REPORT

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FAO Desert Locust Control Committee

Thirty-ninth Session

Report of the

FAO Desert Locust Control Committee

39th Session

Rome, 10 – 13 March 2009

Food and Agriculture Organization of the United Nations
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LIST OF ACRONYMS

ADB	African Development Bank
AG	Agriculture and Consumer Protection Department (FAO)
AGP	Plant Production and Protection Division (FAO)
CERF	Central Emergency Response Fund (UN)
CLCPRO	Commission for Controlling the Desert Locust in the Western Region/ *Commission de Lutte Contre le Criquet Pèlerin dans la Région Occidentale* (FAO)
CMC-FC	Crisis Management Centre along the Food Chain (FAO)
CR	Central Region
CRC	Commission for Controlling the Desert Locust in the Central Region (FAO)
DLCC	Desert Locust Control Committee (FAO)
DLCCTG	DLCC Technical Group
DLCO-EA	Desert Locust Control Organization for Eastern Africa
DLIS	Desert Locust Information Service (FAO)
ECLO	Emergency Centre for Locust Operations (FAO)
eLocust2	System of electronic data collection and transmission
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
GG	Green Guard™
GM	Green Muscle™
IFAD	International Fund for Agricultural Development
IGR	Insect Growth Regulator
IRLCO-CSA	International Red Locust Control Organisation for Central and Southern Africa
NLCUs	National Locust Control Units
PAN	Phenylacetonitrile
PRG	Pesticide Referee Group
PSMS	Pesticide Stock Management System
QUEST	Quality, Environmental Protection, and Safety of Treatments
RAMSES	Reconnaissance and Management System of the Environment of *Schistocerca*
SFERA	Special Fund for Emergency and Rehabilitation Activities (FAO)
SWAC	Commission for Controlling the Desert Locust in South-West Asia (FAO)
TCE	Emergency Operations and Rehabilitation Division (FAO)
TCE-FCEMU	TCE-Food Chain Emergency Management Unit (FAO)
TCEO	Emergency Operations Service (FAO)
TF	Trust Fund
ToT	Training of Trainers
UN	United Nations
USAID	United States Agency for International Development

VAM	Vulnerability Analysis and Mapping
WFP	World Food Programme
WFP/HRD	WFP/Humanitarian Response Depots
WR	Western Region

LIST OF RECOMMENDATIONS

1. It was recommended that for the next DLCC meeting, one locust-affected country from each Region of the Desert Locust distribution area should be given the opportunity to present a summary of the status and capacity of its National Locust Control Unit.

2. The DLCC recommended that the Secretariat should establish a small representative Committee to discuss by email the terminology used to describe population dynamics (particularly outbreak, upsurge and plague/ invasion) and report its consensus back to the next Session.

3. The DLCC agreed to renew its support for the prevention of Desert Locust emergencies, based on targeted interventions carried out as early as possible; such interventions should be implemented by autonomous National Locust Control Units, with strong support from the Regional Commissions, and with sufficient flexibility in their contingency plans and their funding resources to be able to react to any unusual situation.

4. Following the efforts made by the CLCPRO and the Ad Hoc Group, which was created to elaborate Terms of Reference of the Emergency International Fund for Desert Locust, it was recommended to further explore the possibilities of creating this Fund.

5. The DLCC recommended that the affected countries also put in place National Emergency Funds for the Desert Locust in order to be able to deal with any critical eventuality in their countries.

6. The DLCC recommended that FAO look into the establishment of contingency stocks of field equipment to be stored at WFP's Humanitarian Response Depots, solicit donor support for this purpose, and report on progress to the next DLCC Session.

7. The DLCC recommended that its Trust Fund assist in developing suitable open-source software for supporting RAMSES.

8. Following the recommendation of the workshop on biopesticides, which was held in Rome in February 2009, the DLCC recommended that Green Muscle™ should be used operationally for preventive control as much as the temperature range allowed but always by professional teams that had been properly trained.

9. The DLCC recommended that all the outbreak-area (front-line) countries in the whole Desert Locust distribution area should have autonomous National Locust Control Units.

10. The DLCC recommended that there should be a Phase II of the EMPRES/WR in order to consolidate the achievements made so far.

11. In connection with pesticide management, and in order to prevent new obsolete stocks, ensure early responses to future locust outbreaks, and to protect human health and the environment, the DLCC recommended:
    - That the Pesticide Stock Management System (PSMS) recently developed by FAO should be installed and operational in all Western Region countries covered by CLCPRO and extended to the countries of the Central and South-West Asia Regions;
    - That FAO invites countries to provide a list of the pesticides registered for locust control.

12. Following discussions, it was recommended that all DLCC Members pay their annual contribution on a regular basis and that an official letter be sent by the Director-General inviting countries to settle their arrears, if any. Delegates were also invited to sensitize their national authorities on the importance of settling arrears as soon as possible.

13. It was recommended that Burkina Faso and Eritrea, both recent new members of the DLCC, pay an annual contribution of USD 3,000 each. For Kuwait, which has been invited to the DLCC for a number of years, a letter should be sent requesting a financial contribution suggested to be USD 20,000.

14. The DLCC once more invited Nigeria, which had withdrawn from the DLCC in 1995, to settle its arrears to the Trust Fund.

15. It was recommended that the Secretariat carry out an assessment of the annual contribution paid by each country and propose to the DLCC any necessary modification in this respect.

16. It was recommended that the Secretariat explore all possible ways to reduce the costs of DLCC meetings and to proceed with the necessary arrangements in time for the next meeting.

17. The DLCC recommended that the budget proposed for 2009-2011 be adopted. It should include the publishing of the PhD Thesis of Mr M.A. Babah Ebbe in the FAO Technical Series.

INTRODUCTION

1. At its thirty-eighth Session, held in Rome from 11 to 15 September 2006, the FAO Desert Locust Control Committee (DLCC) agreed that the thirty-ninth Session should be held in Rome on a date to be determined by the Director-General of the Food and Agriculture Organization of the United Nations (FAO). The dates chosen were 10 to 13 March 2009 and the Director-General accordingly issued invitations to all member countries and relevant organizations likely to be interested in locust management.

2. The List of Participants is given in Annex 1.

3. The scene for the 39th Session was set with the screening of a film on locust operations in Ethiopia, written and directed by Mr R. Nugent. The official opening was then made by the Assistant Director-General of the Agriculture and Consumer Protection Department (AG), Mr M. Traoré, who welcomed all participants to FAO and to Rome. He said that as someone born in a country that was regularly affected by the Desert Locust, he felt a particular empathy for the activities of those who contributed directly or indirectly to the prevention or mitigation of locust outbreaks, upsurges, and plagues.

4. The Assistant Director-General reminded participants of the mandate of the DLCC, namely to provide the Director-General with technical and scientific advice on the Desert Locust situation and on the activities funded by the DLCC Trust Fund (TF). He recalled that the last DLCC meeting in 2006 had involved much discussion and a report on the evaluation of the major upsurge that occurred in 2003-2005. The upsurge had eventually infested 22 countries and resulted in the spraying of 13 million hectares of infestations. Although nothing of this scale had happened during the past two years and the current situation was assessed as calm, the Assistant Director-General said that it was important not in any way to become complacent. He underlined the need for countries to have autonomous national Desert Locust control units and welcomed the fact that this was the case in several countries; such units should have contingency plans ready to implement.

5. The Assistant Director-General said that the 39th Session would concentrate on five main themes, the Desert Locust situation, the actions taken to deal with it, the status of emergency preparedness, environmental aspects and future planning.

6. The Assistant Director-General reminded participants that the functioning of the DLCC depended on the resources it received from its Trust Fund. This Fund's continued existence relied on regular and timely contributions from participating countries.

7. The Assistant Director-General wished successful deliberations for the meeting and, on behalf of the Director-General, declared the 39th Session of the Desert Locust Control Committee open.

OFFICERS OF THE SESSION

8. The following officers were elected:

Chairman:	Mr Fakaba Diakité (Mali)
Vice-Chairman:	Mr Adnan Khan (Saudi Arabia)
Drafting Committee:	Mr Michel Lecoq (France)
	Mr Mohamed Abdallahi Babah Ebbe (Mauritania)
	Mr Said Ghaout (Morocco)
	Mr Clive Elliott and Ms Marion Chiris (Secretariat)
	Ms Annie Monard and Mr Munir Butrous (checking the French and Arabic translations)

AGENDA

9. The Agenda, as adopted, is given as Annex II.

10. It was **recommended** that for the next DLCC meeting, one locust affected country from each Region of the Desert Locust distribution area should be given the opportunity to present a summary of the status and capacity of its National Locust Control Unit.

PRESENTATIONS, DISCUSSIONS AND RECOMMENDATIONS

Desert Locust developments

Desert Locust developments in 2007-2008

11. The FAO Senior Officer (Locust Information), Mr K. Cressman, gave a comprehensive presentation on the Desert Locust situation from January 2007 to the present. Several outbreaks had occurred in the Central Region (Eritrea, Somalia, Sudan and Saudi Arabia), together with one each in the Western Region (Mauritania) and Eastern Region (Iran). For each case, favourable conditions had allowed two generations of breeding to develop. Failure to control them fully in the Central Region had resulted in a small upsurge during summer 2007 that affected Yemen, Oman, Djibouti, Somalia, Ethiopia, and, for the first time for 50 years, Kenya. A combination of control operations and unfavourable climatic/ecological conditions had brought the upsurge to an end.

12. The Senior Officer (Locust Information) reported that 270,000 ha of infestations had been treated in the Central Region, 44,000 ha in the Eastern Region, and 23,000 ha in the Western Region, during 2007-2008. National survey teams monitored ecological conditions and checked for locusts in the vast recession area that stretches from Mauritania to India but sizeable parts could not be accessed because of insecurity, mostly in summer breeding areas. There may be a need to change strategy because of insecure areas and concentrate more on the winter breeding areas around the Red Sea and, when appropriate, in northwest Africa.

13. The delegate of Mauritania underlined that the situation in northern Mauritania cannot be described as insecure because it had not prevented survey operations and timely collection of data. The same remark was made by the Executive Secretary of the FAO Commission for Controlling the Desert Locust in the Western Region (CLCPRO)/Coordinator of the EMPRES Programme in the Western Region (EMPRES/WR), regarding survey operations in 2007 and 2008 in Chad. The FAO Senior Officer (Locust Information) noted that in the northern part of Mauritania, surveys had been carried out with collaboration of the military, which could constitute a good example for other countries. The delegate of Morocco raised the question of lack of control operations in eastern Ethiopia, which had been surveyed despite insecurity. It was agreed that although insecurity was a real issue, it had existed over time and should not impede appropriate action: as mentioned by the delegate of Niger, solutions did exist and had to be worked out. One of them was mentioned by the Secretary of the FAO Commission for Controlling the Desert Locust in Central Region (CRC), specifically aerial treatments which were carried out in Sudan, Eritrea and Somalia by the Desert Locust Control Organization for Eastern Africa (DLCO-EA) in 2007.

14. The delegate of Mali said that it was clear that good progress had been made in surveying for locusts and most countries seemed to be on the right track. He suggested that insecurity must be included in contingency plans. It was noted that timely and appropriate monitoring, resulting in early reaction, was the key for success.

15. The Executive Secretary of the CLCPRO/Coordinator EMPRES/WR stressed the need better to define the terminology used to describe population dynamics (particularly outbreak, upsurge and plague/ invasion) to avoid any confusion. The DLCC **recommended** that the Secretariat should establish a small representative Committee to discuss this matter by email and report its consensus back to the next Session.

16. The working paper is given in full in Annex III.

Will the situation worsen in the coming year?

17. The Desert Locust Information Service (DLIS) reported that it had continued incorporating seasonal rainfall predictions in its forecasts on an experimental basis. The Desert Locust situation was expected to remain calm throughout the spring and summer of 2009. Seasonal rainfall predictions for six-month periods were obtained monthly from the World Climate Service. It was difficult to use these products and they must be used cautiously as they often varied dramatically from month to month. The latest predictions, issued in February 2009, suggested that rainfall in April and May would be higher than normal along both sides of the Red Sea and in northern Oman and southern I.R. Iran. The prediction up to July was for normal levels of summer rainfall across the Sahel. Given that locust populations in all areas were expected to be low at the start of the summer rainy season, it was likely that only small increases in locust numbers would occur.

18. Due to the uncertainty of the seasonal weather predictions and the large parts of the recession area that were affected by insecurity, national surveys should be carried out regularly in all the breeding areas that remained accessible.

Challenges of preventive control

19. The Senior Officer (Locust Information) pointed out that the preventive control strategy required that countries in the recession area maintain small permanent units to detect, monitor, and control gregarizing and gregarious locust populations in order to prevent outbreaks, upsurges and plagues. Successful preventive control relied on:

- The ability to monitor rainfall, ecological conditions and locust populations on a regular basis;
- Near real time dissemination of data, information, warnings and alerts;
- Accurate and timely early warning and prediction over time and space of the scale of locust breeding and migration, and the subsequent threat to other countries;
- The ability rapidly to mount and undertake effective control operations;
- Countries must be able to maintain a cadre of well-trained staff and have sufficient material and financial resources available to support surveys and control operations for outbreaks and the initial stages of an upsurge, and properly developed contingency plans.

20. Recent examples of outbreak preventive control in northern Somalia, Eritrea, Saudi Arabia, I.R. Iran and Mauritania and of upsurge preventive control in Yemen and Kenya were reviewed in order to determine what made some operations successful and others less so. It was noted that much of the success depended on whether the rainfall pattern favoured the development of an upsurge from an inefficiently controlled outbreak. Several lessons could be drawn:

- Initial outbreaks occur in areas of 1,000-6,000 km² that may be difficult to detect and access;
- If outbreaks are not controlled and unusually good rains follow, infestations are likely to grow much larger. The difficulty is to predict if those good rains will follow. A synoptic meteorologist could help such predictions;
- Control is not always possible because of the lack of resources or insecurity. In such cases, precise forecasts assist neighbouring countries in planning for potential invasions;
- Nomads are an important source of information but they are not a substitute for proactive field surveys by experienced teams.
- Preventive control cannot be achieved without strong national support. Adequate resources do not guarantee success if they are not properly coordinated and used in a timely manner;
- Insufficient resources, difficult terrain and insecurity hamper survey and control operations and should be accounted for in contingency planning.

21. In questions from the floor, the delegate from the Netherlands said that this was the first time he had seen a locust forecast made up to six months ahead based on longer term rainfall predictions. He asked if FAO/DLIS was going to analyse its accuracy. The FAO Senior Officer (Locust Information) agreed that seasonal forecasts needed to be validated and suggested that this would be a good research topic for a university student. In reply to a question from the delegate of Niger regarding the lack of surveys in three out of the four front-line countries in the Western Region, for insecurity reasons, he said that it was possible to forecast the evolution of the locust situation in these countries but difficult to confirm the situation without surveys. This constituted a limitation that had to be overcome as best as possible.

22. With regard to preventive control, France reiterated its commitment to this strategy, which had been recommended by FAO for many years and had led to substantial improvements of the locust situation over the past four decades. The delegate underlined that the efficacy of preventive control could only be evaluated over a long period of time and that the current challenge was to maintain the same strategy, despite temporary and local difficulties in some countries. It should be a priority to pursue preventive control even more efficiently. Preventive control also contributed to maintaining national competencies. The delegate from Mauritania said that his country's capacity for preventive control had been non-existent 25 years ago but it was now regarded as satisfactory. This showed that preventive control was possible, that it brought concrete results - as demonstrated by the successful operations undertaken in 2008 in his country - and that it should be implemented.

23. The delegate from the United States Agency for International Development (USAID) said that in the examples given, several of the countries that had failed to implement preventive control had been part of the EMPRES/Central Region (CR) Programme and others had only joined recently. He suggested that this might require a re-evaluation of EMPRES/CR or some other way needed to be found to overcome the problems. The delegate from Morocco also mentioned that the film on locusts in Ethiopia was very surprising as it showed only negative aspects and that this situation should not be generalized.

24. Matters raised also included the definition of preventive control. The delegate of Morocco said that it should involve intervention prior to the occurrence of outbreaks and before crop damage had been caused. The Executive Secretary of the CLCPRO/Coordinator EMPRES/WR considered that preventive control should occur between recession and outbreaks, and that once an outbreak had occurred, it became curative control. The delegate of Kenya suggested that we had to look at the whole cycle and prevent the development from one stage to another. The FAO Senior Officer (Locust Information) said however that there was a limit to early control as locusts needed first to concentrate in order to form a real target for treatments and use a limited quantity of pesticides.

25. Although it was decided that the meeting was not the right forum to come up with a definition of preventive control, it was agreed that the objective of preventive control was to be able to conduct appropriate and timely monitoring and to intervene as early as possible. The DLCC **agreed** to renew its support for the prevention of Desert Locust emergencies, based on targeted interventions carried out as early as possible. Such interventions should be implemented by autonomous National Locust Control Units with strong support from the Regional Commissions, and with sufficient flexibility in their contingency plans and their funding resources to be able to react to any unusual situation.

26. The delegate of the International Red Locust Control Organisation for Central and Southern Africa (IRLCO-CSA) stressed that preventive control was essential and that its implementation for Desert Locust constituted a good example for other species in other regions.

Actions taken

Actions taken in the implementation of the 38th DLCC recommendations

27. The FAO Senior Officer (EMPRES), Mr. C. Pantenius, reviewed the 19 recommendations made by the 38th Session. It was found that the recommendations had been satisfactorily implemented in the case of the Training-of-Trainers (ToT) approach (R1), the testing of

alternatives to chemical pesticides (R7), the institutionalization and expansion of the QUEST approach (R8, R9), replacing the DLCCTG with internet-based exchanges among experts (R18), and calls by the Director-General to countries to settle their DLCC Trust Fund contributions (R19). Others concerning pesticides (R2, R3, R4, and R10) had been implemented by FAO but the extent to which they have been complied with by affected countries, was uncertain.

28. Efforts to negotiate with pesticide companies that they include the removal of empty pesticide containers into purchase contracts (R5) had made no progress. Instead FAO had continued to promote the use of specialist drum rinser/crushers. These had been installed in eight countries and would soon be installed in two others. No progress had been achieved in persuading donors to support the development of alternatives to conventional pesticides (R6), probably because of the expense involved. Instead FAO had promoted the use of existing alternatives, such as Green Muscle™ (GM), Insect Growth Regulators (IGR) and PAN (phenylacetonitrile). Minimal progress had been made in exploring the contractual arrangements with pesticide companies to ensure that locust pesticides were available in an emergency (R11). FAO had held discussions with Croplife International, which represented the industry, and it had been agreed that FAO should take the lead in establishing a committee to investigate the matter. This had not happened partly because of the focus on the huge stocks of pesticide left over from the 2004/2005 campaign and the need to establish triangulation arrangements to use up as much as possible of this excess. Several triangulations had been successfully completed.

29. On the recommendations concerning follow-up to the Independent Evaluation Mission (R12, R13), the Senior Officer (EMPRES) said that the DLCC Working Group had presented its findings to FAO in November 2006. Two further meetings had been held with representatives of the Steering Committee in 2007, the second at a seminar which is further reported on in Agenda Item 6. Little progress was made on establishing a Desert Locust Emergency Fund (R14, R15, R16, and R17). The FAO Secretariat suggested that the Central Emergency Response Fund (CERF) of the United Nations (UN), which was used successfully for the upsurge in the Yemen, would be a better way forward in the future.

30. Several participants raised the issue of increasing the number of countries that were equipped with pesticide drum rinser/crushers. The case of one country that could not be supplied because of a political embargo was also mentioned. The Senior Officer said that in most cases the problem was only to identify the necessary funding. The FAO Environmental/Pesticide Management Officer, AGP, said that efforts to identify more than one supplier had so far failed.

31. The question was raised by several speakers as to whether efforts to create an Emergency Fund specifically for Desert Locust, which had so far not made major progress, should be continued. The consensus was, given the usefulness of such a fund if it existed, that these efforts should continue.

32. The DLCC welcomed the efforts by the CLCPRO and the Ad Hoc Group, which was created to elaborate Terms of Reference of the Emergency International Fund for Desert Locust. It **recommended** to further explore the possibilities of creating the Fund. The DLCC also **recommended** that the affected countries put in place National Emergency Funds for the Desert Locust in order to be able to deal with any critical eventuality in their countries. The Committee expressed its gratitude to the CERF Fund for the assistance so far provided.

33. The delegate from Morocco said that her country supported the search for alternatives to chemical pesticides and had held an international experts meeting on this subject. The Senior Officer said that FAO welcomed such initiatives but noted that the development of alternatives was a very expensive process and finding companies willing to invest in it was difficult given that only a niche market was involved. FAO's approach was to encourage donors to support operational trials, research, training and infrastructure on using and improving the available alternatives so that they would become routinely used for locust operations.

<u>Towards a more effective response to Desert Locust and their impacts on food security, livelihoods, and poverty – Multilateral evaluation of the 2003-2005 Desert Locust Campaign</u>

34. At the 38th Session, following extensive discussion of the report of the Multilateral Evaluation of the 2003-2005 campaign and the classification of its 31 recommendations into A

(simple), A+ (medium) and B (complex), it was decided that the DLCC Working Group should analyse the A+ and B recommendations and report their findings to the Secretariat. The Evaluation Mission Steering Committee was requested to monitor the implementation of all the recommendations.

35. The Deputy Director of the Plant Production and Protection Division (AGP), Mr. P. Kenmore, said that Working Group had presented its findings to the Secretariat in mid-November 2006. FAO Management had accepted with minor clarification/amendment all of the 20 recommendations addressed directly at FAO and had agreed with the remaining 11 directed at affected countries and their regional commissions. The changes being initiated or planned by FAO, had been discussed with the technical representative of the Government of the Steering Committee's Chairman in February 2007 and at a seminar in April 2007 which was attended by representatives of most of the Steering Committee's member countries. The changes were intended to realize specific goals:

- Protecting livelihoods during locust campaigns and ensuring subsequent rehabilitation in the recession area;
- Using the UN Common Appeal Mechanism as part of the locust campaign appeals process;
- Improving operational efficiency both through modifying FAO procedures and outsourcing some activities;
- Building and maintaining Desert Locust early warning and control capacity at national, regional, and international levels.

36. The Deputy Director, AGP, reported that as a step towards integrating livelihood protection/rehabilitation into locust campaigns, FAO had, from January 2007, begun to assemble information on district-level distributions of food-insecure vulnerable communities. Many agencies had been contacted but better harmonization and a common approach, tools and technologies were still required. Data from these sources had been used to assess the possible impact on vulnerable communities affected by Desert Locust outbreaks in the Central Region in 2006/2007 and facilitated swift assistance from CERF for control operations in Yemen. During control operations in the region, staff had been encouraged to report incidents of crop damage to the World Food Programme (WFP), giving the affected local communities higher priority for assistance.

37. The UN Common Appeal System had been followed for the Yemen outbreak and for an outbreak of Migratory Locust in Timor-Leste (Agenda Items 9 and 16).

38. The Deputy Director, AGP, said that the FAO had created a new Crisis Management Centre along the Food Chain (CMC-FC), with a subsection on Plant Pests under which locust management would fall, and this had been approved in 2006 by Council. An evaluation had also been carried out of FAO's managerial, administrative and operational constraints in its emergency operations. This had recommended many areas in which FAO could streamline its operations in respect of flexible funding mechanisms for large multi-country programmes and the establishment of Framework Agreements for procuring repetitive inputs. In this context, rosters had been established of important stakeholders in locust affected countries, national/international experts, technical specifications of materials, list of suppliers and aerial operators. Enhanced inter-agency cooperation had also been fruitful in implementing pesticide triangulation deliveries, mainly with WFP help. The Deputy Director thanked the Governments of Mauritania and Mali for releasing pesticide stocks at short notice to assist respectively Yemen and Tanzania, through triangulation arrangements. The possibility of establishing strategic stocks of locust campaign equipment at WFP hubs had also been investigated but FAO needed donor assistance to carry this forward.

39. The Deputy Director, AGP, noted that building and maintaining Desert Locust survey and control capacity has long been a priority for FAO. The Training-of-Trainers approach has been addressed by the EMPRES programme with the objective of achieving sustainable Desert Locust control strategies and practices, and the minimization of environmental side-effects.

40. The Deputy Director drew the attention of the participants to the appendix to the working paper which gives full details of FAO's responses to the recommendations of the Multilateral Evaluation.

41. Following the presentation, the DLCC expressed its appreciation of the efforts FAO had made to follow up on the recommendations of the Multilateral Evaluation of the 2003-2005 locust campaign. The delegate from France said that it was important to distinguish clearly between various levels of emergency from pre-crisis situations to real humanitarian emergencies, in order to be able to focus better on the first and to lower the frequency of the second, as far as possible. The Secretary of the CRC said that during the recent outbreaks in the Central Region some countries had shown solidarity with their neighbouring countries in assisting with fuel, pesticides, and equipment, and Yemen had also made available some Green Muscle™ for use in Tanzania on Red Locust. The Director, IRLCO-CSA, also expressed his appreciation of the pesticides and biopesticides that his member countries had received through triangulation arrangements, but said that more assistance was needed to prevent current outbreaks.

Emergency preparedness

The role of EMPRES within FAO's new emergency response system

42. The Senior Operations Officer of the Emergency Operations Service (TCEO), Mr. G. Garbinsky, described changes in organizational structure within FAO under which a new Strategic Framework has been established. Under the eleven Strategic Objectives that had been defined, two applied to EMPRES and the emergency functions of FAO, namely:

- Sustainable intensification of crop production (Strategic Objective A);
- Improved preparedness for, and effective response to, food and agriculture threats and emergencies (Strategic Objective I).

Lessons learnt from recent evaluations underlined FAO's need to streamline its rapid response processes, develop adequate corporate tools, adopt a holistic approach, establish advance funding mechanisms, use a multidisciplinary approach and expand its partnership with other agencies and organizations.

Four Organizational Results (OR) were formulated to support Strategic Objective I, as follows: better preparedness of countries and partners to respond to crisis, threats and emergencies; support to countries and partners in responding effectively to crisis and emergencies with food and agriculture interventions (response); improved transition and linkages for countries and partners between emergency, rehabilitation and development (transition to longer-term); and reduced vulnerability to threats for countries at risk through integration of risk prevention and mitigation policies, programmes and intervention.

43. The Senior Operations Officer said that the EMPRES Locust component was expected to play a significant role in the fulfilment of the Strategic Objective I. EMPRES efforts to help locust affected countries to become proficient in core locust management activities would be a key cornerstone of the strategic framework and the achievement of the organizational results.

Experiences with the CERF instrument – the Yemen example

44. The Senior Administrative Officer, TCEO, Mr. D. Macfarlane, explained how the Central Emergency Response Fund originated and how it was now managed. In the case of Yemen, an assessment carried out in May 2007 had shown that the country was suffering from its worst infestation of Desert Locust for 15 years. If unchecked, swarms could have moved into important agricultural areas and impacted national food security and livelihoods. CERF funds had been received less than a week after the signing of an Understanding. Given an acute shortage of pesticides on the world market, a triangulation arrangement involving excess pesticides in Mauritania and air shipment by WFP had allowed operations to start quickly. The Senior Officer also described how CERF had been used to assist rapidly with other agricultural emergencies.

The operations arm of EMPRES: The FAO Emergency Operations and Rehabilitation Division's Food Chain Emergencies Management Unit (TCE-FCEMU)

45. The Liaison and Operations Officer, TCEO, Mr. D. Burgeon, said that for the last two major locust campaigns an ad hoc structure the Emergency Centre for Locust Operations (ECLO) had been established by the Director-General. While the Multilateral Evaluation had considered that ECLO generally succeeded in its task, it had identified several constraints for the 2003-2005 campaign including the dual line of command and the necessity of preparing more than 60 different project documents to meet the needs of the many donors. In an effort to overcome these constraints, the Emergency Operations and Rehabilitation Division (TCE) had established a Food Chain Emergency Management Unit (TCE-FCEMU), which is the operational arm of the new FAO Crisis Management Centre along the Food Chain (CMC-FC). This new Unit was composed of four groups that covered Rapid Response, Programming, Common Services/Monitoring and the Field Programme.

46. Mr. Burgeon said that TCE-FCEMU had already taken a number of important steps including preparing Global Programme Documents for each major food chain emergency. It was envisaged also to prepare one for the Desert Locust which could be regularly updated. For the next locust emergency, such a document would facilitate advocacy to donors, permit a modular approach for their contributions when earmarked and would function as a reference document for un-earmarked funding. TCE-FCEMU also made use of the Special Fund for Emergency and Rehabilitation Activities (SFERA) which had a working capital component and a programme component, allowing donors to contribute to major thematic programmes such as the Desert Locust. The Unit had also launched advanced market researches for the main inputs needed for a Desert Locust campaign.

47. In response to questions from the floor, Mr Burgeon said that TCE-FCEMU was addressing several of the recommendations made by the Multilateral Evaluation of the 2003-2005 locust campaign. He also noted that EMPRES was not integrated into the new framework but supported it. He said that CERF funding was only for UN organizations, unless some special arrangements of affiliation were made.

Collaboration between WFP and FAO in locust emergencies

48. The FAO Senior Logistics Officer, Mr. J. Figueiredo, said that WFP and FAO had entered into a Technical Agreement for Logistics Cooperation in 2003. Since then, especially during the 2003-2005 locust campaign, WFP had arranged the air transport of pesticides in support of FAO's locust emergency work. There was scope to expand this cooperation also to cover items under the Humanitarian Response Depots (HRD) which included storage of equipment (including pesticides if required), receipt and inspection of stocks, ordinary maintenance, real time stock visibility, handling, and inbound customs clearance. WFP's air logistical support could also include the secondment of aviation/logistics specialists, fuel contracting, and the review of aircraft operators for locust control.

49. With regard to Vulnerability Analysis and Mapping (VAM), Mr. Figueiredo said that WFP collected information on the food security situation, the dependence of households on agriculture and household resilience to shocks. This could be shared with FAO just as FAO shared with WFP its information on locust populations and the potential threat to crops. Some joint steps had been made to use the WFP vulnerability maps to assess the possible impact of locust threats on the food security of rural communities.

50. The Director of the DLCO-EA and other participants expressed their thanks to WFP for the assistance that had been given in transporting urgently needed pesticides to operational areas. The delegate from Mauritania asked if WFP could provide helicopters for locust survey purposes and Mr Figueiredo replied affirmatively. In the Yemen case, WFP had also assisted with transport as this was not available at the time of the locust outbreak. Later on, vehicles were donated by Saudi Arabia.

How ready are we for the next emergency?

51. The Senior Officer (EMPRES), Mr. C. Pantenius, said that an historical review of preparedness for Desert Locust emergencies and the Multilateral Evaluation of the upsurge in 2003-2005 had shown that many of the problems that had been experienced during previous plagues,

were experienced again and were now being addressed. The problems included the significant time lag between appeals to the international community for funds and the resources being made available. The lack of contingency plans on which to draw, a reduction in knowledge/capacity during recessions, and poor institutional memory, were other examples. The Senior Officer suggested that the main conclusions after 2005 were that there was a need to streamline FAO's rapid response processes, to develop adequate corporate tools, have access to advance funding quickly and build up useful partnerships.

52. The EMPRES Desert Locust Programme in developing more proactive preventive control strategies had the capacity to change the way that locusts were managed. Improved early warning systems, support to autonomous national locust control units in the front-line countries, continuous investment in sustainable national staff training and contingency planning were all having an impact on improving preparedness. The introduction of new technologies and the equipping and training of staff to use them had also increased efficiency. Most of the governments of the Sahelian countries had allocated national emergency funding and substantial annual budgets to their autonomous locust units. Contingency planning as advocated by EMPRES was working towards ensuring that rapid mobilization was a reality. Partnerships with WFP for air transport and vulnerability assessment and mapping (VAM), with CERF for rapid funding and with others were also being developed and increased. The Senior Officer, while accepting that progress was being made, pointed out that there were several major hurdles to be overcome. These included:

- the lack of funding to maintain preparedness because most donors were more willing to support emergencies than emergency preventions;
- although the use of CERF had been of great importance in overcoming a small upsurge such as the recent one in Yemen, it was normally limited to three months and would therefore not apply to a major upsurge or plague;
- the recent study of FAO's emergency response capacity indicated that the time elapsed between procurement planning and receipt by beneficiaries was 139-149 days. Being time enough for two generations of locusts, this was too slow for locust requirements. The possibility of using WFP's depots to store certain locust survey and control equipment needed to be explored.
- the recommendation to delegate responsibility to the lowest possible level needs further examination given that sub-regional offices and FAO Representations generally do not have the capacity to support locust emergencies.

53. The DLCC expressed its satisfaction with the progress made in managing emergencies. It stressed that it was also important to continue reinforcing preventive control, mainly at the national level, by placing the emphasis in contingency planning on how to deal with pre-crisis situations.

54. The delegate from USAID said that the DLCC needed to make greater efforts to encourage representatives of donors to participate in DLCC Sessions during recession periods as well as during emergencies. Donor support during recession periods would increase the understanding of the importance of preventive monitoring and control.

55. The delegate from Australia said that it was most important to concentrate on establishing reserve stocks of material needed for preventive surveys and control as access to physical resources was often an issue. Even if funds were immediately available, there would still be a delay in making and delivering the items needed. He also noted that in Australia, the emphasis of publicity was always to mention the amount of crop that had been saved by the control operations, and not the cost of the operations themselves. The delegate of France again stressed to carry out high quality surveys and to intervene as soon as possible. The Senior Officer reassured that improvement of monitoring and early intervention was the goal.

56. The DLCC **recommended** that FAO should look into the establishment of contingency stocks of field equipment to be stored at WFP's Humanitarian Response Depots, solicit donor support for this purpose, and report on progress to the next DLCC Session. It was noted that it was important that such stocks did not undermine efforts to develop national preparedness in the front line countries.

Assessment of national early warning systems and recommendations for improvement

57. The Senior Officer (Locust Information), Mr. K. Cressman, said that the early warning of locust outbreaks, upsurges and plagues was the core element in the preventive control strategy adopted by the DLCC and FAO to manage Desert Locust populations. Early warning relied on the timely collection and transmission of high quality field data on a regular basis to national locust units and to the Desert Locust Information Service (DLIS) at FAO in Rome. The DLIS, the regional locust commissions, EMPRES and the DLCC (through funding training of information officers) had invested substantial time and resources to strengthen national capacities in data collection, analysis and reporting and to introduce new technologies that made this task easier. The Senior Officer reported on a review he had carried out to assess the progress that had been achieved since the last DLCC session and to suggest further improvements that could be made.

58. On data collection, the Senior Officer said that 234 units of eLocust2 had been distributed to affected countries. From October 2008 to February 2009, data from 4,100 survey stops in 16 countries had been sent by eLocust2. On data analysis, RAMSES had been installed in 18 countries, but it relied on unsupported and outdated software. On reporting, DLIS had received 1,449 reports and messages containing RAMSES data from 21 locust affected countries. New versions of eLocust2 and RAMSES were expected to be ready in 2009. FAO was also collaborating with two universities in Belgium to improve rainfall estimates and the detection of green vegetation using the MODIS satellite. The DLCC **recommended** that its Trust Fund should assist in developing suitable open-source software for supporting RAMSES.

59. The Senior Officer presented a Table giving an overview of reporting in 21 locust affected countries, indicating the progress that had or had not been achieved in 2007-2008. He made a number of suggestions for further improvements and requested the DLCC's consideration of them.

60. The delegate from Morocco questioned the appropriateness of the selected criteria for preparing the above-mentioned table. He said that the practice in his country was to carry out surveys if there had been rain or if activity in neighbouring countries suggested that the Desert Locust was active. Since surveys were expensive, they were not carried out if there were no specific indicators. Given this approach, he was not aware of any time lag or drop in frequency in reporting. The Senior Officer suggested that the delegate should visit DLIS to examine the records and to see if a mistake had been made or if some improvement was possible. The delegate of Mauritania supported the idea to update and further develop RAMSES. The delegate from the Gambia said that his teams had not been supplied with eLocust2. In reply, the Senior Officer assured him that in 2008, the chances of locusts reaching the Gambia had been zero and if in future there was such a risk, DLIS would issue a warning well in advance and would supply eLocust2 when needed.

61. The Locust Officer, EMPRES/WR, Mr. M. L. Ould Ahmedou said that the presentation had omitted to mention the extensive inputs made by the CLCPRO in supporting the use of the new technologies for improved reporting, including through training. He was sure that the other regions and all the Commissions had contributed to this effort. Mr. Cressman said that this was correct and that this support was very much appreciated. He also stressed that his evaluation of quality, timeliness and frequency was not intended to compare countries against each other but was intended to reflect the improvements or any drop in these items within each country. In general, improvement was occurring in almost every country and in those where there had been any drop, most likely it would not be difficult to make the necessary correction. DLIS would welcome any suggestions for other ways in which performance could be evaluated.

Environmental management

Establishment of an improved pesticide management system and triangulation of pesticides in emergencies

62. The FAO Environmental/Pesticide Management Officer, AGP, Mr. M. Ammati, described the efforts that had been made for better pesticide management since the 2003-2005 upsurge. The first action had been to develop and introduce a Pesticide Stock Management System (PSMS). This system allowed each country to keep track of pesticide stocks, their locations, the

recommended shelf-life (following quality control) and registration status. The system also facilitated rapid access to certified chemical and biopesticide reserves in emergencies. It had been designed as a pesticide management tool for national and regional coordination with the objective of preventing new obsolete stocks from developing. The system was administered by FAO and was now fully operational in four Sahelian countries. The DLCC expressed its appreciation for the support to developing the PSMS that had been given by USAID and the Netherlands.

63. A second action had been to develop an approach for preventing further environmental damage through various remediation activities. The approach had been successfully implemented in Mali, was at an advanced stage in Mauritania and was ready to be extended to other countries. A third action had been triangulation of pesticides to meet emergencies. In this manner, 70,000 litres had been transferred from Mauritania to Yemen for Desert Locust control and 21,000 litres from Mali to East Africa for Red Locust control. Both actions reduced the likelihood that remaining pesticide stocks in the donor countries would become obsolete.

64. The Environmental/Pesticide Management Officer said that FAO proposed to extend the work achieved so far by developing a global programme for effective and safe management of pesticides for Desert Locust control and for other similar transboundary pests. It was intended to proceed on three fronts:

- Development of inventories of stocks, empty containers, storage facilities and contaminated sites. Every second year, new obsolete pesticides would be repackaged and disposed of in accordance with national/international regulations and best practices.
- Pesticide management capacity building, including quality control of formulations of both pesticides and biopesticides, and the planned development of a Reference Laboratory in each of the three Regions.
- Development of a harmonized legal framework and policies which would include a review of the list of pesticides recommended by the Pesticide Referee Group (PRG), have the recommended pesticides adopted by governments, and update the list of registered pesticides and biopesticides in each country. Efforts would be made to harmonize the list of registered pesticides/biopesticides and promote regional and interregional cooperation among affected countries.

65. The Environmental/Pesticide Management Officer called on DLCC member countries to advise FAO if they were willing to share their certified pesticides with other locust affected countries. They should also indicate if they are willing to develop reference laboratories for quality control and bring their pesticide storage facilities up to international standards. The means for achieving these steps should be discussed.

66. The Secretary of the CRC expressed his satisfaction that the PSMS, originally prepared for better managing the remaining stocks of the 2003-2005 emergency in the Western Region, was now extended to the Central Region. Following his question regarding the certification of “second hand” pesticides in the triangulation process, the Environmental/Pesticide Management Officer confirmed that all guarantees were provided prior to any donation from one country to another. He noted that a solution to overcoming delays would be an advance authorization given by donor and recipient countries. An agreement could be concluded amongst DLCC member countries in this regard. In reply to the Director, DLCO-EA, the Officer said that, so far, no laboratory in the concerned regions had the capacity to provide appropriate certification in the framework of triangulation.

67. The delegate of Gambia worried that existing stocks resulting from the 2003-2005 emergency could be obsolete as no quality control had been carried out so far in his country. According to the Environmental/Pesticide Management Officer, this was unlikely. However, if it had, this would be addressed by the African Stockpile Programme, which included Gambia.

Use of a biopesticide: lessons learned from Timor-Leste

68. The Locust Officer, AGP, Ms. A. Monard, reported on work that had been done in Timor-Leste in Southeast Asia, in which a Migratory Locust infestation had been controlled with the

biopesticide Green Guard™ (GG). Green Guard™ is the trade name of a formulation of *Metarhizium anisopliae* var. *acridum* which has been isolated and developed in Australia. Surveys revealed that an area of about 20,000 ha was infested with gregarious nymphs and that there was a serious threat to the rice crop. The target area was considered unsuitable for chemical spraying because of high density human settlement and many water courses. It was decided to treat the infestation with Green Guard™, targeting flying swarms using a helicopter. Following a pre-spraying public awareness campaign, 56 targets were sprayed comprising a total area of 2,318 ha over about one month. The campaign was considered very successful with large numbers of infected cadavers found and only about 100 ha of hoppers requiring subsequent control. The farming communities were very pleased with the results of the campaign.

69. The delegate of IRLCO-CSA welcomed the presentation and underlined that biopesticides were particularly important in ecologically sensitive areas, such as in Red Locust outbreak areas.

Introduction and use of biopesticides in locust control and challenges – When is Green Muscle™ an operational option?

70. The Environment/Quality Control Officer, AGP, Mr. J. Everts, described the biopesticide known by the trade name of Green Muscle™, which is based on the entomopathogenic fungus *Metarhizium anisopliae* var. *acridum*. He also discussed its efficacy, its formulations and the recommended application doses. He said that a multi-donor-sponsored workshop had been held in Senegal in February 2007 attended by 66 participants, followed by a second workshop in Rome in February 2009.

71. Mr. Everts said that recent developments included the shipment of Green Muscle™ to Yemen for use on Desert Locust infestations in areas that were also used for bee-keeping. Some of the Yemen stock had also been shared with Tanzania for Red Locust control. Trials were ongoing in Mauritania using the dry powder base which is easier to store than the liquid formulation. First results were promising. Operational treatments had also been conducted in Mauritania on Desert Locust and in Senegal on *Oedaleus senegalensis*, the latter with a reduced dosage, and both gave good efficacy. Research had been carried out on using Green Muscle™ mixed with the pheromone PAN (phenylacetonitrile) on reared locusts and on wild populations. Results suggested that the amount of Green Muscle™ could be reduced by 50-75% while achieving the same efficacy. FAO had also collaborated with universities in the U.K. and Germany to compare the costs of Green Muscle™ to conventional chemical pesticides when taking into account the cost of "externalities" such as the clean-up of pesticides.

72. Mr. Everts suggested that an awareness raising programme was the next step needed to increase the use of Green Muscle™ and that storage problems also had to be overcome.

73. The delegate from Australia said that although only 15% of all locust control in his country was done with Metarhizium, the aim was to increase the level to 25%. Some regions carried out 100%, for example local authorities treating roadsides. The temperature range for Green Guard™ was similar to Green Muscle™ but recent work suggested it could also be used successfully in the 8-22ºC range. GG had been cleared by environmental authorities for use in all sensitive areas including waterways and it had been accredited for use in organic production without any restriction. The delegate of Kenya said that the problem for GM was its registration, but Mr. Everts pointed out that several countries in his region had registered GM and FAO was ready to facilitate the process. The delegate of Niger said that work on the toxicity of the GM/PAN mixture to termites should be carried out as soon as possible, so that understanding of any possible negative effects was complete.

74. The delegate from the Netherlands remarked that a large amount of money had been spent on buying chemical pesticides, which were harmful to the ecosystem as revealed by numerous studies. FAO should therefore make greater efforts to use the alternatives to chemical pesticides particularly after the Australian and Timor-Leste experience. It was noted that greater attention needed to be given to the cost of the "externalities" involved in using conventional pesticides.

75. Following the recommendation of the workshop on biopesticides, which was held in Rome in February 2009, the DLCC **recommended** that Green Muscle™ should be used operationally

for preventive control as much as the temperature range allowed but always by professional teams that had been properly trained.

Environmental impact monitoring and quality control. The QUEST approach: perspectives and challenges

76. The Environment/Quality Control Officer, AGP, Mr. J. Everts, gave an account of the current status of the Quality, Environmental Protection, and Safety of Treatments (QUEST). The implementation of QUEST had started with a training-of-trainers workshop in August 2004 and the training process had continued until 2008. QUEST teams had, by then, been established in eleven countries in western Africa. The QUEST programme had been scrutinised in the course of several evaluations and it had been concluded that the teams performed an important function but there remained questions on their activities during periods when no Desert Locust control took place, and on their sustainability.

77. The Environment Officer said that QUEST teams were expected to cover five principal activities: that Good Practices were followed in control operations, that the health of personnel handling pesticides be monitored, to check for serious environmental side-effects, to collect samples if contamination was suspected, and to verify that rural people had been properly informed of the dangers of pesticides being used in their vicinity.

78. There appeared to be a link between the existence of autonomous locust control units and functioning QUEST teams, as those in Mauritania and Mali were performing well, but in other countries in the region more work had to be done to consolidate the teams. The sustainability of the teams appeared to depend on their being used for other pest control operations such as bird or grasshopper control in the periods when the Desert Locust was not active.

Future orientation and planning

EMPRES Western Region Programme, Progress and Directions

79. The Executive Secretary of the CLCPRO/Coordinator EMPRES /WR, Mr. T. Ben Halima, described the origins of the Programme EMPRES/WR which became operational in early 2006 and covered nine countries in western Africa. The programme's main donors were the African Development Bank (ADB), France, USAID, the International Fund for Agricultural Development (IFAD), FAO and the CLCPRO. The World Bank also contributed indirectly to the programme in its support of five of the nine member countries.

80. Mr. Ben Halima said that under the six expected outputs of the programme, notable achievements in the first three years included:

- The establishment of autonomous National Locust Control Units (NLCUs) in Chad, Mali, Mauritania and Niger. The procurement of equipment and the recruitment of personnel for rapid control interventions had been 70% completed.
- The creation of locust information cells within each NLCU staffed by at least one information officer using RAMSES and eLocust2. Further training was needed to ensure that maximum use was made of the available technologies.
- Coordination of EMPRES/WR was provided by the CLCPRO Secretariat. Emphasis had been given to preparing a procedural manual for monitoring and evaluation, and to developing risk management plan matrices. The intention was to create contingency funds for rapid responses to locust crises.
- A regional training plan drawn up in 2007 was being implemented through many different types of training. EMPRES/WR also assisted in developing a university course in acridology in Morocco.
- A review of locust research was ongoing in the region and a regional workshop to determine future directions was planned for 2009.

81. In the immediate future, EMPRES/WR intended to consolidate improvements in preventive control capacity by continuing the strengthening of the NLCUs, evaluating the impact of training in order to identify any gaps, activating the risk management plans, and developing a framework for the governance and financing of sustainable preventive locust control.

82. The delegate of France said that it was evident that EMPRES/WR had made good progress and that the increased commitment from the front-line countries and the national financing of survey/control teams were important steps forward to insure the sustainability of Desert Locust early warning and early reaction mechanisms. The delegate of Morocco said that the efficiency with which the recent outbreak in Mauritania had been controlled was thanks to the high performance of the teams involved and support from EMPRES. Mr Ben Halima welcomed the encouraging remarks from the DLCC but noted that most of the progress was due to the efforts made by the participating countries themselves.

83. The DLCC appreciated the progress made by EMPRES/WR and **recommended** that all the outbreak-area (front-line) countries in the whole Desert Locust distribution area should have autonomous National Locust Control Units.

Presentation of preliminary results of the EMPRES/WR Evaluation mission and recommendations

84. The Team Leader of the EMPRES/WR Evaluation Mission, Mr. O. Cossée, presented a summary of the mission's findings. The mission found that EMPRES/WR was generally well designed and its objectives were realistic. It noted that the emphasis on strengthening autonomous NCLUs was correct and where it had succeeded in this objective (Mali, Mauritania), EMPRES/WR outputs were better used and maintained. The front-line countries had made great progress in organizing and conducting preventive control but the existence of some inaccessible or insecure areas undermined preventive control. EMPRES/WR was attempting to overcome this constraint by using satellite data, local informant networks and joint surveys in adjacent areas and this was thought by the mission to be the best solution. The mission said that QUEST teams were much appreciated but more needed to be done to make large-scale applications of available biopesticides.

85. On the funding position, the Team Leader said that, given that only 43% of the budget of the ADB project had been spent after nearly three years, an extension of the project duration until 2011 was warranted. The mission concluded that a second phase of EMPRES/WR, which is due to end in 2009/2010, was essential to consolidate the improvements that had been achieved.

86. In conclusion, the Team Leader said that the mission had drawn up a list of 22 recommendations. Apart from those already mentioned the mission recommended *inter alia* that the programme of work of EMPRES/WR should be simplified and made more strategic, adopting clearer priorities and integrating certain elements that are currently independent. The second phase should provide less material support and more long-term technical support. Regional capacities should be developed under the aegis of CLCPRO.

87. Several countries expressed their appreciation of the work and recommendations of the EMPRES/WR Evaluation Mission. The DLCC **recommended** that there should be a Phase II of the EMPRES/WR in order to consolidate the achievements made so far.

Commission for Controlling the Desert Locust in the Western Region (CLCPRO)

88. The Executive Secretary of the CLCPRO/Coordinator EMPRES/WR, Mr. T. Ben Halima, reported on the principal activities of the Commission since the last DLCC. He said that the Commission's Secretariat which was also responsible for the coordination of EMPRES/WR, had been strengthened in human resources by a consultant provided by France and by two international officers recruited under the ADB project. At the routine meetings of the Commission, decisions had been taken to overcome the problem of surveying insecure areas. This had lead to reinforcement of survey teams in Algeria, Libya and Mauritania, the use of satellite data and the greater encouragement of nomads to report any locust activity. The use of nomads to report the presence of locusts was done, mainly in Mali and Niger, via a network established between the National Locust Control Units and the decentralized authorities.

89. Following the recommendation of the 4th Session of CLCPRO that a review be conducted of its roles and responsibilities, the Chairman and Executive Secretary met with senior officers from FAO's Agriculture Department and Legal Office. While there was general agreement that there was a need to reinforce CLCPRO's institutional profile, such a change raise juridical issues and would require amendment of the FAO Constitution, which would be a lengthy process.

90. Mr. Ben Halima also reported that the 4th Session had agreed that a ministerial level meeting should be held to decide on and establish sustainable funding mechanisms for preventive control. Mali had confirmed that the meeting would be held there on 27 March 2009.

91. Other activities reported included the effective preventive control action mounted by Mauritania with CLCPRO help and the active cooperation that CLCPRO had enjoyed with the various donor bodies supporting the development of preventive control and with some research organizations. CLCPRO had also successfully exchanged expertise with the CRC.

92. Joint activities related to training, strengthening of information network, and other activities, were conducted within EMPRES/WR and CLCPRO.

Commission for Controlling the Desert Locust in the Central Region (CRC)

93. The Secretary of the CRC, Mr. M. Butrous, reported that one of the Commission Secretariat's major activities since the last DLCC had been to consolidate the take over of the EMPRES/CR Programme. Another had been the official admission of Eritrea to the Commission, becoming the 16th member state. The CRC had also played an important role in addressing several Desert Locust outbreaks and a small upsurge in the region, during which 270,000 ha had been treated.

94. The Commission had again placed an important emphasis on training, with one regional and three sub-regional courses being run. It had also promoted national training courses and many of these had been held using national resources. The Commission had also supported for seven years a diploma course in Desert Locust management at the University of Khartoum, during which time 43 students had successfully completed the course. Without any new donor support following the end of external EMPRES funding, the Commission had decided that it could not afford to cover the diploma's costs on its own and the diploma had been discontinued. Several research studies had been supported by the Commission mainly on aspects of biopesticide or IGR use. Joint border surveys had allowed locust officers to exchange information among themselves. Such surveys now took place annually between Egypt and Sudan, and between Saudi Arabia and Yemen.

95. Mr. Butrous said that another activity of the Commission had concerned locust publications. These had included the translation every month of the FAO Desert Locust Bulletin into Arabic. The Commission had also reproduced the Master Trainer's Manual and kit for member countries in the Commission for Controlling the Desert Locust in Southwest Asia (SWAC). The Desert Locust Glossary in English and Arabic had been finalised and forwarded to CLCPRO for completion of the French component. The CRC maintained its own website which complements the FAO Locust Watch website. Other important publications produced had been the Standard Operations Procedures cards for use by survey and control teams.

Commission for Controlling the Desert Locust in South-West Asia (SWAC)

96. The Secretariat of SWAC is operated by the Locust Group at FAO Rome and the Senior Officer (Locust Information) is the Secretary. For the first time since 1968, the Commission session (26th) was held in Kabul, Afghanistan. Activities that had taken place since the last DLCC included the annual joint survey between I.R.Iran and Pakistan, which was held in April. Joint border meetings were also held between locust officers of India and Pakistan once a month during the June to November summer breeding season. The Commission paid for the use of eLocust2 and supported the introduction of other new technologies. It had also covered the cost of translations of key locust publications such as the Master Training Manual into Farsi, Hindi, Pashto and Urdu.

97. The Secretary SWAC reported that another notable milestone was that Afghanistan had paid off all its arrears and I.R.Iran was making progress towards achieving the same. The 26th Session

made a total of 21 recommendations and these would be followed up by the Secretariat during 2009. There would be several important training workshops during the year.

General Discussion

98. Mr R. Nugent, the Director of the locust film shown at the beginning of the session, said that he wished to clarify that his film was his attempt to show how local people living in a remote area had reacted to a Desert Locust swarm that they had never experienced before. It was his own film and not something done on behalf of FAO. He noted that despite the difficulties experienced, successful control of the swarm had been achieved by the DLCO-EA aircraft. Several delegates said that they were shocked by the content of the film and the apparent lack of preparedness in Ethiopia. The delegate of Eritrea said that the film could be useful for training purposes to show the problems that arise through lack of preparedness. It was noted that in 2007 Ethiopia had provided pesticides for use in Somalia and that the military also provided logistical support to DLCO-EA by airlifting pesticides to insecure areas bordering Somalia.

99. Several delegates commended and praised the Regional Locust Commissions for their work. They noted their importance in coordinating actions against locust outbreaks and upsurges, in training/capacity building and the key and indispensable role they played within the regional early warning system. The delegate of USAID congratulated both the Regional Commissions and the DLCC Secretariat for their work, the good collaboration with stakeholders such as CMC-FC and WFP, and the way in which CERF funds had been accessed. He also welcomed the new PSMS initiative on pesticides. He was pleased that the USAID funding had made a difference to these varied actions.

100. The delegates of Tanzania and the Gambia suggested that the mandate of the DLCC should be extended to include locusts other than the Desert Locust. It was noted that such proposals had been made at previous DLCC sessions and the response had always been that the Desert Locust was a major problem involving a very large number of countries and that it required specific consideration. Any extension of coverage to other species would undermine efforts to contain the target species, and had therefore been rejected.

101. The Secretary of the CRC said that when the outbreak had occurred in Yemen in 2007, it had been impossible to locate Desert Locust targets because of inaccessible terrain and unwillingness of the local authorities to allow aerial control because of the important honey industry. This was why some swarms had developed and had flown out of Yemen, unfortunately into another area with difficult access, namely northern Somalia. From there, new swarms had moved into Ethiopia. The Secretary noted that Ethiopia was not a front line country and recent changes had meant that trained staff had departed leaving only one qualified person to deal with the problem. Possible solutions included large scale use of *Metarhizium* in Yemen and Somalia. The Secretary also mentioned that despite long and sustained encouragement from EMPRES, there were still only a few countries in the Central Region that had autonomous National Locust Control Units. The delegate from France said it was clear that the success of EMPRES depended on high level political ownership in the participating countries. The Ministerial meeting for the Western Region scheduled for March 2009 should allow further progress within that Region.

102. In connection with pesticide management, and in order to prevent new obsolete stocks, ensure early responses to future locust outbreaks, and to protect human health and the environment, the DLCC **recommended:**

- That the Pesticide Stock Management System (PSMS) recently developed by FAO should be installed and operational in all Western Region countries covered by CLCPRO and extended to the countries of the Central and South-West Asia Regions;
- That FAO invites countries to provide a list of the pesticides registered for locust control.

International Trust Fund 9161: Contributions/Expenditures 2006-2008 and Workplan 2009-2011

103. The report on the Trust Fund was presented by the Senior Officer (Locust Information). He said that the Trust Fund supported a number of activities that were of crucial importance to improved Desert Locust management and benefited locust affected countries. They included training at the post-graduate level, at the diploma level and of Locust Information Officers. It had also been used to contract Wageningen University to update a pesticide trials database and to cover the costs of a General Service staff at the DLIS who provided documentary information to countries and supported EMPRES activities.

104. The Senior Officer gave details of the funds received in 2006-2008 and the total expenditure. He provided a list of all the countries participating in the Trust Fund and how much they had paid or owed. He reminded participants that payments could be made at any time of year and could be received in US dollars, Euro or local currency. Unfortunately substantial arrears still remained owed by a few countries.

105. A detailed description of expenditures was given and tabulated in the working paper. It was hoped that these were self-explanatory.

106. The Senior Officer suggested that, given the high cost of holding the DLCC, the next session (40^{th}) might be postponed to early 2012. About one year before the next session, an interactive Internet-based forum could be organized to solicit and exchange viewpoints regarding points for discussion at the forthcoming session.

107. If the provisional date for the next session was agreed, a proposed budget for the period 2009-2011 was presented. This would include funds for fellowships, the reproduction/distribution of technical papers, the translation/printing costs of the 39^{th} Session, training, a technical experts meeting, a Pesticide Referee Group meeting, technical consultancies and support to EMPRES/DLIS.

108. Following discussions, it was **recommended** that all DLCC Members pay their annual contribution on a regular basis and that an official letter be sent by the Director-General inviting countries to settle their arrears, if any. Delegates were also invited to sensitize their national authorities on the importance of settling arrears as soon as possible.

109. It was also **recommended** that Burkina Faso and Eritrea, both recent new members of the DLCC, pay an annual contribution of USD 3,000 each. For Kuwait, which has been invited to the DLCC for a number of years, a letter should be sent requesting a financial contribution suggested to be USD 20,000.

110. The DLCC once more **invited** Nigeria, which had withdrawn from the DLCC in 1995, to settle its arrears to the Trust Fund.

111. It was **recommended** that the Secretariat carry out an assessment of the annual contribution paid by each country and propose to the DLCC any necessary modification in this respect.

112. Discussions also covered the very high cost of DLCC meetings. Solutions envisaged to reduce them included decentralization of the meeting to Desert Locust affected countries, recruitment of local interpreters and translators and distribution of the electronic version of meeting documents only. It was felt that it was important that the DLCC continued to meet every two years to allow regular exchanges of information between all stakeholders and keep interest alive. It was also proposed that the DLCC Trust Fund should cover the costs of the participation of the front-line countries (from the three regions of the Desert Locust distribution area), if this was financially feasible. In view of the above, it was **recommended** that the Secretariat explore all possible ways to reduce the costs of DLCC meetings and to proceed with the necessary arrangements in time for the next meeting.

113. Last, with regard to future activities, the Executive Secretary of the CLCPRO/Coordinator EMPRES/WR wished that the Commissions be associated in the updating of the Desert Locust Guidelines. The DLCC **recommended** that the budget proposed for 2009-2011 be adopted. It should include the publishing of the PhD Thesis of Mr M.A. Babah Ebbe in the FAO Technical Series.

ANY OTHER BUSINESS

114. None.

ADOPTION OF THE REPORT

115. This report with agreed amendments was adopted unanimously.

DATE OF THE NEXT DLCC SESSION

116. The Committee agreed to hold the next Session to the DLCC in 2011 on a date to be decided by the Director-General.

CLOSURE OF THE SESSION

117. The Senior Officer (EMPRES), Mr. C. Pantenius, noted in his closing remarks that all the agenda items had been addressed comprehensively and he felt that all the participants could be satisfied with the results. He expressed his thanks to all the people who had been working, in some cases for months, in preparing for the meeting in order to make it a success. He also thanked the many staff which had supported the meeting including the interpreters, the translators and the messengers. But most of all he wished to thank the delegates of the locust affected countries for their contributions and support. He hoped they would take back a message to their Governments that DLCC was an important forum that should be sustained and that contributions to its Trust Fund should be paid on a regular basis. The Senior Officer also thanked the donors who had participated and remarked that their support during a recession period was particularly appreciated. He wished all participants a safe journey home.

118. The delegate of Mauritania, Mr. M. A. Babah Ebbe, speaking on behalf of participating countries expressed his appreciation to FAO for having organized the DLCC such that important and useful discussions could be held.

119. The Chairman, Mr. F. Diakité, thanked all participants for good contributions and added his wishes for a safe journey home. He formally declared the Session closed.

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Annex II: Approved Agenda

Opening

1. Presentation of Locust Film: Examples from the Desert Locust operations in Ethiopia, January 2008
2. Opening address by the Assistant Director-General, AG
3. Election of Chairperson, Vice-Chairperson and Drafting Committee
4. Adoption of the Agenda

Session 1: Desert Locust developments

5. Desert Locust developments in 2007-2008
6. Will the situation worsen in the coming year?
7. Challenges of preventive control

Session 2: Actions taken

8. Actions taken in the implementation of the 38th DLCC recommendations
9. Towards a more effective response to Desert Locust and their impacts on food security, livelihoods and poverty - Multilateral Evaluation of the 2003-2005 Desert Locust Campaign

Session 3: Emergency preparedness

10. The role of EMPRES within FAO's new emergency response system
11. Experiences with the CERF instrument - the Yemen example
12. The operations arm of EMPRES: The FAO Emergency Operations and Rehabilitation Division's Food Chain Emergencies Management Unit (TCE-FCEMU)
13. Collaboration between WFP and FAO in locust emergencies
14. How ready are we for the next emergency?
15. Assessment of national early warning systems and recommendations for improvement

Session 4: Environmental management

16. Establishment of an improved pesticide management system and triangulation of pesticides in emergencies
17. Introduction and use of biopesticides in locust control and challenges - When is Green Muscle™ an operational option?
18. Use of biopesticides, lessons learned from Timor-Leste
19. Environmental impact monitoring and quality control. The QUEST approach: perspectives and challenges

Session 5: Future orientation and planning

20. EMPRES Western Region Programme, Progress and Directions
21. Presentation of preliminary results of the EMPRES/WR Evaluation mission and recommendations
22. Activities of the Regional Locust Commissions:
    a. Commission for Controlling the Desert Locust in the Western Region (CLCPRO)
    b. Commission for Controlling the Desert Locust in the Central Region (CRC)
    c. Commission for Controlling the Desert Locust in South-West Asia (SWAC)
23. International Trust Fund 9161: Contributions/Expenditures 2006-2008 and Workplan 2009-2010
24. Any other business

Closing

25. Adoption of draft report
26. Next session

Annex III: Desert Locust Developments in 2007-2008

Overview[1]

The Desert Locust situation during the past two years was characterized by several outbreaks in the Central Region (Eritrea, Somalia, Sudan and Saudi Arabia), and an outbreak in Mauritania in the Western Region and one in Iran in the Eastern Region. The outbreaks developed as a result of good rainfall that led to favourable conditions for at least two generations of breeding. As some of the outbreaks in the Central Region could not be fully controlled, a small upsurge developed in the southern part of the Central Region during the summer of 2007 that affected Yemen, Oman, Djibouti, Somalia, Ethiopia and, for the first time in nearly 50 years, Kenya. A combination of control operations and unfavourable climatic and ecological conditions brought the upsurge under control.

Consequently, most of the locust activity in 2007-08 took place in the Central Region where nearly 270,000 ha were treated, followed by the Eastern Region (44,000 ha) and the Western Region (23,000 ha). In all, more than 330,000 ha were treated. Throughout the period, national survey teams monitored ecological conditions and checked for the presence of locusts in the vast recession area between Mauritania and India. However, sizeable portions of this area could not be accessed due to insecurity, mainly in northeast Mali, northwest Niger, eastern Chad, western Sudan (Darfur), eastern Ethiopia and southern Somalia.

The remainder of this paper summarizes the situation in each region during the main breeding periods.

Western Region

Winter 2006 / Spring 2007 breeding. The situation remained calm during the period. Small-scale breeding occurred in northwest Mauritania and central Algeria, and a few adults were present in northwest Libya and in the Draa Valley in Morocco. Limited control operations (460 ha) were carried out against small hopper bands and adult groups in irrigated crops in central Algeria. In May, isolated adults were seen in northern Mali and southeast Niger.
Summer 2007 breeding. Seasonal rains commenced in the Sahel in early July and continued to about mid-September. Isolated adults first appeared in southern Mauritania during July. In September and October, small-scale breeding occurred in southern Mauritania and northeast Chad but locust numbers remained low. By the end of October, solitarious adults had moved from the summer breeding areas to northwest Mauritania and bred. Although surveys could not be carried out in Mali and Niger, there were reports of solitarious adults in Tamesna and local breeding near Tanout, Niger in September.

Winter 2007 / Spring 2008 breeding. Locust numbers increased slightly in northwest Mauritania from small-scale breeding that took place from November to May, and limited ground control operations (130 ha) were undertaken in December, and March to May. In April, small groups of hoppers formed. Numerous infestations were present in central and southern Algeria in December and control (766 ha) was carried out. Thereafter, only low numbers of adults remained in a few irrigated areas until April and May when small-scale breeding caused locust numbers to increase and hoppers and adults formed small groups in the central Sahara that were treated (2,430 ha) by ground teams. Isolated adults persisted during most of the period in a few places in northern Mali and in the Air Mountains in Niger but surveys could not be carried out in either country.

Summer 2008 breeding. Isolated adults were seen in Tamesna and the Tenere Desert in Niger during June. Seasonal rains commenced in the Sahel in mid-June and continued until mid-October. Hence, the rainy season was about six weeks longer than in 2007. Low numbers of adults were present in southern Mauritania from July to mid-September and small-scale breeding occurred in August and September. In Algeria, solitarious adults persisted along the edges of irrigated areas in the central

[1] This paper includes data and information received by DLIS up to 12 February 2009. An update was be provided during the DLCC.

Sahara throughout the summer. Small-scale breeding occurred in August and hoppers formed small groups that were controlled (15 ha). Isolated adults were seen in northeast Chad from September to November. Insecurity prevented surveys from being carried out in Mali and Niger for the second consecutive year. In central Libya, ground teams treated hoppers and adults in July and August (4,000 ha) from breeding that took place after good rains in May.

Autumn 2008 breeding. In western Mauritania (Nouakchott to Akjoujt), rains first fell in early July and heavy showers fell at the end of July and August. Widespread heavy rains fell several times in late September over western and northern Mauritania and in adjacent area of Western Sahara. As a result, ecological conditions became sufficiently favourable east of Nouakchott to allow two generations of breeding between September and December. This caused locust numbers to increase sharply and an outbreak developed in which hoppers formed groups from mid-November onwards and small groups of adults were present by mid-December. Ground teams treated more than 14,500 ha from mid-November to the end of December. Low numbers of adults were present in northern Mauritania and Western Sahara from mid-October onwards. In November, local breeding occurred in the northeastern part of Western Sahara and in southern Algeria near the Malian border.

Winter 2008 breeding. Low numbers of hoppers and adults persisted east of Nouakchott during January and limited control operations were carried out. Isolated adults continued to be present in northern Mauritania and small-scale breeding occurred near Zouerate in early February.

Central Region

Winter 2006 / Spring 2007 breeding. As a result of good autumn rains and unusually favourable ecological conditions, an outbreak developed on the Eritrean coast at the end of 2006. Two generations of breeding took place between Massawa and the Sudanese border from early November to April 2007. First generation hoppers and adults formed groups and small bands in January and second generation adults formed immature swarms in late March. Ground control operations commenced in December but were hampered by mined areas and communication difficulties. The outbreak spread in early February to the adjacent coastal areas in Sudan where local breeding was already in progress. Aerial operations were undertaken from February to April in Sudan by PPD and along both sides of the Sudanese-Eritrean border against late instar bands and immature swarms in April by DLCO-EA. In all, more than 56,000 ha were treated in Eritrea and 22,000 ha in Sudan. Groups of adults moved from the coast to the Nile Valley in northern Sudan and perhaps across the Red Sea to Saudi Arabia. By June, the situation was calm along both sides of the Red Sea.

Small-scale breeding occurred from January to April on the Red Sea coast in Saudi Arabia and Yemen, and in northwest Somalia. By the end of March, small swarms formed on the coast of Saudi Arabia and laid eggs. Some of the swarms moved into the interior in mid-April and laid eggs that hatched in May and formed hopper bands until June. More than 83,100 ha were treated by air and ground from February to June.

A few swarms also formed in northwest Somalia in March and moved to adjacent areas in Djibouti and northeast Ethiopia, and across the Gulf of Aden to the southern coast in Yemen. In April, a few swarms moved from northwestern Somalia to Djibouti and Ethiopia. Breeding occurred during May on the plateau in northern Somalia and northeastern Ethiopia where hopper bands formed. Several swarms formed in June and move east to northeast Somalia.
Summer 2007 breeding. Unusually heavy and widespread rains occurred in the interior of Yemen where several swarms arrived from northern Somalia and Saudi Arabia in March and April and laid eggs. By late May, numerous hopper bands had formed north of Wadi Hadhramaut on the southern edge of the Empty Quarter in an area previously considered by locals as a transit zone. Infestations extended into southern Oman in July where heavy rains (300+ mm) from tropical cyclone Gonu had fallen the previous month (5-9 June) in the north. FAO assisted Yemen in organizing and implementing an emergency aerial survey and control campaign, supplemented by ground teams, which treated more than 32,000 ha from June to October. Oman treated 2,707 ha in the south from

July to September, including a few swarms that arrived in mid-August. As vegetation dried out in Yemen in September, immature swarms formed and moved to northern Somalia (8-16 September), Djibouti (16 September), eastern Ethiopia (21-25 September), and northeast Kenya (18 November).

Early summer breeding occurred in northern Sudan and southern Egypt during June that caused small hopper bands to form in the Nile River Valley, and control operations (202 ha) were carried out. Small-scale breeding continued during the remainder of the summer in the interior of Sudan and in western Eritrea. At the end of the summer, an outbreak developed in northern Sudan where a second generation of breeding produced small hopper bands and swarms between October and early December, and 30,000 ha were treated.

Winter 2007 / Spring 2008 breeding. Groups of adults from the Nile Valley appeared in winter breeding areas along the Red Sea coast in Sudan near Tokar and in Wadi Diib in September, which is earlier than normal. Adults and a few swarms continued to move from the interior to the coast until mid-December. Two generations of breeding occurred but, due to poor rainfall, infestations were confined mainly to the Tokar Delta and, to a lesser extent, in Wadi Diib near the Egyptian border. Small hopper bands formed in the Tokar Delta in November and ground and aerial control operations treated more than 12,000 ha from December 2007 to February 2008. By March, no further locusts were seen on the coast.

Elsewhere, small-scale breeding occurred in a few places along the Red Sea coast in Saudi Arabia (from adults that may have originated in the interior of Sudan), Eritrea and Yemen. Local breeding also occurred in the interior of Oman and ground teams treated hopper bands January (5,880 ha) and a few swarms formed in February. Some of the swarms moved to eastern Yemen and continued to farms on the northern edge of the Empty Quarter in Saudi Arabia, while others moved to northern Oman, UAE and to southeastern Iran. Although ground and aerial control (544 ha) were immediately undertaken in Saudi Arabia, some egg laying and hatching occurred that gave rise to small hopper bands, which were treated (6,064 ha) by the farmers through the irrigation systems.

Several waves of swarms that originated from summer breeding in northern Somalia and Yemen moved south and laid eggs in the Ogaden in northeastern Ethiopia and central Somalia (October) and in southeastern Ethiopia and northeast Kenya (November). Hatching occurred until mid-December and hopper bands formed until about mid-January 2008. Ground control operations were quickly mounted in Kenya but were hindered in Ethiopia by insecurity. DLCO-EA conducted aerial control in Ethiopia (5,200 ha November-January) and Kenya (1,250 ha December). Immature swarms formed in eastern Ethiopia in early January and moved west and southwest to the highlands and Rift Valley of Oromiya region in southern Ethiopia where they concentrated and persisted during the spring. It is thought the adults perished in the highlands as no locusts were reported after April.

Summer 2008 breeding. The situation remained generally calm during the summer. Only scattered locusts were present in the interior of Yemen, Sudan and southern Egypt. Despite good rains, primarily in Sudan, no breeding was detected during the summer.

Winter 2008 breeding. Unusually heavy rains in late October caused flooding on the coast and in interior areas in southern Yemen. Consequently, small-scale breeding occurred during the winter near Aden and probably further east along the coast near Ahwar. A second generation of breeding was reported in early February when solitarious and transiens adults were seen laying eggs near Ahwar. In Eritrea, small-scale breeding started on the northern coast in November. Scattered adults were present on the Red Sea coast in Saudi Arabia and Yemen from November onwards, and in Sudan starting in December.

Eastern Region

Spring 2007 breeding. Small-scale breeding occurred on the coast of western Pakistan from March to May. Unusually heavy and widespread rains in mid-March allowed breeding to continue somewhat

longer than normal and extend into southeast Iran during April. Consequently, locust numbers increased, hoppers and adults gregarized to form small groups, bands and, in Pakistan, one small swarm. In June, locusts declined in both countries due to control operations since March (4,765 ha Iran and 2,000 ha Pakistan) and subsequent adult movement to the Indo-Pakistan summer breeding areas.

Summer 2007 breeding. Pre-monsoon rains in March and April allowed local breeding to occur in Rajasthan, India and control (290 ha) was undertaken. On 6-9 June, Tropical Cyclone Gonu caused heavy rains and flooding on the coast in southeast Iran and western Pakistan. This allowed medium to high densities of solitarious and transiens adults to breed in southeast Iran where they were treated (50 ha) in August. Scattered adults persisted in these areas during September and October, and bred again in November.

A second cyclone, Yemyin, brought heavy rains and flooding to the coast of southeast Pakistan and in adjacent areas of Rajasthan and Gujarat, India on 23-26 June. An increasing number of solitarious adults from western Pakistan appeared in the summer breeding areas and laid eggs in Khairpur and Cholistan deserts in Pakistan and in Rajasthan. At the end of June, monsoon rains started and some locusts appeared in early July on the Gujarat coast, probably carried by winds associated with the cyclone from western Pakistan or northern Somalia. One generation of breeding occurred during the summer on both sides of the Indo-Pakistan border, and control operations (880 ha) were carried out in August against hoppers on the coast west of Karachi.

In northern Baluchistan, ground teams controlled late instar hoppers near Kharan in late October (700 ha) and two small immature swarms in early November (250 ha). No locusts were seen in India after mid-October and in Pakistan after mid-November.

Spring 2008 breeding. Scattered adults that had been present since the summer on the southeast coast of Iran bred on a small-scale after rains fell in November 2007. A second generation occurred in early 2008 when unusually heavy rains fell over most of the spring breeding areas in southeast Iran and western Pakistan. In some places, more than five times the long-term average fell. This was compounded by the arrival of a few low-density mature swarms from the eastern Arabia in southeast Iran from 20 February to early March. The swarms dispersed and laid eggs on the coast and in the interior that hatched in March and April, and hoppers formed small groups and bands. Control operations treated nearly 35,000 ha from February to June, causing locust numbers to decline by July. In Pakistan, isolated adults were present on the coast west of Karachi during March and in the interior in April. Poor rainfall during the spring resulted in little breeding in Baluchistan except in parts of the northern interior in April and May when 145 ha were treated.

Summer 2008 breeding. Pre-monsoon rains fell for the second consecutive year along both sides of the Indo-Pakistan border in early April and throughout May. These were followed by light to moderate rains associated with the monsoon that reached Rajasthan in early June – about two weeks earlier than normal. Consequently, vegetation was greener earlier and remained green in Cholistan, Pakistan until late November. This allowed two generations of breeding to occur in Cholistan between May and October but control was not required. In India despite the early monsoon, isolated immature adults were seen only in July in central Rajasthan. The monsoon rains began to withdraw at the end of September, nearly one month later than normal, and by November no further locusts were reported in either country. In Iran, residual populations of isolated adults persisted on the southeast coast until November.

Winter 2008. Nearly double the average annual rainfall occurred in southeast Iran in late 2008 and early 2009, which caused ecological conditions to become unusually favourable for breeding.