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**Emergency Prevention System for  
Transboundary Animal and Plant Pests and Diseases**

**- Desert Locust Component -**

**Central Region Programme**

**EMPRES/CR**

**Progress Report**

January - December 2004

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**Food and Agriculture Organization of the United Nations**

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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, 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), botanical insecticides, and mycopesticides.

### **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 and Switzerland (through GTZ). 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,

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 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, the introduction of RAMSES (GIS based data management system) 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 PAN, research towards improved DL control strategies, and 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 DL staff. In general, the mission was of the opinion that sufficient progress has been made during Phase II to warrant an extension of the programme to a third, and probably final, phase of three years, which would address some of unfinished components within the overall objective of establishing a sustainable locust management system for the Central Region.

The results and recommendations of the Phase II evaluation were discussed in the 5<sup>th</sup> Consultative Committee Meeting in Rome, 19-23 May 2003 and a participatory planning workshop conducted to develop the conceptual 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<sup>1</sup> gradually taken over by the CRC and the participating countries,
- R2: Implementation of improved early warning systems supported,
- R3: Campaign evaluation measures and contingency planning mechanisms in place,
- R4: Alternative control technologies supported.

The implementation of the Phase III activities started in January 2004.

By the end of 2004, two FAO-EMPRES/CR staff remained, one based in Sana'a and one in Cairo. As before, EMPRES/CR is supported by national EMPRES Liaison Officers (ELO) in eight of the nine the member countries and by a representative of the Desert Locust Control Organization for Eastern Africa (DLCO-EA). Somalia is represented by an "EMPRES Link Person" 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

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<sup>1</sup> **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

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 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. 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 Countries Focus Programmes will therefore continue during Phase III.

Planned Activities	Status / Reasons for Deviation
<p><b>1.1 Support member countries to develop sustainable national training programmes, with reduced technical and financial support from EMPRES</b></p>	<p>It was planned that during 2004 each of the member countries should conduct at least one training course. Also in view of the developing locust threat, the response was much better as compared to 2003 where only a few countries took the opportunity provided by EMPRES/CR to further develop the human capacity on locust survey and control. In total thirteen national and local training courses were conducted in Yemen (3), Eritrea (2), Ethiopia (2), Sudan (4), Oman (1) and Egypt (1) by using the EMPRES/CR Master Trainer's Training Manual. Only in Egypt was the Secretary of the Commission partially involved in the organization of the training course and participated also as trainer. In Oman and Yemen the EMPRES/CR NPO participated as observer and provided some technical backstopping. The subjects addressed were survey and control principles and reporting. In total more than 255 plant protection staff, extension staff, scouts and farmers were trained and retrained.</p> <p>The feedback from the trainees and the authorities on the training courses and the training approach was generally very positive, which could be understood as an encouragement for the national Master Trainers to continue conducting training courses under the national responsibility. Particularly encouraging were the examples in Yemen, Sudan and Ethiopia, by providing training to newly recruited officers and according to the actual performance in order to fill knowledge gaps.</p> <p>Two Master Trainers from Saudi Arabia were invited to join the second training course in Yemen (May 2004) in order to gain experience from the Yemeni example. But unfortunately the promising model has not yet been picked up in Saudi Arabia despite the high need for training Agricultural Department officers as identified during the Country Focus Planning workshop in Jeddah (April 2004).</p> <p>Also, in Somalia and Djibouti no formal training has been conducted, but the ELP in Somalia gave instructions during his field visits to private radio operators on how to collect information on ecological conditions and locust observations from nomads and travellers and how to report to the Ministry of Agriculture. In Djibouti the former ELO, who was trained by EMPRES/CR as Master Trainer, resigned from his position at the Ministry of Agriculture in March 2004. A new officer was nominated four months later. Because of</p>

**Planned Activities**

**Status / Reasons for Deviation**

these changes, the EMPRES/CR activities remained comparatively limited in Djibouti throughout the whole year.

In close collaboration with CRC, EMPRES/CR succeeded in assembling 35 Master-Trainer's Training Kits. These Kits contained the EMPRES Training Manual including two series of overhead transparencies in English and Arabic, and some important training materials such as compasses, stop watches, hand lenses, anemometers, tachometers, hygrometers, oil and water sensitive papers for the use during the practical exercises. In total 20 Kits have been distributed to the EMPRES/CR member countries, DCLO-EA, AGPP and the University of Khartoum in October 2004. All other non-EMPRES CRC-countries received one kit each. Also Libya and Mauritania (EMPRES/WR) have been provided with one kit each. As far as other training material was concerned, EMPRES/CR received no request from the member countries for additional support. However, the need was felt that EMPRES/CR should maintain this opportunity in case that the need arises in future.

Some efforts have been made in Sudan to introduce the EMPRES/CR training model on Desert Locust survey & control techniques at the University of Sudan for Polytechnic Sciences, Faculty of Agriculture. But in order to qualify the future field staff it was seen more appropriate to approach the agricultural colleges and extension services. Yemen and Eritrea also signalled their intension of introducing the training concept at agricultural training institutes.

Because of the high interest of the member countries in the Diploma Course on Desert Locust Management at the University of Khartoum, it was decided to maintain the support also during Phase III of the EMPRES/CR Programme. Despite financial difficulties during the first half of 2004 CRC and EMPRES/CR succeeded to provide fellowships to the minimum number of students required to run the course. After six students (2 from Yemen, 1 from Saudi Arabia, 1 from Egypt, 1 from Sudan and 1 from Ethiopia) graduated in August 2004, six additional students from Oman (1), Syria (1), Jordan (1), Yemen (1) and Sudan (2) have been enrolled for the academic year 2004-2005.

CRC, EMPRES/CR and FAO have supported this special academic programme since 2000. The first term started in 2001 with six students from Sudan, Eritrea and Ethiopia 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 Central Region. An additional six students (2 from Yemen, 1 from Sudan, 1 from Saudi Arabia, 1 from Ethiopia and 1 from Egypt) have been enrolled at the University of Khartoum in September 2003.

However, the doubts persist as far the sustainability of the Diploma Course is concerned. Since the Faculty of Agriculture did not succeed to integrate the Desert Locust Diploma Course in the syllabus of the University of Khartoum and to attract additional sponsors, the costs for the course are basically shouldered by CRC and EMPRES/CR. Only in 2002-2003 one student from Libya was supported by CLCPRO and one from India by SWAC. Taking the high fellowship rate of USD 24,000 per student into consideration, the support given to the University of Khartoum is one of the most important cost factors of the EMPRES/CR Programme. Also, the feedback received from the University and the member countries on the performance of the course and/or the students remained insufficient.

Planned Activities	Status / Reasons for Deviation
<p><b>1.2 Support the national Locust Control Units in improved management and administrative procedures and methods.</b></p>	<p>In consultation with the responsible supervisor, several possibilities and alternatives to enhance the sustainability of the Diploma Course have been discussed. Amongst others it was agreed to evaluate the course by an independent consultant in order to develop realistic proposals to CRC and FAO. Unfortunately due to shortage of funds as well as difficulties to identify a suitable consultant with appropriate background on teaching and improved locust management it was not possible to conduct the consultancy as planned during 2004. Still, the importance remains to secure this unique opportunity of higher education on Desert Locust management subjects also in the future.</p> <p>Due to the erratic nature of the Desert Locust and the remoteness of the areas in which it is developing, conventional planning and management procedures do not necessarily fit in the context of Desert Locust control. During recession periods, different strategies are needed than in outbreak, upsurge or even plague situations. Under recession conditions, the governments of the affected countries normally scale down their locust control capacities to a minimum in terms of funding and personnel. However, good managerial competencies at the LCUs are essential in every phase in order to react fast and efficiently to likely threats and rapidly changing situations. For this reason, adapted management instruments that reflect both the nature of the pest and the circumstances under which locust control is being operated need to be in place. For this purpose EMPRES/CR contracted a consultant to develop an appropriate concept on how best to address this question. The consultant discussed the issue during the 12th ELO Meeting and received some feedback and additional comments from the participants. The final concept paper is expected to be submitted to EMPRES/CR by early 2005.</p> <p>During the recent period some encouraging progress in improving administrative and managerial procedures has been observed in Yemen, Sudan and in Saudi Arabia. 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. In addition, the countries are undertaking more efforts in keeping track of their resources, its distribution and use. But due to the preoccupying locust situation during the reporting period it was unfortunately not possible to organize exchange visits to countries with well organized LCUs as planned, but the offer will be maintained in 2005.</p> <p>To better monitor the activities in the field EMPRES/CR and CRC developed in collaboration with DLIS check lists in English and Arabic on good survey and control practices. These check lists should help the management of the LCUs to better assess the performance of the field staff during the operations and should help needs for training.</p>

Planned Activities	Status / Reasons for Deviation
<p><b>1.3 Support member countries in initiating bilateral projects on selected Desert Locust management components.</b></p>	<p>The developing Desert Locust upsurge following an outbreak in Sudan in September/October 2003 made it clear that most of the affected countries will almost certainly exhaust their available resources in a very short period of time. Particularly in Sudan the LCU was much affected by internal difficulties with negative consequences on their rapid reaction capacity (ref. EMPRES progress report 2003). In view of the developing threat, FAO and EMPRES/CR immediately initiated in April 2004 a TCP Project for Sudan, Eritrea and Yemen for USD 390,000 to provide these countries with some material and operational funds to face first infestations. At the same time EMPRES/CR in coordination with CRC and AGPP brokered bilateral support from Saudi Arabia to Sudan of a total of USD 2 million. The first allocation in terms of 15 4WD vehicles, 15 vehicle mounted ULV sprayers and operational funds have been provided to the Government of Sudan in May 2004. In addition, EMPRES/CR and CRC assisted in providing supplementary support in particular to Sudan through UNDP (USD 50,000), FAO TCP (USD 150,000) and IFAD (USD 200,000). Including its own mobilized resources, the LCU in Sudan was, by the end of 2004, in a position to face an infestation of about 700,000 ha, to mobilize 34 fully equipped Survey &amp; Control teams and to secure about 380 flying hours. In response to the unexpected Desert Locust invasion of Egypt in November 2004, EMPRES/CR and CRC supported the Ministry of Agriculture in the preparation of a TCP Project worth USD 193,000.</p> <p>EMPRES/CR also prepared short guidelines on how to develop requests for bilateral assistance to donors and presented them during the second Emergency Prevention Ad Hoc Meeting in Khartoum in September 2004. These guidelines were perceived as suitable and recommended by the 12<sup>th</sup> ELO Meeting to make the guidelines available to all EMPRES/CR countries.</p>
<p><b>1.4 Prepare a Monitoring and Evaluation system in collaboration with the CRC.</b></p>	<p>During the reporting period, the Secretariat of the Commission was fully involved in all aspects of day-to-day follow up and monitoring of the various activities and operations. Daily briefings were routinely held between EMPRES/CR Coordinator and the CRC Secretary, initiatives and activities were fully harmonized and joint backstopping provided to the member countries. This was particularly effective when it came to coordinate the countermeasures and support to contain the Desert Locust outbreak/upsurge. Daily contacts were held by phone and email with the immediately affected countries to inform the counterparts on the most recent and likely developments and provided advice on the necessary steps regarding survey and control operations.</p> <p>The EMPRES/CR Programme is currently designed as “project” with a limited lifespan of 10 to 12 years. During the past eight years EMPRES/CR undertook significant efforts in collaboration with various partners to develop and to introduce components of preventive control into the national and regional locust management systems. The development of new techniques of preventive control however will continue after 2006. One of the most important aspects is the further introduction of components of improved early warning such as remote sensing and wireless field data transfer. In order to secure that the locust affected countries continue benefiting from new technologies, and to allow systematic/coordinated introduction following minimum quality standards, the current momentum needs to be maintained. Similarly important aspects are the intensive backstopping as has been provided during the past years, the improved intra-regional interaction and the more harmonized implementation of survey and control operations between the affected countries. Following the experiences made and to maintain the concept of preventive control also in future in particular during recession periods, this approach needs to be routinely continued beyond the currently targeted lifespan of EMPRES/CR.</p> <p>It is believed that the Secretary of the CR Commission will take on most of the coordination tasks and to ensure further integration of new techniques</p>

Planned Activities	Status / Reasons for Deviation
<p><b>1.5 Give support to Country Focus Programmes (CFPs)</b></p>	<p>into the national programmes beyond 2006. The contributions from the CRC member countries will certainly be an important assistance to sustain some of the technical aspects, but it will be more difficult to keep up a same level of interaction and response. Already under the current conditions, that EMPRES/CR is sharing some of the tasks with the CRC Secretary and is operating with only two FAO staff, clearly demonstrated the limits of its capacity to provide the services.</p> <p>For the above reasons, the possibility should be taken into consideration to change the status of EMPRES/CR from a temporary project to a permanent programme of FAO in order to secure sustainability of preventive control.</p> <p>Also in Phase III, EMPRES/CR continues providing support to the Country Focus (CF) approach in Eritrea, Somalia, Sudan, Yemen and Ethiopia and for the first time to Saudi Arabia.</p> <p>EMPRES/CR succeeded after many previous attempts to organize a CF planning workshop in <b>Saudi Arabia</b> with the objective to improve the operational capacity of the National Centre for Locust Research &amp; Control and the cooperation between the Centre and Agricultural Departments of the Kingdom. A concept paper has been prepared in April 2004 and translated into Arabic. The structure of the Centre has been reviewed and recommended to create new Sections under the technical Divisions in order to strengthen the locust information and forecasting office and the interaction with the Agricultural Departments in particular as far as staff training and campaign monitoring is concerned. But due to the heavy involvement of the Agricultural Department staff in control operations, the training courses could not be conducted as recommended. However, the two national master trainers joined a training programme in Yemen to maintain their capacity as trainers.</p> <p>The participation of Saudi Arabia within the EMPRES/CR Programme has considerably improved. The Centre is now increasingly following the standards of preventive control and is participating actively in all EMPRES/CR meetings. One of the highlights in 2004 was the contribution of Saudi Arabia to assist Sudan in enforcing its intervention capacity worth USD 2 million. The rapid and unbureaucratic assistance in view of the build up to the Desert Locust threat has been recognized by the member states and FAO as a substantial example of regional solidarity. In close consultation with EMPRES/CR and CRC survey and control operations have successfully been conducted against the Desert Locust upsurge in early 2004 and later again in November, December 2004 when Saudi Arabia received swarms arriving from the Western Region. The control operations coordinated by the Centre prevented the escape of swarms into the spring breeding areas where it would have been extremely difficult to detect further breeding and hence mitigated further spreading of the Desert Locust into the Eastern Region and re-infestation of CR countries.</p> <p>The implementation of the CF activities in <b>northern Somalia</b> continued in a satisfactory way. Regular surveys are being conducted and reports sent to DLIS and EMPRES/CR. A radio communication network has been built up comprising 22 private radio operators in the locust prone areas and some training provided to private radio operators on locust identification, what kind of information to collect from travellers, herdsman and nomads, and how to transmit the information to the Locust Office at the MoA in Hargeisa. Unfortunately the network experienced a set back after the radio antenna at the MoA had been stolen. In the meantime a new radio antenna has been installed and the contacts with the private radio operators are continuing smoothly.</p> <p>As mentioned in the previous reports, the MoA in Hargeisa is operating at a very basic level without enough capacities of its own to sustain a LCU. This situation is likely to continue because of the many unsolved internal difficulties. With comparatively limited assistance, EMPRES/CR has</p>

**Planned Activities****Status / Reasons for Deviation**

succeeded that the locust situation in this strategically important area is closely monitored. Undetected gregarization of the Desert Locust in northern Somalia would have immediate consequences on the food security in Ethiopia, Eritrea and Yemen. For this reason it is crucial that the current level of support provided by EMPRES/CR is being secured also beyond 2006. Since Somalia is a member country of DLCO-EA, it has been agreed that DLCO-EA would conduct aerial survey and control operations in case of outbreaks/upsurges.

During the past years good progress has been made in **Yemen** in building up an autonomous *Desert Locust Monitoring and Control Centre* (DLMCC). This encouraging development continued also during 2004. A model locust information network and early warning system has been built up. Field information from various sources is regularly collected and registered by the Locust Information Office at the Centre. Surveys are being conducted according to the ecological developments and the information received from the field, meteorological agencies and DLIS. As a result, early signs of an outbreak situation in the Tihamah area after heavy rainfall in September 2004 were immediately detected and contained in October. Since then, the locust situation in Yemen remained calm.

The DLMCC is keeping all national and international stakeholders regularly informed of the operations of the Centre by producing a national DL Bulletin since January 2004 to provide the national authorities and the donor community with updates on the national and regional locust situation, the operations carried out and the status of the control capacities. The performance of the Centre has also been much acknowledged by the MoA and thus mobilized additional own resources. Besides increased operational funding, the GoY supported the Centre with 5 micron ULVA-mast sprayers, 33 micronair AU 7010 sprayers, and 34 micronair AU 8110 sprayers. In view of the critical Desert Locust developments in the Western and Central Region, FAO gave supplementary assistance through an international TCP project by providing 15,000 L of ULV pesticides, 10 additional GPS hand sets, 2 mobile HF radio stations and funds for intensified survey operations and training courses.

As far as training is concerned, the DLMCC established a commendable training cycle following need assessment > training > performance assessment > retraining etc. In 2004 three training courses have been conducted for plant protection staff, scouts, extension agents and new recruited staff reaching 43 trainees. During the 12th ELO Meeting in October 2004 it was recommended that the good approach practised in Yemen should also be followed by the other LCUs.

The CFP programme 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*. The Centre gained full autonomy for locust control operation in the country by August 2004. However, certain aspects regarding the authority over the summer season campaign need to be clarified and additional qualified staff is required in order to cope with the new responsibilities and extended tasks. For this reason, the support provided by EMPRES/CR though the CF approach will continue. As a first step, EMPRES/CR made proposals for a new organizational set-up of the Centre. Another issue was the establishment of a permanent and fully equipped base in Suakin, responsible for the winter campaign. The PPD is currently negotiating with the GoS to fund the construction of a new building at Siuakin. However, additional assistance might be required to make the base fully operational. EMPRES/CR will support the Centre in brokering for donor assistance once the project is taking concrete shape.

Another important task of the Centre is to secure close monitoring of the vast summer breeding belt in particular in tension areas such as Darfur.

**Planned Activities****Status / Reasons for Deviation**

The past summer campaigns in 2003 and 2004 revealed dangerous gaps as far as the national early warning system is concerned. The danger of Sudan being invaded during the summer season by swarms arriving from Chad through Darfur was high and efforts have been made by the Centre to establish contacts with NGOs and other humanitarian UN Organizations operating in Darfur in order to obtain information on any Desert Locust sightings and ecological conditions. The feedback was not as expected and conflicting information received from Chad contributed to additional confusion. In this situation, the Centre set up a first defence line in the bordering areas of North Kordufan to spot the arrival of swarms. Finally the PPD managed also to send a team from the Centre to Chad in October 2004 to develop a better picture of the locust situation and the control operations. By this time the locust situation in the Sahel already changed and swarms started migrating from the Sahelian areas northwards and thus presented no longer a threat to Sudan. From this example and the experience made during summer/autumn 2003, the Centre needs to undertake more efforts in establishing a reliable early warning network in summer breeding areas under its direct supervision.

Besides these shortcomings the Centre made considerable progress in making use of the contingency planning mechanisms. Following the example of Yemen and with some support from EMPRES/CR and CRC, the Centre is preparing similar monthly DL Bulletins since May 2004 and called in regular Steering Committee Meetings. By keeping the national and international authorities well informed, the Centre received important support also from the GoS in terms of pesticides, operational funds and flying hours.

The reaction of the LCU to the developing upsurge in September/October 2003 was hampered at the beginning by the effects of the internal difficulties faced during 2003. Some swarms escaped the control operations and crossed the Red Sea to Saudi Arabia. However, the LCU/Centre succeeded to preserve some of its capacities which had been established during the previous years and managed with increasing efficacy during the following months to control the upsurge. By May 2004 the Desert Locust situation was generally calm again. Nevertheless, vigilance has been maintained under the orchestration of EMPRES/CR and CRC, and emergency preparedness measures have been put in place in case of a reinvasion from the Western Region. In this respect, it is worthwhile mentioning that more realistic contingency/action plans for the summer and the winter campaigns have been prepared. By closely following the predicted movements of the Desert Locust, advanced preparations have been initiated, recourses and aircraft mobilized and pre-positioned, and survey and control operations launched immediately where and whenever necessary.

The implementation of the CF Programme in **Ethiopia** was to some extent affected by the results of the structural adjustment process at the MoA and the resignation of the ELO in September 2004. The former ELO, who gained during the past years good experience in operating RAMSES and as master trainer, was recruited as DLCO-EA Base Manager in Dire Dawa. That was the third ELO trained by EMPRES/CR to join DLCO-EA. Because of his good experience and performance, his resignation was considered as a great loss. Amongst others, the ELO assisted in installing RAMSES in Egypt in April 2004 and gave on-the-job-training to the Egyptian Information Officers. However, it is expected that EMPRES/CR can make use of his important expertise also in future.

Certainly because of the professional transfer of responsibilities by the previous ELO no major set-back was experienced. The newly nominated ELO is following the example of his predecessor and familiarized himself quickly in his new position. The information flow from the field and reporting to DLIS was not interrupted, RAMSES is being operated without major

**Planned Activities****Status / Reasons for Deviation**

difficulties, surveys and training courses continued to be conducted. Two training courses have been organized in May and December 2004 for 52 trainees. With the establishment of a Contingency Planning Steering Committee in October 2004, the original objective of the CF Programme was achieved. However, support to the CF Programme will continue in particular with the aim to reinforce the links to the Agricultural Offices and Plant Health Clinics in order to further improve the flow of information from the field to the LCU in Addis Ababa. In addition, since the ELO in Ethiopia is handling simultaneously many tasks by himself such as coordination of survey and control activities, information management and forecasting, briefing of the MoA, organizing training courses etc., it is strongly recommended that the MoA seconds at least one additional staff as a fulltime Information Officer to the LCU.

**Eritrea** was the first country to benefit from a CF Programme to build up its locust control capacities. Eritrea was also the first country in the CR to which the RAMSES system was introduced. Plant protection staff was trained as national master trainers, and in order to improve the interaction between the former Plant Protection and Quarantine Unit and EMPRES/CR and to allow full participation in the international context of locust management, a Local Area Network was established.

Unfortunately, the efforts to develop national locust control capacities in Eritrea had been affected by unfavourable external and internal conditions. Trained personnel have been assigned to other duties, and the position of a Liaison Officer to EMPRES/CR has been vacant since 2001, with the consequence that a number of activities could not be implemented as planned. The establishment of a Locust Information Office had been severely delayed by various difficulties in using RAMSES. But locust reports from Eritrea started improving again over the past few years after the RAMSES problems had been resolved and two new Information Officers assigned to its operation. But the timeliness of the reports as well as the link of the Locust Information Office to sources of information in the field remained critical. All in all, comparatively only slow progress had been made in Eritrea. The pending nomination of a Liaison Officer and the long restructuring process of the agricultural sector, finalized in 2004, contributed to this situation.

In the new structure of the MoA the responsibility for coordinating locust survey and control operations in Eritrea is shared between two Departments: the Agricultural Promotion & Development Department and the Regulatory Services Department. The Regulatory Services Department is responsible for all regulatory aspects in agriculture including Plant Quarantine which is handled by the Crop Health Division. The Agricultural Promotion and Development Department coordinates the agricultural policies and cooperates with the Agricultural Departments at Zoba (*District*) level through its Technical Services, Irrigation Development and Technical Mechanization Divisions. During a follow-up visit of the EMPRES/CR Coordinator to Eritrea in November 2004, it was confirmed that the Director of the Crop Health Division will remain the Focal Person for the EMPRES/CR Programme, whereas the Technical Services Division is in charge of the implementation of the locust activities in the country.

Despite of the above mentioned organizational difficulties the EMPRES Focal Person made good efforts during the reporting period in reactivating the CF Programme and participated in all Ad Hoc Emergency Prevention Meetings organized by EMPRES/CR. As a result, two training courses were organized in May and June 2004 by using the national master trainers. The first training course was addressed to 31 plant protection staff, while during the second 28 farmers from the Zoba Debub were trained. The Information Officer from Yemen was invited by EMPRES/CR in June 2004 to provide on-the-job-training on RAMSES to the Locust Information Office in Asmara. And in return, EMPRES/CR invited the two Information Officers from Eritrea

**Planned Activities**

**Status / Reasons for Deviation**

in December 2004 to visit Yemen in order to share experience and to gain form Yemeni example on how the national early warning system is organized by the Centre.

During the backstopping visit the EMPRES/CR Coordinator made reference to the prevailing locust threat and the urgent need to re-establish an operational locust early warning system. For this purpose the CF Programme has been reviewed again and a detailed action plan for 2005 prepared with emphasis on improving the internal and external means of communication to facilitate coordination between the Zobas and the MoA, and to participate more actively in the regional context of preventive locust management.

In order to keep the government authorities, the FAO Representation and the local donor community informed of the Desert Locust situation and the possible risks to agricultural production, the production of a national Locust Bulletin has proved very useful in the case of Yemen and Sudan. Since FAO is supporting a National Food Information System (NFIS) in Eritrea, which prepares monthly newsletters on issues such as climatic conditions, agricultural situation, commodity prices etc., it has been agreed with the responsible FAO staff and the Director of the Crop Health Division that the Locust Information Office should provide NFIS regularly with information on the locust developments in the country as well as details on control operations, crop damage and available resources for locust control in the country.

Eritrea experienced a small Desert Locust outbreak in January/February 2004 in the areas of Meleet, Shieb and Wadilo which was controlled rapidly by DLCO-EA aircraft. In order to strengthen the intervention capacity of Eritrea in case the country is invaded by swarms or confronted with another outbreak during the winter breeding season 2004/2005, FAO assisted the MoA through an international TCP project, shared between Eritrea, Yemen and Sudan, with 15,000 L of pesticides, 4 ULVA mast sprayers, 70 ULV handheld sprayers and operational funds for conducting intensified surveys. In view of the precarious overall locust situation since September/October 2003, a Desert Locust Steering Committee had been established, headed by the Minister, involving also the Zobas. The committee met twice during 2004 to discuss the locust situation and necessary actions.

With regard to the membership of Eritrea to the Central Region Commission, the MoA has officially recommended to join the Commission and forwarded the request to the Ministry of Foreign Affairs for final decision.

**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 by 2006

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

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

In order to ensure that locust surveys are complete, special attention has to be given to potentially important breeding areas in which access may be restricted because of civil conflicts and/or other forms of insecurity. In the Central Region, such areas are presently located between the borders between Somalia/Ethiopia, Eritrea/Sudan, Yemen/Saudi Arabia, and Sudan/Egypt. During Phase II progress has been made in organizing joint surveys with the participation of DL officers of the concerned countries. 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 understanding/confidence between neighbouring national locust control units.

The ultimate objective of an improved preventive locust control strategy is to locate and control gregarizing locust populations at the earliest possible stage, preventing them from developing into a major outbreak or even a plague. Nevertheless, finding early gregarized patches or even hopper bands in vast areas is extremely difficult. It is therefore important to find better methods that will increase the likelihood for detecting “hot spots”. One of them is to limit surveys to those areas that received good rainfall and have been identified as green by using RAMSES and remote sensing images. By narrowing down the potential target area, surveys and hence costs can be reduced.

Planned Activities	Status / Reasons for Deviation
<p><b>2.1 Make routine use of the RAMSES locust database and the interpretation of results.</b></p>	<p>The GIS locust data management system, RAMSES has been installed in Egypt in March/April 2004 and training provided by the ELO from Ethiopia to the Egyptian Information Officers (IO) on the applications and use of RAMSES. Egypt is now the seventh country in the CR where RAMSES had been introduced. Other countries using RAMSES since a longer period are Eritrea, Ethiopia, Oman, Saudi Arabia, Sudan and Yemen.</p> <p>With increasing confidence and experience, most countries using RAMSES are preparing their operations with the help of the RAMSES data base and are sharing datasheets with DLIS and neighbouring countries by email. In Yemen, Sudan, Saudi Arabia, Eritrea and Egypt RAMSES outputs (maps) are being attached to the national DL Bulletins/Newsletters. A particular good example of making appropriate use of RAMSES as a decision making tool for survey and control operations is Yemen with encouraging results on directing survey teams and finding infestations at early stages. Also in Sudan and Ethiopia RAMSES is being used satisfactory. However, in general better attention should be given by the IOs to check the data more carefully, particularly the coordinates, before distributing the data sheets.</p> <p>The Information Office at the MoA in Eritrea faced for many years some obstacles in using the data management system and technical backstopping had been given at several occasions by EMPRES/CR and FAO staff to resolve the difficulties. The use of RAMSES started to improve again, and in June/July 2004 the IO from Yemen provided refresher training to the IOs in Eritrea. Also after the visit of the Eritrean IOs to Yemen in December 2004 it should be expected that RAMSES/ERI will be operated in future in a similar professional way as in Yemen.</p> <p>Since the introduction of RAMSES in Saudi Arabia, January 2003, the IO is facing difficulties to operate RAMSES. The description of the problems was not always clear enough to allow proper advice by email. In addition, due to the shortage of local expertise regarding this technology and after the Ethiopian ELO left, it was not possible to assist the Saudi colleagues as desired. But after the IO of the Locust Centre of Yemen (previously trained by the Ethiopian ELO) could further prove his capability in this matter, it is planned that he will assist his Saudi counterparts in finding a more sustainable solution. Similar difficulties in retrieving already entered data have been observed by the IOs in Egypt. Also in this case the assistance of the Yemeni IO will be requested.</p> <p>With regard to historical data sets, the LCU in Ethiopia is keeping perhaps the most comprehensive locust data base in the Region. Locust data from 1963-67, 1970-86, 1989 – to date are kept in the RAMSES computer. In the other countries the situation looks like follows:</p> <ul style="list-style-type: none"> <li>Yemen: from 1997 – to date.</li> <li>Egypt: from June 2000– to date,</li> <li>Sudan: from 1999– to date,</li> <li>Oman: from 1990-1993, ongoing,</li> <li>Saudi Arabia: no information,</li> <li>Eritrea: no information.</li> </ul> <p>Unfortunately none of the countries made use of the of the opportunity to be assisted by EMPRES/CR and to obtain historical data from DLCO-EA.</p>

Planned Activities	Status / Reasons for Deviation
<p><b>2.2 Facilitate the interpretation of remote sensing satellite images and their use in directing survey operations.</b></p>	<p>Since the appointment of a new remote sensing expert at DLIS in August 2004 the distribution of <i>Normalized Difference Vegetation Index</i> (NDVI) satellite maps to the EMPRES/CR countries resumed again in September 2004. Satellite images are made available by DLIS to the IOs in 10 days intervals. Most of the IOs started making use of satellite vegetation maps for directing survey teams and gave positive feedback on the usefulness for decision making.</p> <p>As this technology has only recently been developed to an extent that it can be used with a reasonable level of confidence, training needs to be provided to the IOs on the interpretation of NDVI maps to take advantage of this tool for early warning in connection with RAMSES. But due to the staff situation regarding the remote sensing expert at FAO HQ, DLIS could not offer this training opportunity as planned.</p> <p>In addition, the satellite pictures need to be further validated and the actual vegetation cover verified to avoid false positive or false negative values. The countries have therefore been asked to cooperate in this matter and to provide DLIS with a brief ground verification of the SPOT satellite images at the same time with the survey reports, but no referring feedback has been provided until October. The ELOs have therefore been reminded again of the importance of this matter during the 12<sup>th</sup> ELO Meeting and informed that the referring form is available on the FAO webpage. The first country that picked up this advice in December 2004 was Yemen.</p>
<p><b>2.3 Support joint cross border survey.</b></p>	<p>Subject to suitable conditions, it was planned to support up to 5 joint cross border surveys during 2004 between Yemen/Saudi Arabia, Egypt/Sudan, Djibouti/Somalia, Libya/Egypt and Ethiopia/Somalia.</p> <p>In actual fact, two joint cross border surveys were conducted between Yemen/Saudi Arabia in January 2004 and Djibouti/Somalia in February 2004. The other surveys have not been realized because of either unfavourable conditions (no locust activities likely in the target areas) or that the LCUs were too much involved in the campaigns in their own countries.</p>
<p><b>2.4 Support development of survey practices and technologies through solicited research projects.</b></p>	<p>Since August 2004 CRC is sponsoring one MSc scholarship for two years at the University of Khartoum to provide more accurate estimates of Desert Locust infestation present in the field.</p> <p>From the member countries no referring research project proposals on improved survey practises have been received.</p>
<p><b>2.5 Up-date national locust information systems.</b></p>	<p>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 essential 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 2003/2004 upsurge. Serious gaps in the network have been identified in Sudan regarding the supervision of the summer breeding areas and in Egypt after the country was invaded by swarms in November 2004. Also in Eritrea the locust information system needs urgently to be re-organized. The currently best organized and managed national information system is that of Yemen (ref. item 1.5, Country Focus Programmes).</p>

Planned Activities	Status / Reasons for Deviation
	<p>Intra-national communication on locust and rainfall events is mainly depending on HF radios. Only in Saudi Arabia, Oman and partly in Yemen cell-phones and fax are being used for transmitting information from the field to the HQ. In order to improve the mode of communication by HF radios, EMPRES/CR advocated regular and defined contacts between the LCU/Locust Information Office and the field stations and prepared in cooperation with DLIS Standard Operating Procedures (SOP) for radio communication in 2003. It was planned to produce and distribute the Radio SOPs in 2004. But due to the preoccupying locust situation during the reporting period this result has not yet been accomplished but will be finalized in 2005.</p> <p>Despite some persisting shortcomings in the national information systems, continued improvements have been made by all EMPRES/CR countries as far as quality, timeliness and frequency of reporting to DLIS was concerned. For the period October 2003 – September 2004 DLIS received from the national LCUs a total of 230 reports. Some room for improvement has been observed particularly in Saudi Arabia and Ethiopia. Better timeliness is obviously needed in Eritrea, and the frequency of reporting could be better in Djibouti, Eritrea and Oman.</p>
<p><b>2.6 Support introduction of eLocust</b></p>	<p>EMPRES/CR in close cooperation with DLIS is supporting the countries in further improvements of the national locust communication network by providing the LCUs with additional HF radio equipment and new communication technologies such as eLocust. Amongst others, Yemen and Sudan received two additional mobile HF radio stations each, and Egypt one base and two mobile stations. All equipment fits to the requirements for transfer of field data by using eLocust. In addition, Sudan received in September 2004 a satellite receiver for field-testing. This equipment can be used in connection with a laptop computer for sending data files by email and to have Internet access in the field. By end of 2004 this new technology was not yet operational in Sudan.</p> <p>Some difficulties have been observed during configuration of eLocust particularly in Sudan. While in Yemen the problems could be solved, the eLocust system in Sudan was still not working. After various attempts failed to find a solution locally, it had been decided to send the Yemeni IO to Khartoum to help his counterparts in this matter. The Yemeni IO gained good experience in setting up and operating the equipment and in trouble shooting. The system is regularly being used with good results in Yemen during survey operations organized by the Centre.</p> <p>The Information Technology (IT) developed rapidly over the past decade. It became more and more reliable and less expensive with more applications. The satellite net is likely to become the standard means for communication and real-time data transfer over long distances, and will open up new avenues for improving locust early warning systems in future. For locust management purposes the equipment needs to be robust, easy to be handled, compatible and finally affordable by the countries. The eLocust system has shown some weaknesses and limitations, particularly as far as the platform for data entry is concerned. The currently used hand-held computer is no longer produced and a new, equally robust and comparatively cheap platform needs to be found.</p> <p>As remote sensing, the whole development in this area is an equally ongoing process and requires a long-term perspective in order to help the countries in keeping pace with the technological developments and in setting the standards. 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.</p>

Planned Activities	Status / Reasons for Deviation
<b>2.7 Support survey teams.</b>	<p>The aim was that the LCUs have enough material to equip their survey teams whenever needed. A standard survey-set comprises one GPS, compass, wind-meter, psychrometer, stop watch, hand-lens each and maps. Generally, most countries are sufficiently equipped with survey material, but due to losses or damage one or the other item requires replacement, and additionally mobilized teams need be equipped in case of emergency. For this reason, FAO through TCP/INT/3003 provided Yemen with supplementary ten GPS handsets and Sudan with nine pieces. In addition to that, EMPRES/CR and CRC set up a reserve stock at the RNE Office in Cairo of 30 GPS and psychrometers, and 50 pieces each of the other survey material in order to react quickly after a request for such material arrived. More difficult and costly is the procurement of maps. Therefore the LCUs have been requested to search for suitable maps (Scale: 1:100,000 – 1: 250,000) in their own countries.</p> <p>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 are being prepared since 2003. These field-cards have been made print-ready in 2004 but some errors had been discovered which required comprehensive revision of the index cards and modifications regarding the layout. The accomplishment of this activity is now programmed for 2005.</p>
<b>2.8 Prepare national survey plans.</b>	<p>The aim was that surveys are not always following “traditional” tracks but that more rational parameters are being used to plan and to direct the survey teams according to rainfall situation, analyzed RAMSES data, NDVI maps and FAO DL Bulletins. This should help the LCUs to organize more targeted surveys with better chances to detect early signs of gregarization.</p> <p>During the past years EMPRES/CR was encouraging the LCUs to apply the provided tools such as RAMSES, NDVI maps and meteorological data to organize their survey operations and to routinely monitor the most important breeding sites also during recession periods. This approach started to root at almost all LCUs with particularly good results during the past critical period in Sudan and Yemen. But also Eritrea, Ethiopia, Saudi Arabia and Somalia are monitoring the breeding areas in regular intervals. However, EMPRES/CR needs to continue providing backstopping in this matter in particular as far as the interpretation of RAMSES and NDVI maps is concerned and what conclusions to be drawn for the preparation surveys (see 2.2).</p>

**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 Locust Control Units as well as the regional and international bodies need to be organized for a full range of scenarios, from recession to plague situations, and need to have appropriate instruments at hand in order to allocate additional resources quickly enough to be effective. During Phase II, only the Sudan was in the position to develop contingency plans for the summer and winter breeding seasons in an adequately comprehensive manner. Contingency planning with the aim of having the necessary arrangements in place is a complex matter which requires well functioning coordination at the national, regional and international levels in addition to appropriate mechanisms that facilitate the process. Further attention to contingency planning during Phase III is therefore an essential step in creating a preventive control strategy that works in practice.

One of the important aspects in this matter is to encourage member countries to create national locust management committees (Steering Committees). Such committees serve to keep the concerned governmental institutions informed of locust developments and can assess the capacities of the responsible Locust Control Unit to respond to each particular situation. 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 be 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
<p><b>3.1 Encourage the concerned countries to create national locust management committees (Steering Committees).</b></p>	<p>The strategy followed by EMPRES/CR and the Commission with regard to Contingency Planning is based on 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.</p> <p>Desert Locust Steering Committees made up of government institutions, donor representatives and senior officers from the LCUs have proved to be very useful during the past months. The initiative by EMPRES/CR to create such committees in Sudan, Yemen, Ethiopia and Eritrea started already in 2001. As a result of the deteriorating locust situation in 2003/2004 committee meetings were organized in Sudan and Eritrea. In August 2004 the MoA of Sudan issued a decree defining the constrictions and the objective of this committee. Similar in Ethiopia, a “National Desert Locust Control and Preparedness Steering Committee” has been established on the initiative of the FAO Representative in September 2004. In Yemen, locust emergency matters are currently dealt with by the National Disaster Management Committee, but the need was felt to establish a separate committee for Desert Locust operations only.</p> <p>Generally the committees have as objective to create awareness among government officials and other related local institutions, to analyse the locust situation and the immediate consequences for food security in the country, to analyse the capacity of the LCU to cope with the situation, to harmonize the necessary actions by the concerned government bodies and the donor assistance, and to monitor the operations carried out by the LCU. To keep the committee members and other parties informed, the DL Bulletins proved to be another very important instrument. As a result of both, the Locust Centre in Sudan succeeded to obtain fast and substantial assistance from the government and the donor community.</p> <p>In addition to the DL Bulletins, also lists of the available resources proved to be a very important reference in the context of the Desert Locust Steering Committee Meetings. In order to better identify the immediate needs of the countries in a developing emergency situation and to initiate assistance at an early stage, EMPRES/CR advocated in 2003 the use of “Capacity Information Spread Sheets” by the LCUs (Intervention capacity monitoring). Because of some organizational difficulties (i.e. locust control equipment is often been used for other plant pests control) and the absence of an appropriate resource management in most cases, it was not always that easy for the managers of the LCUs to provide this important piece of information as needed in order to help in the process of soliciting assistance. EMPRES/CR received in 2004 information with regard to pesticide stocks, spray equipment, staffing situation and other items from six countries namely Egypt, Ethiopia, Oman, Saudi Arabia, Sudan and Yemen. Updates have been received most frequently from Sudan (4) and Yemen (3); and the Commission received from DLCO-EA three up-dates on the situation of its air fleet.</p>

Planned Activities	Status / Reasons for Deviation
<p><b>3.2 Prepare guidelines for national contingency planning mechanisms.</b></p>	<p>As a result of the Contingency Planning Workshop organized by EMPRES/CR in Borg El Arab in 2002, it became obvious to all participants that the question of contingency planning is not a matter of the affected countries alone. Contingency planning has to be interlinked and backed up by FAO (coordination of emergency assistance) and the donor community (allocation of assistance), in addition to rapid mobilization and deployment mechanisms in place at all level. For this reason FAO organized an inter-regional Contingency Planning Workshop under the umbrella of DLCC Technical Group (TG) in Nouakchott, May 2004. The workshop was attended by three members of the DLCCTG, seven FAO staff and six country representatives from all three Regions (Mauritania, Morocco, Saudi Arabia, Sudan, Iran and Pakistan). The programme comprised several computer simulations, resource assessments by using spread sheet and field exercises.</p> <p>The workshop participants considered that in periods of a long recession the countries find it difficult to maintain large specialized structures for Desert Locust control. These relatively small locust units need to be quickly reinforced during periods of higher locust activity either by mobilizing additional national resources or by addressing their needs early enough to FAO and to the international donor community. It was therefore recognized as essential that the structures of the Commissions and FAO need to be strengthened in order to assist the countries to respond to their needs more effectively. It was thus strongly recommended to re-establish the Emergency Center for Locust Operations (ECLO) at the FAO HQ as during the plague of 1986 - 1989. FAO responded to this important recommendation with the result that the Director General of FAO reinstated ELCO in August 2004.</p> <p>FAO assigned a consultant with the task to prepare guidelines for FAO and the affected countries on how best to organize for <i>possible, probable and certain</i> locust threats and which mechanisms to be used at the various levels. A first draft guide for contingency planning was received for comments in September 2004.</p>
<p><b>3.3 Support the national entities in developing national contingency planning mechanisms.</b></p>	<p>EMPRES/CR continued assisting the member countries in various aspects of contingency planning. Some of the mechanisms had been addressed and trained already during the previous years (see EMPRES/CR progress reports 2003, 2002, 2001). Sudan made best progress in regularly preparing contingency plans and made a number of useful experiences when it first came to application in late 2003. As a result of this experience, Sudan could prepare a more realistic plan for the summer season 2004, which has been presented as a good example during the DLCCTG in May 2004.</p> <p>Another important component in contingency planning is the preparation of national DL Bulletins/Newsletters. Guidelines for preparing DL Bulletins have jointly been drafted by CRC and EMPRES/CR and distributed to the member countries in March 2004. DL Bulletins in Arabic and English are being prepared by the LCUs in Egypt, Saudi Arabia, Sudan and Yemen with the objective to keep the national authorities and stakeholders informed of the locust developments and the actions undertaken by the LCUs.</p> <p>During 2004 the Locust Centre of Yemen issued most DL Bulletins (eleven), Sudan eight (in addition to 32 updates!), Egypt five, and Saudi Arabia three. Since this instrument has only been introduced relatively recently, the countries encountered some difficulties regarding the contents, layout and language. EMPRES/CR and CRC assisted the countries as much as possible in many aspects and the bulletins improved steadily. But further improvements in some cases are still necessary in order to provide brief but comprehensive and correct information. Eritrea issued four summary reports including RAMSES outputs in 2004 which</p>

Planned Activities	Status / Reasons for Deviation
<p><b>3.4 Assist the CRC in developing regional contingency planning mechanisms in accordance with those of the countries and FAO.</b></p>	<p>were comparatively good. But in order to circulate the information more widely and to avoid duplication of efforts it has been agreed to incorporate locust information in the existing National Food Information System (NFIS) Newsletter. Based on the Memorandum of Understanding between CRC and DLCO-EA drafted in 2003 and signed by DLCO-EA in October 2004, CRC and EMPRES obtained nine Migratory Pests Situation Reports from DLCO-EA.</p> <p>In general the DL Bulletins/Newsletters proved to be very suitable particularly in Sudan and Yemen. The government institutions felt better informed of the locust situation in their country and beyond, and could therefore respond to the obvious needs of their LCUs much better. Also the ELO of Egypt admitted that the bulletin could have helped in avoiding much of the rumours and confusion which occurred in the MoA and the public after the invasion in November 2004 in case the bulletin had been issued more frequently and timely.</p> <p>A CD ROM containing some computer simulations and useful spread sheets on assessing resources needed for outbreak, upsurge and plague campaigns has been finalized and distributed to all LCUs in September 2004. The computer simulations run well on computers operated with Windows 2000 but unfortunately not all simulations work with Windows XP. But particularly important are the spread sheets and it has been recommended that all key countries make regular use of them to assess the sufficiency of the available recourses in the context of contingency planning.</p> <p>After it became obvious that the Desert Locust situation was likely to aggravate in the Central Region, EMPRES/CR and CRC took the initiative to organize Ad Hoc Emergency Prevention Meetings with the immediately affected countries Sudan, Saudi Arabia, Yemen and Eritrea. A first meeting was held in March 2004 and a second in September 2004. The meetings had as objective to assess the locust situation, to discuss the likely scenarios during the forthcoming season, to agree on appropriate counter measures in accordance with the predicted movements month by month, to assess the available and pledged resources and to convene on a detailed regional action plan. Based on the regional action plans for the summer campaign 2004 and winter campaign 2004/2005, Sudan, Yemen and Saudi Arabia prepared national plans, which had been submitted to the government authorities and distributed to neighbouring countries in order to inform them of the scheduled preparations to control the locust infestations. Although Eritrea participated in these meetings, it was not known whether referring national action plans had been prepared or not. However, the Ad Hoc Meetings were generally perceived as useful in providing guidance for the planning of the campaigns and pre-positioning of resources and teams. The campaigns have been conducted in a comparatively more coordinated manner and the involved LCUs managed to contain the locust upsurge by May 2004. Particularly important was that the Saudi Locust Centre succeeded to avoid an escape of locust swarms into the spring breeding areas in the interior of the country. This could have posed a dangerous threat not only for the CR but also for the Eastern Region.</p> <p>FAO has been informed of the findings of the Ad Hoc Meetings and assistance was initiated immediately. As mentioned under item 1.3, FAO prepared as a result of the first meeting a TCP Project in April 2004 for Sudan, Eritrea and Yemen worth USD 390,000.</p>

Planned Activities	Status / Reasons for Deviation
<p><b>3.5 Assess the “operationality” of the contingency planning mechanisms.</b></p>	<p>The first experience with above approach was generally encouraging. The predictions made with the help of DLIS were sensible and close to the reality. The Ad Hoc Meetings facilitated early reaction by the countries to the predicted situations. Better stakeholder sensitization by issuing DL Bulletins and Capacity Information Sheets, and calling in Desert Locust Steering Committee Meetings could mobilize additional national resources, and timely bilateral and international assistance.</p>
<p><b>3.6 Develop guidelines for campaign evaluation.</b></p>	<p>On the background of the experiences made during the control operations in the CR the subject of preparing guidelines for campaign evaluation has been discussed during the 12<sup>th</sup> ELO Meeting in October 2004. The participants came to the conclusion that it might not be feasible to prepare “pass-par-touts” guidelines for a variety of possible scenarios under different circumstances and a number parameters such as decision-making, performance of the survey and control teams, environmental impact, spray efficacy, crop damage etc. It was therefore recommended to use a more practical approach.</p> <p>Certain critical points of a campaign could be followed up by the management of the LCUs by applying the Check Lists for good survey and control practices (see 1.2), which had been developed by EMPRES/CR and the FAO Spray Monitoring Form (see 3.7) and other recommended standard procedures. The routine use of these instruments by the LCUs and regular data recording could contribute to a more precise picture of the success of the survey and control operations and need to be further encouraged by EMPRES/CR.</p>
<p><b>3.7 Develop mechanisms to collect data on the extent of infestations, crop damage etc. during control campaign.</b></p>	<p>As a first step, FAO officially recommended during the 36<sup>th</sup> DLCC Meeting in 2003 the regular use of the FAO Spray Monitoring Form. This recommendation has immediately been followed up by EMPRES/CR and CRC when first control operations started in the CR in October 2003. The countries were encouraged not only to make sure that the S&amp;C teams are trained on how to use the forms and supplied with a sufficient number of forms, but also to send hard copies of the filled forms to EMPRES/CR and to enter the data into RAMSES. Unfortunately the response from the countries was not as expected. In some cases it was said that the teams were facing difficulties in filling the forms. In other cases it was pointed out that the teams lose important time for assessing the mortality rate after the spray instead of continuing their control work.</p> <p>It should be mentioned that it also took some time before the LCUs started to make routine use of the FAO Survey Form. The same should be expected with regard to the application of the Spray Monitoring Form and the Check Lists and requires continuous encouragement by EMPRES/CR.</p> <p>As part of the TCP/INT/3003 it was planned to conduct a campaign efficiency study in the CR as soon as the situation allowed. Advance preparations for an expert mission had been completed in July 2004, but by this time the locust situation in the CR had already improved and remained generally calm. The experiences in this matter showed that it was very difficult to keep a mission of experts on stand-by for an uncertain event. In this particular case it would be useful to know better of the experiences made in the WR and with what results. Because of the identified difficulties to launch a campaign evaluation when the opportunity arises, it was recommended by the 12th ELO Meeting to look for local expertise with focus on control efficiency, crop damage assessment and environmental/human health impact.</p>

<b>Planned Activities</b>	<b>Status / Reasons for Deviation</b>
<b>3.8 Evaluate economic advantage of preventive control.</b>	No substantial progress has been made in this matter. However, in the light of the different turn of the locust development in the CR as compared to the situation in the WR, EMPRES/CR approached ESAF at FAO HQ to assist in the selection of an appropriate consultant for assessing the economic advantage of preventive Desert Locust control. The opportunity for such study seemed to be adequate. In the CR principles of preventive control are being followed and increasingly practiced since 1997, while in the WR the EMPRES Desert Locust Programme did not yet fully materialize. More than 10.4 million ha have been sprayed in the WR against the Desert Locust since the beginning of the campaigns in October 2003 until November 2004, while in the CR about 250,000 ha were treated during the same period.
<b>3.9 Assist member countries in developing simulated outbreak control campaigns in the field.</b>	Small-scale simulated survey and control exercises are already a routine part of the standard S&C training courses followed in the CR. Large-large scale mock exercises as suggested during the CLCCTG Meeting in May 2004 have been considered as much too expensive (almost equal the cost of a real campaign) and might not find the approval from the governments. But medium mock survey and control exercises on simulated outbreak campaigns were considered particularly useful during recession periods. Some EMPRES/CR countries showed high interest in this subject (Eritrea, Yemen and Sudan) and requested guidance from EMPRES/CR. It was therefore agreed that EMPRES/CR will work out referring guidelines for practicing outbreak campaigns by 2005.

**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
<p><b>4.1 Participate with member countries and other collaborators in harmonizing bio pesticide regulations.</b></p>	<p>One of the important highlights during 2004 was that Sudan registered as first country in the CR the bio-pesticide “Green Muscle” (<i>Metarhizium anisopliae</i> var. <i>acridum</i>) for use against locusts and grasshoppers in August 2004. The registration trails have been conducted in close collaboration between PPD Sudan and ICIPE.</p> <p>Also Egypt and Yemen expressed there wish to follow this example soon. In Egypt bio-control products are particularly needed in areas were high-value export crops are produced or in cases that high density agricultural areas are being invaded by locust swarms were it is almost impossible to use chemical pesticide without risk to the rural population and their livestock. In Yemen it is expected to use metarhizium products in areas which are frequently visited by bee keepers. After investigations supported by EMPRES/CR could approve that “Green Muscle” does not affect bees, the GDPP in Yemen is considering registration of this bio-product.</p> <p>In order to avoid costly separate registration trials on the Desert Locust only, which in addition are more difficult to carry out because of the problem to find suitable infested areas, it was agreed to support also registration trials on other locust and grasshopper species. One referring project in Ethiopia has been supported by EMPRES/CR, but unfortunately the results were not significant enough to allow the registration of Green Muscle. It has therefore been agreed to repeat the trails with assistance from DLCO-EA.</p> <p>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 CR. DLCO-EA received</p>

Planned Activities	Status / Reasons for Deviation
<p><b>4.2 Support large-scale operational trials and small-scale demonstrations of the use and efficacy of bio-pesticides and other novel technologies.</b></p>	<p>substantial support in this matter from USAID and conducted several national, regional and international workshops to develop standard requirements and protocols for the registration of bio-pesticides. However, the conclusions of these efforts are not known. DLCO-EA has therefore been requested to closely collaborate in this aspect with CRC and EMPRES/CR and to provide information on the status.</p> <p>With support from EMPRES/CR, DLCO-EA successfully organized and conducted a field demonstration of the Differential Global Positioning System (DGPS) in Ethiopia in April 2004. The objective of this field exercise was to illustrate to interested parties from the member countries (Ethiopia, Sudan, Saudi Arabia, Oman and Yemen) and several air companies the advantages of this track guidance system for aerial control operations. Since the system facilitates more targeted and more precise pesticide application, the amount of chemicals used during aerial control operations can significantly be reduced and unwanted contamination of uninfested areas avoided. As a result of the demonstration, the Omani Air Force, responsible for aerial control operations in the country, indicated interest to obtain one DGPS equipment for locust control.</p> <p>Because of the high risk that the CR could be invaded by Desert Locust swarms arriving from the WR it was felt necessary to strengthen the aerial intervention capacity in the CR. For this reason, EMPRES/CR with support from USAID supplied four additional DLCO-EA aircraft with the track guidance device in November 2004. In total five aircraft of the Organization are now equipped with DGPS.</p> <p>Since 2002 EMPRES/CR is collaborating with ICIPE to make the Desert Locust pheromone, <i>phenylacetone nitrile</i> (PAN) available as a low-cost and effective alternative to conventional locust control. It was expected from this technology that PAN will break the cohesion of gregarious hopper bands and hence makes the individual nymphs a more easy prey for predators. If mixed with bio-pesticides or chemical pesticides it was also expected that PAN will increase the susceptibility of the nymphs to these products, and thus enhances the effects of i.e. Green Muscle or reduces the application rate of chemical pesticides.</p> <p>Because of the absence of natural hopper bands and to facilitate at least the testing of PAN under semi-natural conditions, mass-rearing facilities had been built up at the ICIPE station in Port Sudan in 2002 and semi-field validation trails on reared locusts conducted during 2003. The Desert Locust outbreak in Sudan in 2003 opened a first opportunity to conduct trails with PAN on natural Desert Locust hopper bands in early 2004.</p> <p>ICIPE succeeded to carry out several trails at the Red Sea coast of Sudan during winter 2004 on marching hopper bands and non-marching hopper groups under bushes.</p> <p>Two sets of trials have been conducted: Pesticide (Carbosulfan ULV) at different dosages with and without PAN, and Green Muscle (<i>Metarhizium anisopliae</i>) at different dosages with and without PAN.</p> <p>The results could confirm the previous findings from various laboratory 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. If these results could be verified, the cost per ha of Green Muscle for locust control would become competitive to the price of conventional insecticides.</p> <p>As ICIPE obtained promising results and achieved to confirm the effects of PAN also under natural conditions, it is advisable that ICIPE should demonstrate and present the effects to a broader audience of interested parties in order to agree on next steps as far as the promotion and introduction of this technology as part of a preventive control strategy is</p>

Planned Activities	Status / Reasons for Deviation
	<p>concerned. EMPRES/CR will support ICIPE in this matter.</p> <p>Despite the good achievements, there are questions regarding ecotoxicological side effects of PAN. Since the molecule (<i>phenylacetonitrile</i>, synonym <i>benzyl cyanide</i>) is classified as “toxic”<sup>2</sup> or class 3 according to the Swiss classification of toxic substances (5 ranks; 1=most toxic), this aspect needs to be addressed in a careful manner in order to avoid queries at a later, more advanced stage. Although PAN is currently being used by ICIPE at very low dosages of 200 mg per ha, its benign effect on non-target organisms needs to be confirmed. An additional aspect is concerning its practicality when either diluted or mixed with other pesticides. In its pure form (99 %) PAN may be fatal if inhaled, swallowed or absorbed through the skin, and contact may cause burns to the skin and eyes. This indicates that during formulation similar precaution measures need to be applied as in the case of chemical insecticides, and could raise concerns as far as its environmental safety or advantages are concerned.</p> <p>As one of the pending items as part of the GTZ support to EMPRES/CR, GTZ finalized a study on barrier treatments as means of controlling migratory locusts. This study has been presented in the Pesticide Referee Group Meeting of FAO in October 2004 and the final version submitted to EMPRES/CR in December 2004.</p>
<p><b>4.3 Support solicited research projects.</b></p>	<p>Since the beginning of the Programme, EMPRES/CR, CRC and FAO provided support to in total eleven research projects. Five projects have been completed; five were still in process, and one was in preparation. In detail the following topics have been addressed:</p> <ul style="list-style-type: none"> <li>• 1 study on eco-toxicological aspects of PAN, DLCO-EA (in the pipeline),</li> <li>• 1 MSc study on eco-toxicological aspects of PAN since June 2004, University of Khartoum (ongoing),</li> <li>• 1 MSc study on survey methods since Sept. 2004, University of Khartoum (ongoing),</li> <li>• 1 project on efficiency of Green Muscle since Aug. 2003, Plant Protection Research Institute, Cairo (ongoing),</li> <li>• 1 project on efficiency of Green Muscle, University of Addis Ababa, February 2003 – June 2004 (completed),</li> <li>• 1 MSc study on effect of herbal quality on DL distribution since January 2003, University of Khartoum (ongoing),</li> <li>• 1 project on impact of environmental factors and control operations on the Desert Locust population in Saudi Arabia, since July 2002, King Faisal University (ongoing),</li> <li>• 1 MSc study on control technologies, May 2002 – December 2002, NRI (completed),</li> <li>• 1 MSc study on Desert Locust population comparison in different recession periods in Ethiopia, Alamaya University, October 1999 - May 2001 (completed),</li> <li>• 1 PhD study on population dynamics, University of Khartoum, September 2000 – April 2003 (completed),</li> </ul>

<sup>2</sup> ORL-RAT LD50 270 mg kg-1

IHL-RAT LC50 430 mg/m<sup>3</sup>/2h

SKN-RAT 2000 mg kg-1

Planned Activities	Status / Reasons for Deviation
	<ul style="list-style-type: none"> <li data-bbox="646 279 1399 363">• 1 study on effects of GM on honey bees, University of Aden, September 2000 – October 2004 (completed, revised final report pending).</li> </ul> <p data-bbox="597 380 1399 625">As mentioned in many of the previous progress reports, the preparation, implementation and the reporting on research projects was not always following acceptable scientific minimum standards. This led in many cases to significant delays as far as the approval process was concerned and also extended project periods beyond the actually expected timeframe. EMPRES/CR and CRC continued to invest time and efforts in assisting the researchers in various aspects by providing reference material, advice and technical backstopping. Nevertheless, the improvements remained marginal in many cases.</p> <p data-bbox="597 642 1399 1050">There have been several reasons for this observation. There was certainly insufficient support from the responsible supervisors and not always enough sense of ownership of the soliciting body, the LCUs. Regarding the latter, it should be admitted that the staff of the LCU did not in all cases feel competent enough in order to follow up the progress of the research projects or to comment the results. Comparatively good support and professional backstopping had been provided by the Crop Protection Department in Ethiopia in the case of the registration trials of Green Muscle. Although the trial results were at the end not sufficient to allow registration, the justification given by the Department was rational and fully acceptable. Another aspect was that the scientists neglected the importance of interacting with fellow researchers who already gained a lot of experience in the specific topics. EMPRES/CR and CRC continuously encouraged the scientists to more actively take advantage of the possibilities with unfortunately not always satisfactory results.</p>

## 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 December 2005.
1 International Migratory Pest Expert (Khartoum, Sudan)	Project funded post. Appointed in December 2002. Contract ended in February 2004.
1 National Professional Officer for Survey (Sana'a, Yemen)	Project-funded post. Current contract until October 2005.

**b. Support staff**

1 *Administrative Secretary* in Cairo, project-funded fixed-term contract from September 2002, extended until December 2005,  
1 *Driver* in Sana'a, project-funded fixed-term contract until August 2005,  
1 *Driver* in Cairo, since May 2003 project funded fixed-term contract until June 2005.

**C.2 Equipment purchased since January 2004 (Phase III)<sup>3</sup>**

- |                      |   |
|----------------------|---|
| <b>Djibouti:</b>     | <ul style="list-style-type: none"><li>• 1 Master Trainers' Training Kit (English)<sup>4</sup>.</li></ul>  |
| <b>DLCO-EA</b>       | <ul style="list-style-type: none"><li>• 4 DGPS track guidance equipment,</li><li>• 1 Master Trainers' Training Kit (English).</li></ul>   |
| <b>Egypt:</b>        | <ul style="list-style-type: none"><li>• 2 mobile HF radios including modems,</li><li>• 1 HF base station including modem,</li><li>• 2 Master Trainers' Training Kits (English/Arabic).</li></ul>                              |
| <b>Eritrea:</b>      | <ul style="list-style-type: none"><li>• 10,000 L Fenitrothion ULV 45 %,</li><li>• 4 ULVA mast vehicle mounted sprayers,</li><li>• 70 ULVA+ handheld sprayers,</li><li>• 2 Master Trainers' Training Kits (English).</li></ul> |
| <b>Ethiopia:</b>     | <ul style="list-style-type: none"><li>• 2 Master Trainers' Training Kits (English).</li></ul>   |
| <b>Oman</b>          | <ul style="list-style-type: none"><li>• 2 Master Trainers' Training Kits (English/Arabic).</li></ul>  |
| <b>Somalia:</b>      | <ul style="list-style-type: none"><li>• 1 radio antenna,</li><li>• 1 Master Trainers' Training Kit (English).</li></ul>   |
| <b>Saudi Arabia:</b> | <ul style="list-style-type: none"><li>• 2 Master Trainers' Training Kits (English/Arabic).</li></ul>  |

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<sup>3</sup> The below list includes equipment purchased under TCP/INT/3003(e)

<sup>4</sup> Each Training Kit contains: *English and/or Arabic manuals and 1 CD ROM, 4 Anemometers, 4 Tachometers, 4 Hygrometers, 4 Stop Watches, 4 Compasses, 4 Hand Lenses, 4 Droplet Counting Templates, 1 pack of Water Sensitive Paper, 2 packs of Oil Sensitive Paper*

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- Sudan:**
- 1 Media Projector,
  - 5 Solar cells,
  - 1 Laptop computer,
  - 2 UPS,
  - 2 Stabilizers,
  - 1 RBGAN Satellite receiver,
  - 9 GPS hand sets,
  - 2 mobile HF radios including modems,
  - 2 Master Trainers' Training Kits (English/Arabic).
- Yemen:**
- 10 GPS hand sets,
  - 2 mobile HF radios including modems,
  - 15,000 L Fenitrothion ULV 45 %,
  - 2 Master Trainers' Training Kits (English/Arabic).
- University of Khartoum**
- EMPRES/WR:**
- 2 Master Trainers' Training Kits (English).
- CRC, EMPRES/CR<sup>5</sup>**
- 2 Master Trainers' Training Kits (Arabic); *Mauritania, Libya*.
  - 30 GPS hand sets,
  - 50 Windmeter,
  - 30 Psychrometer,
  - 50 Tachometer,
  - 50 Droplet Counting Templates,
  - 50 Compasses,
  - 50 Stop watches,
  - 50 Hand lenses.
  - 5 Master Trainers' Training Kits (English/Arabic).
- AGPP**
- 1 Master Trainers' Training Kits (English/Arabic).

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<sup>5</sup> For distribution to the EMPRES/CR member countries upon request

### C.3 Training activities during the reporting period

- Egypt: 1 national S&C course from 07 - 17 Aug. 2004, *21 trainees*,  
1 on-the-job RAMSES training from 26 March – 06 April 2004,  
*3 trainees*,
- Eritrea: 1 national S&C course from 17 - 28 May 2004, *31 trainees*,  
1 local S&C course in June 2004<sup>6</sup> (exact dates not known), *28 trainees (?)*,  
1 on-the-job RAMSES training from 24 June – 01 July 2004,  
*2 trainees*,
- Ethiopia: 1 local survey/reporting course from 03 - 07 May 2004, *34 trainees*,  
1 national S&C course from 16 – 25 Dec. 2004, *18 trainees*,
- Oman: 1 national S&C course from 17 – 21 July and 29 July – 04 Aug. 2004,  
*10 trainees*,
- Sudan: 1 national S&C course from 22 – 29 May 2004, *20 trainees*,  
1 national refresher S&C course from 03 – 09 July 2004, *14 trainees*,  
1 national S&C course from 11 – 17 Dec. 2004, *16 trainees*,  
1 local survey/reporting course from 17 – 19 Dec. 2004, *20 trainees*,  
1 DL Diploma course, University of Khartoum, *6 students* (academic year 2004/2005),
- Yemen: 1 local survey/reporting course from 26 – 31 March 2004, *14 trainees*,  
1 national S&C course from 05-10 June 2004, *14 trainees*,  
1 local survey/reporting course from 27 Nov. – 02 Dec. 2004,  
*15 trainees*.

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

- Locust Group Staff Meeting, Rome, Italy, 23-25 February 2004,
- Ad Hoc Emergency Prevention Meeting, Khartoum, Sudan, 15-17 March 2004,
- CRC Meeting, Jeddah, Saudi Arabia, 17-22 April 2004,
- CF Planning Workshop, Jeddah, Saudi Arabia, 23–27 April 2004,
- DLCCTG Meeting, Nouakchott, Mauritania, 02–06 May 2004,
- Ad Hoc Emergency Prevention Meeting, Khartoum, Sudan, 06-10 September 2004.
- 12<sup>th</sup> ELO Meeting, Hurghada, Egypt, 09–13 October 2004,
- Extraordinary Session of the DLCC, Rome, Italy, 29 November–02 December 2004.

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<sup>6</sup> No detailed report received

## C.5 Relevant publications and reports during the reporting period

- Report on joint cross border survey between Saudi Arabia and Yemen (EMPRES/CR), January 2004,
- EMPRES/CR report on progress, 2003 (EMPRES/CR), February 2004,
- Report on joint cross border survey between Djibouti and Somalia (EMPRES/CR), March 2004,
- 11<sup>th</sup> progress report, July - December 2003; Scenario studies for improved Desert Locust survey and control strategies (Wageningen University), March 2004,
- Report on RAMSES installation in Egypt (EMPRES/CR), April 2004.
- Report on local training course in Yemen (EMPRES/CR), April 2004,
- Report on 8<sup>th</sup> Session of the DLCCCTG - Contingency Planning Workshop in Nouakchott (AGPP), May 2004,
- Report on DGPS demonstration and training on ground support for aerial operations (DLCO-EA), June 2004,
- Report on national S&C training course in Sudan (LCC-Sudan), May 2004,
- Final report on evaluation of efficacy of *metarhizium anisopliae* (Green Muscle) against mixed grasshoppers spp. in central Ethiopia (Addis Ababa University), May 2004,
- Workshop report on spray equipment used in Desert Locust Control: English and Arabic (CRC-EMPRES/CR), June 2004,
- Desert Locust Master Trainer Manual: English and Arabic (CRC-EMPRES/CR), June 2004,
- EMPRES/CR Phase II Evaluation Report (FAO), June 2004,
- Optimization, validation and transfer of pheromone technology to national locust control organizations, Phase III 1st scientific report (ICIPE), July 2004,
- Report on local training course in Ethiopia (MoA Ethiopia), July 2004
- Report on national S&C training course in Yemen (EMPRES/CR), July 2004,
- Report on national S&C training course in Sudan (LCC Sudan), July 2004,
- Report on national S&C training course in Oman (EMPRES/CR, MoAF Oman), August 2004,
- Report on national S&C training course in Eritrea (MoA Eritrea), August 2004,
- Report on national S&C training course in Egypt (MoA Egypt), September 2004,
- Report on 12<sup>th</sup> ELO Meeting (EMPRES/CR), October 2004,
- Standard Operating Procedures (SOP) on Aerial Control: Arabic (CRC), November 2004,
- Report on national S&C training course in Yemen (DLMCC Yemen), December 2004,
- Report on national S&C training course in Ethiopia (MoA Ethiopia), December 2004,
- Study on barrier treatments as means of controlling migratory locusts, Final version (GTZ- EMPRES/CR), December 2004.

## **D. General Assessment**

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

The major events during 2004 were the Desert Locust upsurge in the Central Region and the alarming developments in the Western Region.

Widespread and unusual heavy rainfall during the summer breeding season in 2003 triggered Desert Locust outbreaks in several parts of Northwest Africa and the Central Region. In the Central Region a locust outbreak developed first in Sudan in October 2003 and control operations were immediately mounted by the Locust Control Units in Sudan, Saudi Arabia, Egypt and Eritrea against the rapidly developing threat. However, some adult Desert Locust groups and swarms escaped during the following months and moved into winter breeding areas on both sides of the Red Sea. Despite all interventions carried out, the situation deteriorated further particularly in the Western Region. In February 2004 it became obvious that the level of the Desert Locust threat risked exhausting the available resources. Consequently, FAO launched an appeal to raise emergency funds to respond to the immediate needs.

Against this background the need was felt to call an ad hoc emergency prevention meeting in March 2004 with those countries of the Central Region who were immediately affected and at risk. Short and mid-term scenarios of the likely Desert Locust developments and movements from March 2004 until the winter-breeding season 2004/2005 were discussed among the participants, and possible counter measures in each of the countries agreed. Encouraged by the meeting, the Kingdom of Saudi Arabia provided bilateral support to Sudan to respond to the most urgent needs of the Locust Centre and a TCP Project was prepared by FAO to support the limited intervention capacities of the Locust Control Units of Sudan, Yemen and Eritrea. National action plans have been prepared in the context of the contingency planning approach and followed successfully in most parts. Survey and control operations were carried out in a comparatively better coordinated and efficient manner and the feared escape of swarms into the spring breeding areas of Saudi Arabia could be prevented. As a result, the situation improved again in May 2004.

However, a high level of alert was kept in the Central Region and second emergency prevention meeting was organized in September 2004. Because of the alarming reports received from North-West Africa and the Sahelian countries during summer 2004, a high risk was felt that the Central Region could possibly be invaded by swarms coming from Chad and crossing the insecure area of Darfur, Sudan. Following the action plan as a result of the first emergency meeting, the Locust Control Centre in Sudan had already established several defence lines though out the summer breeding belt by this time and continuously monitored the area. Lucky enough, the expected locust invasion did not take place.

Bases on available information and the weather forecast until January 2005, it seemed to be realistic that the chances for a second outbreak in the Central Region were limited. Below average rainfall was expected in most parts of the Central Region during the period from September 2004 – January 2005. Because of the climatic conditions, it was not seen very likely that swarms originating from Northwest Africa would arrive in the Central Region during the remaining summer

season until mid of October 2004. And even if few undetected swarms had arrived from Chad during August, further successful breeding of a second gregarious generation was not expected to be likely. Despite the predicted relatively calm Desert Locust situation for the following winter season 2004/2005, EMPRES/CR and CRC advised the countries to keep the capacities at the Locust Control Units fully operational and to be prepared for a possible swarm invasion from Northwest Africa during the summer season 2005.

This situation as discussed during the 2<sup>nd</sup> emergency prevention meeting took place earlier than expected. Unusual strong and persisted south-westerly winds across Libya during October 2004 caused immature Desert Locust swarms moving from southwest Libya towards the northeast Libya near Tubruk and the Egyptian borders. On 28<sup>th</sup> October, first swarms were reported in northwest Egypt. By mid of November the north-westerly winds drifted the swarms southeast and a large swarm of medium density appeared over Cairo on the 17<sup>th</sup> October which moved further southeast towards the Red Sea coast. As soon as the swarms arrived in the Western Desert of Egypt, the General Department for Locusts and Agro-aviation Affairs launched intensive ground control operations. The Ministry also formed an Emergency Task Force Operation Committee headed by the Director General of Pest Control Department and the Head of the Locust Department. In December the Ministry requested FAO for assistance for the on-going control operations and EMPRES/CR and CRC assisted in the formulation of a TCP Project worth USD 200,000.

The Desert Locust situation since October 2003 tested for the first time the strategy of preventive control followed by EMPRES/CR. The events could demonstrate to which extent the various aspects regarding early warning, staff capacity building, preparedness, control efficiency and monitoring started to root in the operations of the national Locust Control Units. Definitely some gaps had been observed in several cases which will be addressed by EMPRES/CR in the following months and years. But all in all it should be mentioned that this time the Locust Control Units were much better prepared and fast reacting to the threat.

The following factors are believed to have contributed to the decline of the locust developments in the Central Region:

- Early alerts contributed to immediate mobilization of resources and control teams in Egypt, Sudan, Saudi Arabia, Yemen and Eritrea,
- Good interaction, collaboration and information exchange between the countries in the Central Region,
- Intensive information exchange by email and telephone between EMPRES/CR, the Commission, the affected countries and DLIS,
- Despite some difficulties at the beginning, good efforts have been made by most EMPRES/CR key countries to reinforce the necessary structures to successfully face the Desert Locust threat,
- The Ad Hoc Emergency Meetings contributed substantially to the sensitization and proper preparation of the campaigns,
- Successful operations by the Saudi forces prevented the escape of swarms to spring breeding areas in Saudi Arabia,

- The key countries were well aware of following up and monitoring their strategic resources,
- Good bilateral and intra-regional support between key countries such as Saudi Arabia-Sudan and Saudi Arabia-Yemen,
- Unsuitable ecological conditions in most parts of the summer season belt during the summer 2004.

But measures of preventive control are not enough in case of an invasion. Pre-positioning of resources at strategic places and swarm control by using aircraft before they enter the agricultural areas is the only appropriate choice under such circumstances. The current Desert Locust situation underlines the necessity of having preventive control strategies also in place in the Western and in the Eastern Regions and to supervise close inter-regional collaboration and harmonization of all aspects of development and introduction of preventive control strategies.

Despite the direct involvement in the operations to prevent a major upsurge, EMPRES/CR continued to make satisfactory progress in implementing the activities as agreed by the 11<sup>th</sup> ELO Meeting. Only few activities could not be carried out or are delayed. One important reason for this was the severe shortage of funds during the first six months. It was only by June 2004 that remaining funds had been release by one of the most important contributors to the Programme. In general the funding situation of EMPRES/CR remains unstable. EMPRES/CR started already to cut down costs and is operating with two FAO staff only (from originally seven), but particularly in 2006 a shortfall of approximately USD 500,000 is likely in case that no new donor to the Programme is found.

## List of Acronyms

AGPP	Plant Protection Service (FAO)
CF	Country Focus
CFP	Country Focus Programme
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
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
ICIPE	International Centre of Insect Physiology and Ecology, Nairobi
IGR	Insect Growth Regulator
IO	(locust) Information Officer
LCC	Locust Control Centre
LCU	Locust Control Unit (National)
MoA	Ministry of Agriculture
MoU	Memorandum of Understanding
NDVI	Normalized Difference Vegetation Index

NPO	National Professional Officer (FAO)
NRI	Natural Resources Institute (UK)
PAN	Phenylacetonitrile
PPD	Plant Protection Department (National)
RAMSES	Reconnaissance and Management System of the Environment of Schistocerca (GIS data management and aid to decision-making)
S&C	Survey and Control
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