been identified in some cases and the use of inappropriate control tactics in others. These deficiencies have been addressed and discussed with the national campaign managers as well as with the staff in the field with the result that many of the points raised have been corrected in the following. Overall campaign evaluation dose not only include monitoring of the technical aspects of the operations in the field, but also organizational, financial and environment issues. These questions were addressed by FAO during 2005-2006 in a comprehensive evaluation of the 2003-2005 campaign commissioned by the donor community. The campaign evaluation was covering both the Western and the Central Regions, but only limited reference has been made to the campaign efficacy in the Central Region. However, although the effects could not be quantified as accurately as perhaps wished, it can be assumed that the technologies and approaches introduced by EMPRES/CR caused improvements also at the campaign level with the result that the recent upsurge could be brought under control in Central Region relatively quickly by comparatively limited national and international efforts.
3.7 Develop mechanisms to collect data on the extent of infestations, crop damage etc. during control campaign.	Some of the information could be obtained by incorporating certain key parameters into RAMSES for later case studies. For this purpose, a Spray Monitor Form has been introduced to the LCUs to be regularly used during control operations, but because of the comparatively limited control operations conducted by the Central Region countries during the 2003-2005 emergency only the teams in Sudan started to make practical use of the forms. The countries have been requested pass copies of the filled forms to EMPRES/CR for analysis and to identify difficulties in filling the forms. By the end of the reporting period this request has not been followed by the concerned countries.

Planned Activities	Status / Reasons for Deviation
3.8 Evaluate economic advantage of preventive control vs. emergency control.	It is believed that the preventive control principles adopted in the CR with regular surveys in the breeding areas, and rapid reaction once gregarious locust populations had been detected, resulted in a rapid decline of Desert Locust development in the Central Region at a minimum cost. There was less need for large scale treatments, less use of pesticides which resulted in a reduced risk of unwanted side-effects to the environment and human health. Since 2003 it was planned to recruit a consultant to assess the economic advantage of preventive Desert Locust control. All attempts to find suitable expertise also with the help of Food Security and Agricultural Projects Analysis Service (ESAF) of FAO failed. However, the economic question of locust control is also being addressed in the overall 2003-2005 campaign evaluation and it hoped that at the questions with regard to economic advantage of preventive control could be answered more comprehensively on the background of the recent examples in the Western and Central Regions.
3.9 Assist member countries in developing simulated outbreak control campaigns in the field.	As some EMPRES/CR countries showed high interest in practising medium size mock survey and control exercises on simulated outbreak campaigns, especially during recession periods. EMPRES/CR developed in 2005 referring guidelines for mock outbreak campaigns. The guidelines were compiled and distributed in September 2005 and are now available on the CRC-EMPRES website. Currently there is a proposal under revision to test a simulated outbreak campaign in Yemen.

Result 4: Alternative control technologies supported.

Indicator 4.1: At least one bio pesticide against the Desert Locust registered in at least 3 countries and ready for operational use by 2006.

National laws and regulations governing bio-pesticides are in a state of uncertainty and change. Some countries are using existing guidelines for chemical pesticides to evaluate bio-pesticides while others have guidelines and authorities specifically to process and encourage registration of bio-pesticides. The need for a pragmatic but critical approach to regulatory requirements for bio-pesticides 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. However, EMPRES/CR will further participate with member countries and other collaborators in FAO efforts to harmonize bio-pesticide regulations. Provided that national legislations allow the registration of locust bio-pesticides, it is expected that at least one bio-pesticide against the Desert Locust will be registered in at least three countries for operational use by 2006.

Low Desert Locust populations since 1998 until autumn 2003 have not allowed large-scale field trials on alternative control technologies. During Phase II, the introduction of bio-pesticides and the encouragement of the national authorities to adopt bio-control has had to depend on using reared Desert Locust. As an alternative, EMPRES/CR has also promoted bio-pesticide research on other locust species or grasshoppers.

Planned Activities	Status / Reasons for Deviation
4.1 Participate with member countries and other collaborators in harmonizing bio pesticide regulations.	After the Sudanese registration[7] of the bio-pesticide Green Muscle® (*Metarhizium anisopliae* var. *acridum*) in 2004 for the use against locusts and grasshoppers, Egypt and Yemen intensified their attempts to also register this more environmentally friendly product. So far both countries are in the process to compete the Green Muscle® Dossier in order to initiate registration. As stipulated in the MoU (para. IV) between CRC and DLCO-EA, the Organization could play an important role in harmonizing the registration procedures for bio-control products in the Central Region. DLCO-EA had received substantial support in this matter from USAID and conducted several national, regional and international workshops to develop requirements and protocols for registration of bio-pesticides (workshops in Addis Ababa 21-23 July 1999, Nairobi 4-6 December 2000, Arusha 1-4 July 2003 and international workshop in Cotonou 29 January-2 February 2001). The compiled documentation regarding the standard protocols for biopesticide-registration was planned to be finalized by DLCO-EA in 2005 but has not been received by CRC by the end of 2005. However, EMPRES/CR supported DLCO-EA in conducting registration trials of Green Muscle® against mixed grasshopper population in Ethiopia. A first progress report has been submitted to EMPRES/CR and CRC. The

[7] Following the registration, for the first time in the country 400 L of Green Muscle® were purchased in 2005 to be used in case of a Desert Locust outbreak

Planned Activities	Status / Reasons for Deviation
	results were not satisfactory due to the cross contamination by Green Muscle® and pesticides of the control plots. It was agreed to repeat the trial in 2006.
4.2 Support large-scale operational trials and small-scale demonstrations of the use and efficacy of bio pesticides and other novel technologies.	Since 2002, EMPREC/CR is supporting the International Centre of Insect Physiology and Ecology (ICIPE) to make the Desert Locust pheromones Phenyl-Aceto-Nitrile (PAN) available as a low-cost and effective alternative to conventional locust control. It was expected from this technology that PAN, by breaking the cohesion of gregarious hopper bands, would make the individual nymphs a more easy prey for predators and more susceptible to other control agents such chemical pesticides and mycopesticides. The results from various validation trials using PAN mixed with conventional insecticides and with Green Muscle®, showed that PAN affects gregarious hoppers, could reduce the insecticide dosage rates by 60%, and speed up the effects of Green Muscle®. The 2003-2005 upsurge provided for the first time the possibility to conduct larger scale field trials on natural hopper bands and non-marching groups with PAN and Green Muscle® in late 2004 and early 2005. The results confirmed the previous findings from various laboratory studies and semi-field trails that PAN is showing the expected effects also under natural conditions. Mixed with pesticide, an equal mortality has been observed by 60 % reduced application rate. Also when mixed with Green Muscle® an equal mortality by 50 % reduced application rate could be achieved, which could reduce the cost per ha of Green Muscle® for locust control and would hence provide a realistic alternative to conventional insecticides. As a result of the findings it was recommended that ICIPE should demonstrate and present the effects of PAN to a broader audience of interested parties in order to agree on next steps as far and the promotion and introduction of this technology as part of a preventive control strategy is concerned. The findings have been presented at the 9th International Conference of the Orthopterists' Society[8] held in Canada in August 2005. A study of eco-toxicological side-effects of PAN in cooperation with the University of Khartoum, Sudan was cancelled without producing tangible result by December 2005. But it was agreed with ICIPE to address eco-toxicological questions of PAN in cooperation with CERES/LOCUSTOX during the next period of support by EMPRES/CR.
4.3 Support solicited research projects.	Since the beginning of the Programme, EMPRES/CR, CRC and FAO have provided support to totally thirteen research projects. Eight projects have been completed, three are still in process and two were not completed and hence cancelled. In details the following topics have been addressed: • 1 project on efficacy of Green Muscle® since March 2005, Desert Locust Control Organization for Eastern Africa (on-going), • 1 MSc study on eco-toxicological aspects of PAN since June 2004, University of Khartoum (cancelled in 2005), • 1 MSc study on survey methods since Sept. 2004, University of Khartoum (ongoing), • 1 project on efficiency of Green Muscle® since Aug. 2003, Plant Protection Research Institute, Cairo (ongoing), • 1 project on efficiency of Green Muscle®, University of Addis Ababa, February 2003 – June 2004 (completed), • 1 MSc study on effect of herbal quality on DL distribution, University of Khartoum, since January 2003 – December 2005, (completed), • 1 project on impact of environmental factors and control operations

[8] See website: http://people.uleth.ca/%7Edan.johnson/pdf/program_Orthopterists2005.pdf

Planned Activities	Status / Reasons for Deviation

on the Desert Locust population in Saudi Arabia, King Faisal University, since July 2002, (cancelled in 2005),

- 1 MSc study on control technologies, NRI, May 2002 – December 2002, (completed),
- 1 project on validation of the effects of PAN on gregarious hopper bands, International Centre of Insect Physiology and Ecology (ICIPE), Phase I from March to September 2002, Phase II from November 2002 - October 2003, Phase III from November 2003 - May 2004, (completed),
- 1 PhD study on population dynamics, University of Khartoum, September 2000 – April 2003 (completed),
- 1 study on effects of Green Muscle® on honey bees, University of Aden, September 2000 – October 2004 (completed),
- 1 MSc study on Desert Locust population comparison in different recession periods in Ethiopia, Alamaya University, October 1999 - May 2001 (completed),
- 1 PhD study on population dynamics, University of Wageningen, July 1999 – December 2003 (completed).

The observations as mentioned in earlier EMPRES/CR progress reports concerning the unsatisfying quality of preparation, implementation and the reporting on research projects are unfortunately still valid. Also the Phase III Evaluation Mission pointed out in their assessment that the limited number of research proposals of acceptable quality was a draw back on the research component of the Programme. This was mainly because of the weak capacities of the national research institutions both as far as equipment and qualified researchers were concerned.

The CRC-EMPRES research initiative was originally defined as joint and demand driven effort between the LCUs, as soliciting party, the national research institutions and CRC-EMPRES, as sponsors. This cooperation between the three parties did not always function in reality. Only in rare cases the national LCUs were in the position to identify their research needs themselves and to actively address their demands to researchers and CRC-EMPRES with the request for support. Consequently, national scientists often approached CRC-EMPRES with bilateral proposals which were not in all cases in line with the interests of the countries and the objectives of CRC-EMPRES.

One reason for the inadequate research results was certainly the limited funding to support researchers in more substantial way. It was originally anticipated that the assistance provided by CRC-EMPRES should only add to the existing own resources of the institutions for a limited period of not more than two years. But because of the poor equipment, the lack of operational funds, transport facilities and assistant staff this expectation was certainly too ambitious. By encouraging the national scientists to get into closer collaboration with the LCUs some of these obstacles could be resolved and contributed to better results.

In order to encourage North-South research partnership between western and national institutions, EMPRES/CR originally initiated so called Core-Research Teams to jointly work on certain issues in a broader context. Unfortunately this did not work out as expected as it became obvious that also the international institutions competed for the same scarce funds and were more interested in basic rather than in operational research.

Some of the earmarked topics on i.e. testing of alternative control agents require field research on the target pest itself, but due to the long recession period and the absence of locusts this was not always possible. For that reason EMPRES/CR supported the establishment of Desert Locust rearing units to allow at least laboratory tests or semi-field trials.

Planned Activities	Status / Reasons for Deviation
	It was often expected that upsurges or plagues would provide more suitable conditions for various field tests. But it should be noted that due to fast changing situations over extended geographical areas it is not easy to find appropriate opportunities in the right time and place. It would require highly mobile research teams at stand-by, good logistical support by the national counterparts, good coordination and substantial funding to enhance the chances. But since most of the national capacities are normally entirely absorbed by the anti locust campaigns this proved to be difficult.

C. Staff status and Inputs

C.1 Staff situation

a) Professional staff

1 Programme Coordinator (Cairo, Egypt)	From August 2001 under FAO Regular Programme funds. Contract extended until 31 December 2005.
1 National Professional Officer for Survey (Sana'a, Yemen)	From May 1997 project-funded post. Current contract until 31 December 2006.

b) Support staff

1 Administrative Secretary (Cairo), project funded fixed-term contract until 31 December 2006.
1 Driver (Sana'a), project funded fixed-term contract until 31 December 2006.
1 Driver (Cairo), project funded fixed-term contract until 31 August 2006

c) Consultants

During the reporting period one international and one national consultant were recruited for reviewing the Post Graduate Diploma in Desert Locust Control at University of Khartoum in Sudan.

C.2 Equipment purchased since January 2005 (Phase III)[9]

DLCO-EA
- 20 ULVA+ handheld sprayers (for use in Somalia)
- 1,000 l Dursban 45% ULV (for use in Somalia)

Egypt:
- 2 mobile Codan radios
- 10 sets of survey equipment (GPS, compass, hygrometer, anemometer, tachometer, hand lens and stop watch)
- 2 Palm top computers

Eritrea:
- 3 fax machines

Somalia:
- Digital camera
- Radio antenna

Sudan:
- 10 sets of survey equipment (GPS, compass, hygrometer, anemometer, tachometer, hand lens and stop watch)
- 2 palm top computers

Others:

Pesticides to Eritrea were bilaterally donated during 2005. 15 tonnes of pesticide (Fenithrothion 45% ULV) was airlifted from Dakar, Senegal, to Asmara in August 2005 and 10 tonnes of Malathion 96% ULV from Khartoum, Sudan in September 2005.

By bilateral support from Saudi Arabia, Sudan received 45 land cruiser pick-up, 3 4.5 trucks, 30 ULVA Mast sprayers, 50 back-pack sprayers, 25,000 litres Malathion 96% ULV and US$ 209,333 for operations. The financial support (US$ 300,000) from the same donor to Eritrea has been provided in December 2005. According to the agreement between the Government of Saudi Arabia and the Government of Eritrea it is expected that the funds will be used for 9 vehicles and vehicle mounted ULV sprayers, protective clothing and operational funds.

C.3 Training activities during the reporting period

Djibouti: 1 national training S&C course, Djibouti, 27-29 September 2005, 17 trainees,

Egypt: 1 national training S&C course, El-Ismailia, 19-26 March 2005, 20 trainees,

1 on-the-job RAMSES and eLocust training, Cairo, 1-10 July 2005, 4 trainees (including 3 LIOs),

1 national training S&C course, El-Ismailia, 10-17 September 2005, 20 trainees,

1 national training S&C course, El-Ismailia, 26 November-1 December 2005, 16 trainees,

	1 local training S&C course, Quena, 12-13 November 2005, 21 farmers,
	1 local training S&C course, Burg Al-Arab, 16-17 November 2005, 23 farmers,
	1 local training S&C course, El-Ismailia, 19-20 November 2005, 32 farmers,
Eritrea:	1 national training S&C course, Debub, 20 April-4 May 2005, 20 trainees,
	1 national training S&C course, Massawa, 20 November-1 December 2005, 25 trainees,
Ethiopia:	1 on-the-job RAMSES training, Addis Ababa, 23-27 May 2005, 4 trainees,
	1 national training S&C course, Addis Ababa, 25-27 October 2005, 15 trainees,
Oman:	1 national training S&C course, Alnagd, 1-4 May 2005, 8 trainees,
Saudi Arabia:	1 national training S&C course, Jeddah, 17-28 September 2005, 25 trainees,
Sudan:	1 national training S&C course, El-Fashir, 3-9 May 2005, 15 trainees,
	1 national refresher S&C course, Obeid, 3-9 July 2005, 15 trainees,
	1 national training S&C course, Kosti, 1-7 August 2005, 20 trainees,
	1 national training S&C course, Damazie, 12-18 November 2005, 20 trainees,
	1 national training S&C course, Gedaref, 19-25 December 2005, 17 trainees,
Yemen:	1 national training S&C course, Marib, 4-8 June 2005, 18 trainees,

C.4 Meetings, workshops, seminars attended by FAO EMPRES/CR and CRC staff during the reporting period

- Visit to Beirut, Lebanon to meet with the Minister of Agriculture, the Ministry of Agriculture staff and FAO Representative to discuss locust situation, forecast and various other aspects, 25-27 January 2005.
- Participation in 3rd EMPRES/WR ELO Meeting, Dakar, Senegal, 6-11 February 2005.
- Participation in 2nd Locust Group Staff Meeting in Rome, Italy, 23-25 February 2005.
- Participation in 3rd Ad hoc Emergency Prevention Meeting (summer campaign 2005), Cairo, Egypt, 22-24 March 2005.
- Visit to Asmara, Eritrea, 26 March-1 April 2005 to finalize the adhesion of Eritrea to the Commission and to follow up on the mission of EMPRES/CR Coordinator in November 2004.
- Participation in joint campaign evaluation in Shalateen area, Egypt, 4-8 April 2005.
- Visit to Amman, Jordan to organize and conduct the sub-regional training course on Desert Locust survey and control operations, 20 April-3 May 2005.
- Backstopping mission to Eritrea, Ethiopia, Sudan and Yemen, 24 April-20 May 2005.
- Visit to Bahrain and Kuwait, to re-activate the role of the non-front-line countries in the Commission and to inform the countries on the activities of the Commission and its role in Desert Locust operations, 20-26 May 2005.
- Participation in 2nd CLCPRO Session, Tripoli, Libya, 12-16 June 2005.
- Participation in national workshop for Information Provider in Sana'a, Yemen, 24-25 June 2005.
- Visit to Khartoum, Sudan, 26 June-2 July 2005, to assess the Desert Locust situation and the possible further development in Darfur State and to evaluate the preparedness level of the Locust Centre.
- Field visit to northern Somalia to assess the Desert Locust situation and to provide technical backstopping , 5-12 July 2005.
- Participation in 27th CRC Executive Committee Meeting, Khartoum, Sudan, 24-29 July 2005.
- Field visits to Eritrea, Red Sea coastal plains, to assess the Desert Locust situation and to provide technical backstopping, 5-12 August 2005 and 9-12 September 2005.
- Backstopping mission to the national Desert Locust management training course in El-Ismailia, Egypt from 9-15 September 2005.
- Participation in EMPRES/WR starting up Meeting in Rome, Italy, 5-9 September 2005.
- Visit to Sana'a, Yemen, 10-13 October 2005, to inform the Minister of Agriculture and Irrigation of the role of the Commission in the region and to discuss Yemen's contribution and arrears to the Commission.
- Participation in 6th Consultative Committee Meeting, Cairo, Egypt, 13-15 November 2005.
- Participation 13th EMPRES/CR Liaison Officers Meeting, Sana'a, Yemen, 11-15 December 2005.

- Visit to Hargeisa, Somalia in December/January 2005/06 to discuss locust survey operations could be maintained in the absence of the EMPRES/CR Link person, and to plan a survey for January 2006.

With regard to the EMPRES/CR Liaisons Officers Meetings, it was recommended at the 13th ELO Meeting that the ELO Meetings and CRC Executive Committee Meetings should be merged in future as the objectives of the meetings were similar, for example monitoring the implementation of the preventive control strategy and regional work planning. The recommendation will be address in the next Commission Session for approval. Further, the next ELO Meeting (to be held in Muscat, Oman from 4 to 8 November 2006) in its current form will be the last.

C.5 Relevant publications and reports during the reporting period

- Saudi Arabia Country Focus concept paper (EMPRES/CR), January 2005.
- Training Manual on aerial Survey and Control (DLCO-EA), January 2005.
- Report on local training course on locust information reporting and safety measures in El-Damar, Sudan, held 27-29 December 2004 (Locust Control Centre-Sudan), February 2005.
- Report on national Desert Locust management training course in Suakin, Sudan held11-20 December 2004 (Locust Control Centre-Sudan), February 2005.
- EMPRES/CR report on progress, 2004 (EMPRES/CR), March 2005.
- Report on national Desert Locust management training course in Gadarif, Sudan held 19-25 February 2005 (Locust Control Centre-Sudan), March 2005.
- Report on 3rd ad hoc emergency prevention meeting in Cairo, Egypt held 22-24 March 2005 (EMPRES/CR), March 2005.
- Report on 4th joint cross border survey between Egyptian and Sudanese survey teams in the winter breeding areas of the Red Sea coast (Locust Control Ministry of Agriculture & Land Reclamation, Egypt), April 2005.
- Report on national Desert Locust management training course in El-Ismailia, Egypt held 19-26 March 2005 (Locust Control Ministry of Agriculture & Land Reclamation, Egypt), April 2005.
- Report on 3rd joint cross border survey between Yemeni and Saudi survey teams in the winter breeding areas of the Red Sea coast of the Tihama (Desert Locust Control and Monitoring Centre, Yemen), April 2005.
- Report on national Desert Locust management training course in Debub, Eritrea held 20 April-4 May 2005 (MoA Eritrea), May 2005.
- Report on RAMSES training in Addis Ababa, Ethiopia held 23-27 May 2005 (DLCO-EA), May 2005.
- Report on national Desert Locust management course in El Fashir, Sudan held 3-9 May 2005 (Locust Control Centre, Sudan), May 2005.
- Report on local Desert Locust control training course in Marib, Yemen held 4-8 June 2005, (Locust Control Centre, Yemen), June 2005.
- 1st report on progress on the effects of PAN on non-target insects (University of Khartoum), June 2005.
- Report on the twenty-seventh Executive Committee Meeting of the Commission for Controlling the Desert Locust in the Central Region, held 24-28 July (Khartoum, Sudan), July 2005.
- Report on national Desert Locust management course in Kosti, Sudan held 1-7 August 2005 (Locust Control Centre, Sudan).

- Review report on the Post Graduate Diploma in Desert Locust Control at University of Khartoum (CRC-EMPRES/CR), September 2005.
- Preparedness to prevent desert locust plagues in the Central Region, An historical review (EMPRES/CR), September 2005.
- A Locust Officer's Field Guide, locusts and some other grasshoppers of the Central Region, (CRC-EMPRES/CR), September 2005.
- Report on national Desert Locust management training course in El-Ismailia, Egypt held 10-17 September 2005 (Locust Control Ministry of Agriculture & Land Reclamation, Egypt).
- Report on national Desert Locust control operation course in Djibouti held 27-29 September 2005 (MoA, Djibouti).
- Report on national Desert Locust management course in Damazine, Sudan held 12-18 November 2005 (Locust Control Centre, Sudan).
- Report on 6th Consultative Committee Meeting, Cairo, Egypt held 13-15 November, 2005.
- 1st progress report on field evaluation of Green Muscle (*Metarhizium anisopliae)* against Grasshoppers in Ethiopia (DLCO-EA), November 2005.
- Report on local Desert Locust training courses conducted in November 2005 for farmers in Egypt, in Qena 12-13, Burg Al-Arab 16-17 and Ismailia 19-20 (Locust Control Ministry of Agriculture & Land Reclamation, Egypt), November 2005.
- Draft report on improving managerial competencies in Desert Locust management, November 2005.
- Report of the Evaluation Mission on EMPRES/CR Phase III review, November 2005,
- Report on national Desert Locust management course in Massawa, Eritrea held 20 November-1 December 2005 (MoA, Eritrea), December 2005.
- Report on national Desert Locust management training course in El-Ismailia, Egypt held 26 November-1 December 2005 (Locust Control Ministry of Agriculture & Land Reclamation, Egypt), December 2005
- Final report on effect of Green Muscle on Locust and Grasshoppers, Egypt Research Institute, December 2005.
- Final report on Desert Locust distribution in relation to herbal quality in Sudan (University of Khartoum), December 2005.
- Report on 13th EMPRES/CR Liaison Officers Meeting, Sana'a, Yemen, December 2005.

D. General Assessment

Conclusion: whether the programme purpose can be achieved
Recommendations on necessary steps to be taken
Future action required

During 2005, the Programme experienced two major events: (1) the evaluation of Phase III conducted from 12th September to 11th October 2005 in six of the nine EMPRES/CR member countries, namely Egypt, Eritrea, Ethiopia, Saudi Arabia, Sudan and Yemen, and (2) the transfer of the responsibly for the coordination of the EMPRES/CR Programme after nine years to the Commission for Controlling the Desert Locust in the Central Region in December 2005.

The Evaluation Mission observed important achievements in integrating preventive management components into the national programmes in a sustainable way. Despite the generally positive trend some constraints were noted, particularly concerning the unbalanced use of some of the technologies and approaches provided by EMPRES/CR in some of the countries. It was felt that the Mission did not appropriately recognize that the frame conditions do not always allow full use of all components for either technical or structural reasons in an equal manner by all countries (see Appendix 1). Taking into consideration that some technologies and approaches are not or not yet applicable (see also 1.5 and 2.1), it should be noted that the majority of the counterpart institutions adequately adopted most of the key components. However, there are areas for improvement, which require further attention and follow up also in the future by the Secretary of the Commission.

In addition, some of the key countries in the Central Region are belonging to the world's poorest and are situated in one of the most unstable areas with immediate effects on their preventive control capacities and their efficiency of the regional preventive management system as a whole. In order to be effective, preventive Desert Locust tactics and approaches require a certain degree of autonomy of the national LCUs, sufficient funding for routine operations, and staff stability to gain the necessary professionalism and experience. It requires organizational talents and long term visions as well as the ability to collaborate and cooperate across national boundaries. The experience showed that EMPRES/CR was particularly vulnerable to structural changes and instability (see 1.5), which made constant follow-up and restoration of the capacities necessary in some cases. That …"physical difficulties (in Desert Locust management) are easier to surmount than political ones" has already been noted in 1940 when assessing lessons learned.

Preventive strategies are subject to continuous revision in the context of the scientific and technical progress. The development, introduction and use of the remote sensing technology, electronic data possessing and transmission systems, bio-pesticides and semio-chemicals may serve as examples. These instruments need to be upgraded, which cannot be left to the individual countries to secure compatibility of techniques and approaches, but requires continuous regional and global coordination to stimulate innovation and new developments, to ensure regular upgrading of proven technologies and staff training, to assist in replacing outdated equipment, and to encourage intra and inter-regional collaboration.

In order to enable the Commission to strengthen its long-term backstopping and coordination capacity the Mission recommended appointing a Regional Technical Officer

to assist the Secretariat of the Commission to ensure follow up of standards of preventive Desert Locust strategies in the member countries also in the future.

By developing more economic and environmentally safer control strategies, the EMPRES/CR Programme could change the way that locusts were managed in the Central Region. In the event of the Desert Locust upsurge in 2003, the impact of early detection and control, staff training and contingency planning became evident in terms of cost, area infested and treated, and timely mobilization of additional resources. Most of the EMPRES/CR countries could demonstrate their improved rapid response capability with the effect that the upsurge was contained and terminated in the Central Region by May 2004 before it could have spread into other regions or developed into a plague. As a result of the various preventive management components in place prior to the upsurge, less than 300,000 ha have been treated in the Central Region during the campaign 2003-2005 preventing damage to crops and the environment. Also the multilateral and bilateral assistance to the Central Region countries in the emergency remained with US$ 3.4 million comparatively small. However, it remains doubtful whether the recurrent needs of, as well as necessary upgrades for, preventive control systems can be met from the contributions of the CRC member countries to the Commission alone once EMPRES/CR, as a donor supported Programme, phases out by the end 2006. The economic advantages and the relevance of preventive strategies as advocated by EMPRES/CR could be proven during the recent events. Taking into consideration the erratic nature of the pest and the complexity of the environment, EMPRES should be given long-term attention and considered as a permanent programme to preserve its capability to serve the affected countries in their attempt to prevent international crises due to the Desert Locust.

List of Acronyms

AGPP	Plant Protection Service (FAO)
AOAD	Arab Organisation for Agricultural Development
CF	Country Focus
CFP	Country Focus Programme
CLCPRO	Commission for Controlling the Desert Locust in the Western Region
CPPTRD	Crop Production and Protection, Technology and Regulatory Department
CR	Central Region
CRC	FAO Commission for Controlling the Desert Locust in the Central Region
DGPS	Differential Global Positioning System
DL	Desert Locust
DLC	Desert Locust Control
DLCC	Desert Locust Control Committee
DLCO-EA	Desert Locust Control Organization for Eastern Africa
DLIS	Desert Locust Information Service (FAO HQ)
DLMCC	Desert Locust Monitoring and Control Centre - Yemen
ELO	EMPRES Liaison Officer
ELP	EMPRES Link Person
EMPRES	Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (FAO)
EMPRES/CR	EMPRES Central Region Programme
EMPRES/WR	EMPRES Western Region Programme
ESAF	Food Security and Agricultural Projects Analysis Service
FAO	Food and Agriculture Organization of the United Nations
GDPP	General Directorate for Plant Protection
GIS	Geographical Information System
GPS	Global Positioning System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)
HF	High Frequency
HQ	Headquarters
IBIMET	Italian Bio-Metrological Institute
ICIPE	International Centre of Insect Physiology and Ecology, Nairobi
IGISA	International Geographic Information System Academy
IGR	Insect Growth Regulator

LCC	Locust Control Centre
LCU	Locust Control Unit (National)
LIO	Locust Information Officer
MoA	Ministry of Agriculture
MODIS	Moderate Resolution Imaging Spectroradiometer
MoU	Memorandum of Understanding
NDVI	Normalized Difference Vegetation Index
NFIS	National Food Information System
NPO	National Professional Officer (FAO)
NRI	Natural Resources Institute (UK)
PAN	Phenylacetonitrile
PPD	Plant Protection Department (National)
QUEST	Quality and Environmental Surveys of Treatments
RAMSES	Reconnaissance and Management System of the Environment of Schistocerca (GIS data management and aid to decision-making)
S&C	Survey and Control
SWAC	FAO Commission for Controlling the Desert Locust in Southwest Asia
TCP	Technical Cooperation Programme
TG	Technical Group (of DLCC)
ToT	Training of Trainers
ULV	Ultra Low Volume
USAID	United States Agency for International Development
WR	Western Region
WU	Wageningen University

Appendix 1 Use of technologies and approaches provided by EMPRES/CR[10]

	DJI	EGY	ERI*	ETH	OMA	SAU*	SOM*	SUD*	YEM*
Early warning									
Improved surveys	P	F	P	P	F	0	F	F	F
National locust information network in place	P	F	0	P	F	P	F	F	F
Use of FAO Survey & Control forms	F	F	F	F	F	F	F	F	F
Locust Information Office in place	NA	F	F	F	F	F	NA	F	F
Operational RAMSES system	NA	F	F	P	F	P	NA	F	F
% adoption rate	66	100	70	70	100	70	100	100	100
Staff Training/Staff development									
Systematic national and/or local training courses	0	F	P	P	0	0	P	F	F
Use of EMPRES training standards	F	F	F	P	F	F	NA	F	F
Use of trained national Master Trainers	F	F	F	P	F	F	F	F	F
Application of training cycle	0	P	0	0	0	0	NA	P	F
Staff performance monitoring	0	P	P	0	0	0	NA	P	P
% adoption rate	40	80	60	30	40	40	75	80	90
Interaction/Collaboration									
Joint border surveys	F	F	0	0	F	F	F	F	F
Bilateral exchange of experience/ expertise	F	F	F	F	0	F	F	F	F
Bilateral consultation	F	F	F	0	F	F	F	F	F
Participation in regional activities	F	F	F	F	F	F	F	F	F
Access to Internet	F	F	F	F	F	F	F	F	F
% adoption rate	100	100	80	60	80	100	100	100	100
Economic and environmentally safer control methods									
Use of ULV technology	F	P	P	F	F	F	F	F	F
Registration bio-pesticides	0	F	0	P	0	0	NA	F	P
Use of FAO Spray Monitoring Form	0	0	0	0	0	0	NA	F	P
Campaign evaluation/self reflection	NA	P	0	0	0	0	NA	F	P
DGPS, standard for aerial application	<F>	0	<F>	<F>	F	F	<F>	F	0
% adoption rate	50	30	30	50	40	40	100	100	50
Contingency planning									
Preparation of Contingency/action plans	0	F	0	F	0	P	NA	F	F
Monthly national DL bulletins	F	F	F	0	F	F	NA	F	F
Steering Committees	0	F	F	F	0	0	NA	F	F
Regular assessment of available resources	F	F	0	0	F	F	NA	F	F
Regular national budget for DL operation	0	F	0	0	P	F	NA	F	0
National emergency funds	0	F	F	F	F	F	NA	F	P
% adoption rate	33	100	50	50	58	75	-	100	75
% mean adoption rate	58	82	58	52	65	65	94	96	85

[10] NB: The selection of criteria and the rating provide only a general overview of the adoption level and the main areas for improvement.

Key:

(F) = fully integrated and/or in use, (P) = partially in use or in process being integrated, (0) = not in use or not yet part of the national programme, (NA) = not applicable under the specific circumstances in the country. (*) = Key country for Desert Locust breeding, <F> in case aerial control is being conducted by DLCO-EA aircraft.