REPORT OF THE

NINETEENTH SESSION OF THE FAO DESERT LOCUST CONTROL COMMITTEE

Held in Rome, Italy
29 September - 3 October 1975

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Meeting Report No.
AGP/1975/M/6

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THE NINETEENTH SESSION OF THE FAO DESERT

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Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
Rome, 1975

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INTRODUCTION

The Eighteenth Session of the FAO Desert Locust Control Committee, which was held in Rome from 4 to 8 November 1974, recommended that the next Session should be convened by the Director-General in October 1975. He invited the following Governments to be represented by Delegates at the Nineteenth Session:

Afghanistan
Algeria
Arab Republic of Egypt
Bahrain
Cameroon
Central African Republic
Chad
Dahomey
Ethiopia
France
Ghana
Guinea
India
Iran
Iraq
Israel
Ivory Coast
Jordan
Kenya
Kuwait
Lebanon
Libyan Arab Republic
Mali
Mauritania
Morocco
Niger
Nigeria
Oman
Pakistan
Portugal
Qatar
Saudi Arabia
Senegal
Sierra Leone
Somali Democratic Republic
Spain
Sudan
Syrian Arab Republic
Tanzania
Togo
Tunisia
Turkey
Uganda
United Arab Emirates
United Kingdom
United States of America
Upper Volta
Yemen Arab Republic
Yemen, Peoples' Democratic Republic of

He also invited the representation of the Desert Locust Control Organization for Eastern Africa (DLCO-EA), International African Migratory Locust Organization (OICMA), Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviaire (OCLALAV), and the League of Arab States, and the Arab Organization for Agricultural Development as Observers. In addition he invited the representation of the United Nations Development Programme (UNDP) because of their continued involvement and interest in the Desert Locust programme.

The Session was opened by Dr. D.F.R. Bommer, Assistant Director-General, Agriculture Department, who welcomed all the participants and briefly reviewed the subjects to be discussed and the action taken by FAO on the recommendations of the last Session. Dr. Bommer pointed out that FAO had kept constant watch on the locust situation in all the areas and kept the Member Governments informed. He appreciated the prompt action taken by countries lying along the Red Sea Coast and Gulf of Aden area, thus eliminating for the present the chances of locusts spreading to other areas. He pointed out the recent developments in remote sensing and the proposed use of satellite imagery in the future Desert Locust survey activities. He hoped that the recommendation made in this regard by the Expert Group last week would be favourably considered by the Committee. He also referred to the fact that the DLCC had completed twenty years of useful and constructive role in promoting and coordinating international action in the fight against the Desert Locust as a result of which there had been no major locust plague over the last thirteen years. He, however, cautioned the Members that the continued absence of locusts was likely to create a feeling of complacency in some quarters, and stressed the need not only to maintain the present arrangements for locust control but also to strengthen them to further reduce the threat posed by the winged menace.

Officers of the Session

The Committee unanimously elected the following officers:

Chairman: Dr. Saïd Zitoune, Algeria

Vice-Chairman: Dr. S.N. Banerjee, India

Drafting Committee: The Delegates of Algeria, Egypt, Mali, Pakistan and the Somali Democratic Republic, and the FAO Secretariat.

Mr. J. Roy, Dr. J.S. Gill, Dr. H. Huque, Messrs. A. Khasawneh, N. Mahjoub, S.S. Pruthi, R.D. MacCuaig, and Miss C. Hemsted acted as technical secretaries and Mr. Gurdas Singh as consultant.

Acknowledgements

At the close of the Session, the Members thanked the Chairman and expressed their warmest appreciation of conducting the business of the House in a very courteous and tactful manner. The Delegates also thanked the FAO Secretariat for the efficient services provided for successful conduct of the proceedings. The chairman thanked the members and the FAO staff for their cooperation.

PARTICIPATION IN THE SESSION

The following delegates from Member nations of the Food and Agriculture Organization of the United Nations and Specialized Agencies, observers and members of the FAO staff participated in the Session and contributed to the discussions summarized in this report :

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Mrs. D. Waudby
Mrs. L. Zuckerman

AGENDA

1. Opening of the Session (10.00 hours)
2. Election of the Chairman and Vice-Chairman
3. Adoption of the Agenda
4. Election of the Drafting Committee
5. The Desert Locust Situation during 1974-75 and Forecast
6. Anti-Locust Measures Undertaken by Various Countries and Regional Organizations November 1974 to September 1975)
7. Report on the Study of the 1973-74 Upsurge of the Desert Locust (Schistocerca Gregaria Forsk) in the Indo/Pakistan Area and the Effect of the Control Operations Undertaken by National and International Organizations
8. Consideration of the Report of the Expert Consultation on Satellite Application for Improving Locust Survey and Control Techniques
9. Progress Report on Training Project in Crop Pest Control with Special Reference to Desert Locust Control and Research
10. Progress Report on FAO/SIDA and FAO/DANIDA Projects
11. Trust Fund 9161 - Contributions and Expenditure
12. Status of Various Desert Locust Regional Organizations :
    (a) South-West Asia
    (b) Near East
    (c) Eastern Africa
    (d) North-West Africa
    (e) West Africa
13. Other Business
14. Date and Place of Next Session
15. Adoption of Report

SUMMARY OF DISCUSSIONS

The Desert Locust Situation from November 1974 to September 1975

1. The Committee had before it a summary of the Desert Locust situation prepared by the FAO Secretariat. This was brought up-to-date by the additional information supplied by Delegates and Observers.

General Features

2. During the period under review a significant upsurge in locust activity was observed in Saudi Arabia and Sudan. Several swarms, groups of fledglings and numerous hopper bands were observed over extensive areas during November/December 1974 and January/February 1975. The conditions for further breeding were highly suitable and a potentially dangerous situation would have developed but for the prompt and efficient control operations undertaken by the national anti-locust organisation. Also in Algeria, Libya, Mali, Mauritania, Niger, and People's Democratic Republic of Yemen , the locusts developed into large scale populations necessitating control operations. Locust swarms invaded Morocco in December 1974; however, prompt aerial and ground operations helped control the gregarious populations, which, nevertheless, persisted over several weeks. Breeding on a small scale took place in the summer breeding areas of Pakistan which was controlled.

South-West Asia

3. In Afghanistan, no locusts were observed during the period under review except that one male solitary adult was collected on 1 June by the Special Survey Team at Dast-e-Shahidan.

4. Small numbers of scattered adults were observed from October 1974 to June 1975 in areas mainly in Bandar Abbas and Jiroft in Iran. A few hoppers of IV and V stages were also reported from those localities in May 1975. No locust activity was reported thereafter.

5. The desert areas in India constituting part of the summer breeding zone, were practically free of locust activity up to February 1975. A few scattered adults were reported during March and April indicating a possible eastward migration from the West but there was no significant increase in locust numbers up to July; the maximum population recorded was 300 adults per square kilometer in Jaisalmer and 225 per square kilometer in Churu and Jodhpur districts. Fairly widespread rains had occurred in Rajasthan during the monsoon breeding season which resulted in very favourable ecological conditions followed by a rise in the locust population. A mature swarm was reported at Tanot in Jaisalmer district of India in September 1975.

6. In Pakistan, scattered but fairly wide-spread solitary locust adults were reported during October and November 1974, and through January to July 1975 from different localities in Bahawalpur, Lasbella, Kulanch, Mekran and Dasht Valley. Control operations were carried out in June and July against fresh adults and hopper bands. With reported wide-spread rains in the desert areas, the situation for further breeding was highly favourable and a rise in the locust population was recorded in the month of August; and in September, a mature swarm was observed in Sukkar district.

Near East

7. In the Arab Republic of Egypt, a few scattered locusts were observed during November 1974 in the south eastern part of the country in Shelatan area, whereas the rest of the country was reported free from any locust activity during the period under review.

8. In Saudi Arabia, there had been good rainfall in northern Tihama during October-November whereas southern Tihama remained comparatively dry. In the month of November there was a

sudden development in the locust situation in areas between Mastura and Rabigh of northern Tihama where a mature swarm measuring approximately 96 square kilometers was observed on 5 November, at the same time another pink swarm was reported near Rabigh flying north. In view of suitable ecological conditions, the mature swarms started laying which subsequently resulted in the production of numerous hopper bands in the month of December. Control operations were organised immediately both against hoppers and swarms. There was, however, some regrouping of the escapes with the result that sporadic breeding continued during January and February 1975. Because of the continued pressure of well organised control operations, there was a decline in the locust population in March and thereafter only scattered individuals were observed in the area.

9. In other areas of Saudi Arabia, scattered locusts continued to be observed until July 1975. In August, a few groups of locusts were observed in northern Tihama, 100 km. north of Jeddah and control operations were carried out against those concentrations.

10. In People's Democratic Republic of Yemen there were marching bands and mature adults distributed over 600 sq. km. in Wadi Sofra, Wadi Rumh, Wadi Markha and in Wadi Diysur. Locust adults were also reported from Shuqra and Ahwar on the eastern coast. During October, there was further development in locust situation in Wadi Hadramout where control operations were started against hoppers and adults and continued during November and December. A few solitary locusts were reported at the western coast of the PDR of Yemen during January, February, March and April 1975. During May, 39 solitary locusts were found along the western coast of the country. Some hoppers were also reported during June, July and early August in Wadi Mayfah.

11. In Yemen Arab Republic a mature swarm was observed on 18 August 1974 from Wadi Habil area where, later on, fledglings and hopper bands were reported and control operations were carried out during September. A few scattered adults and V instar hoppers at low density were reported to the north and south of Hodeidah during October. In November, solitary population persisted at low density in Wadi Habil, Haran and Beitul Faqieh; only 3 solitary locusts were seen in Tihama of Yemen during December. There was no significant development in the locust population from January 1975 onwards.

12. In United Arab Emirates, from February until June 1975, the important locust breeding areas were surveyed by a Pakistani Anti Locust Mission and no locust activity was observed by the survey team.

13. Other countries of the Region were reported free of locust activity during the period under review.

Eastern Africa

14. In general, the locust activity in the Region remained low, except in parts of Sudan. In Somalia, large concentrations of locusts were reported in the Geriad plain and at Humbeis in July but the numbers decreased by end September. Solitary scattered adults were reported from October to December in Northern Somalia stretching from Silil to Bosasso. During January-March, solitaries persisted on the northern Somali coast but no hoppers were reported in the area. A few yellow solitary adults, with no egg-development in female specimens were collected at Salil. These solitary populations persisted in the area through April-June 1975. In Ethiopia, scattered locusts were observed during July near the Red Sea Coast. These populations persisted until December especially between Akbanazaf plains and Wadi Adirbarbo; some concentrations were also confirmed along the Wadis draining into the Red Sea. In December, these infestations moved further north between Mersa Gulab and Wadi Korara on the Sudan border. The locust activity remained low during January to September 1975. From Djibouti territory, solitary adult locusts were reported during October on the coastal areas. Low density populations varying from 10 to 200 adults /hectare were also observed in Hanle plains. A few solitary locusts were observed in Yoboki area and east of Lake Abbe in November; in April north of the Gulf of Tadjourah; and in June, on the Gobald plain and on the northern shores of the Gulf of Tadjourah. Kenya, Uganda and Tanzania remained free of locust activity.

15. In Sudan, during September-October, there were groups of maturing adults at a density of 3,000 to 42,000 per hectare at Gash Delta in Kassala province over an area of 8,000 hectares. There were also mature and immature adults in Sinkiat, Haiya and the Gash Delta and the Red Sea hills. Four immature swarms were reported in Sinkiat area in November. The total infested area was estimated at 155 sq. kms. Also large groups of locusts and hopper bands were reported during October along the western bank of River Atbara and the Nile El Hassaneya area over 163 sq.kms. at a density of 30,000 adults per hectare.

16. In the winter-spring breeding area of the Red Sea Coast, the infestation consisting of large groups of immature and mature adults was confined to the southern sector of the coast, mainly to Tokar delta, during December 1974-March 1975. Small pockets of hoppers and fledglings were also found in the coastal area of Sudan-Ethiopian border. Because of control measures undertaken in these areas, very few locusts were seen in the normal summer breeding areas during June, July and August 1975. Control operations were carried out from September to March from the ground and air using 2132 kgs BHC dust, 2034 litres of BHC solution, 8772 litres of malathion, 227 litres of dieldrin and 122160 kgs. poison bait.

North-West Africa

17. In October, numerous solitary locusts were seen in some south Saharan wadis of Algeria, which were partly covered with green Schouwia. In mid-October, five copulating pairs were noted in two places (wadis Djouden and Agdem) whereas a low density population of young green hoppers was reported in an area of about 100 hectares in Wadi Icheed. In November 1974, conditions were generally unfavourable except in wadi Daoura and in a few other areas where it had rained. Breeding continued in the Southern Sahara and the adult population was found to have increased following the arrival of locusts from the breeding areas of the Adrar des Iforas, the Temsna and the Valley of the Tilemsi. The locust population diminished in December, probably because of the dessication of vegetation in the area. The situation remained calm until March 1975, when three adults were observed in the Chegga area on the border between Algeria and Mauritania. Abundant rainfall fell during April in the western part of the region espeoially in the valley of wadi Saoura where heavy flooding oocurred. Relatively important rains fell on Central and Southern Sahara during the month of May, causing floods followed by favourable conditions for breeding in certain wadis in the Hoggar region (wadi Abezou, wadi Iriane). Control operations were carried out in July using poisonous bait in the area of In-Ecker covering a thousand hectares against late instar hopper bands and fledglings which appeared at the time of control operations were also dealt with. Since then only some solitary locusts were observed in southern Sahara (wadi In Ouzal), however, ecological conditions remain favourable in certain wadis of the area.

18. In Libya, no locust activity was reported during October and November 1974, probably owing to unfavourable ecological conditions. On 10 November three locusts were captured in the region of Nalout and Rhibet. These locusts had probably immigrated from the neighbouring areas, as ecological conditions were not favourable for breeding locally. Apart from a small solitary locust population observed on 24 March 1975 in wadi Sofggin east of Hamadah-al-Hamra, thereafter other populations were found during surveys in Wadis Ben-Walid, Mizda and El-Ajal (15.6.75), ZamZam (22.6.75), Sukna (15.9.75); these were controlled by BHC bait.

19. Morocco remained free from any locust activity until 14 November 1974. In the second half of November a swarm reached southern Morocco. A second swarm, which split into five swarmlets, was reported in the same area in December. Control operations were carried out against these swarms during November and December over an area of about 3,000 hectares. Scattered showers were received in December in southern Morocco although on the whole conditions continued unfavourable for breeding. However, during the last survey, carried out from 23 March to 3 April 1975, three solitary locusts were captured between Maader Anziz and Maader Telmaout. Control operations were also carried out in July over 1000 hectares against concentrations of locusts.

20. Tunisia was reported free from any locust activity.

West Africa (OCLALAV)

21. During the first six months of 1975 the situation was calm, ecological conditions were not favourable.

22. During the monsoon season of 1974 (June to December) ecological conditions were very favourable in the whole of the Sahel and large scale but not very dense breeding of solitary locusts followed.

23. In September, following the rapid advance of the inter-tropical front (FIT), accompanied by cold fronts in western Sahara, resulted in large concentrations of mature adults in south-west Mauritania. This was followed by important breeding in Eguenent, Boutilimit and Latfar. In Niger and Mali, gregarious populations were reported in November, and by December several swarms had been produced. A total of 27,000 hectares of infested area was controlled in the Adrar des Iforas (Mali) and Tamesna (Niger).

24. On the other hand, in the western Sahara, ecological conditions on the whole were not favourable during the last three months of 1974. Only a group of flying adults was observed on 13 November at Tickla, and another on 16 November at Ausert, Spanish Sahara.

25. During the first four months of 1975, the locust situation remained calm in West Africa. In May important heavy rains covered the whole of the Adrar des Iforas and the surrounding areas and a widespread population of solitary locusts was observed. In July, 480 hectares of high density hopper groups were controlled in those areas. Following this, ecological conditions were unfavourable and in August the vegetation had largely dried up.

26. In the whole of the Sahara, the 1975 monsoon season brought heavy rains, causing ecological conditions to be very favourable for breeding. Breeding of adults of low density was observed in all the areas surveyed. From 10 August, a population of adults of 40 to 400/ha were observed over an area of 1 million hectares in West Mauritania in Aleg and Mondjeria areas. At the end of April, similar densities were reported in Eguenent. At the end of September a report of fledglings and hoppers was made in the region of Boutilimit. 7000 ha. were at present being controlled (densities oberved 20,000 hoppers/ha.). Control operations were carried out against adult and hopper populations in Mali, Niger and Mauritania during October-December 1974 and over 350,300 hectares.

27. Heavy rains and flooding also occurred in the wadis in western Sahara, especially in the highlands of the Mauritania Adrar and the south of the Spanish Sahara, resulting in favourable conditions for further breeding. Surveys of these regions were taking place. The situation could become very serious if further rains occurred in October.

Forecast

28. In the south-west Asian region, fresh adults in fairly large numbers and hopper concentrations of different stages were observed in Lasbella, Kulanch and Dasht Valleys in Pakistan during June and July necessitating control operations. Significant locust populations were also present in summer breeding areas in India. The rains in the summer breeding areas were reported to be well distributed and wide-spread creating favourable breeding conditions as a result of which one generation had already been produced which included at least two swarms. There was every likelihood that these populations would move towards winter-spring breeding areas of Pakistan and Iran during coming months. This situation would need continuous vigilance particularly in the areas which might receive winter-spring rains.

29. Because of good rainfall during October-November 1974, a threatening locust situation developed in northern Tihama of Saudi Arabia; oviposition occurred on a large scale and control operations against swarms, fledglings and numerous hopper bands were undertaken during the period from November 1974 to March 1975. Thereafter, the locust activity in Saudi Arabia declined considerably although groups and solitary adults continued to be reported

from the Taraina until August 1975. In the coastal plains of Sudan Republic, egg-laying started in October-November 1974 and control operations against locust swarms and hopper bands remained in progress until February 1975 bringing the situation under control in March. Thereafter, only solitary adults at low density were reported from the Tokar delta area until May 1975. Scattered locust populations continued to be reported from PDR of Yemen, and Yemen Arab Republic.

30. Because of the seasonal redistribution of population in the coastal areas along the Red Sea and the Gulf of Aden, there was a need to keep those areas under careful surveillance, especially during the forthcoming winter-spring breeding season when further increases in population were likely. It would also be necessary to keep sufficient resources in readiness for undertaking control operations which might have to be undertaken in the Red Sea Coastal Plains during the winter-spring of 1975-76.

31. In East Africa, frequent surveys should also continue on the northern Somali coast, Ethiopia and Djibouti territory to detect migration and breeding. The desert locust populations were expected to increase in the summer breeding belt of the Region following good rains that had occurred in the area. Adequate control potential should also be maintained to undertake prompt operations to kill locusts.

32. In Western Africa, scattered locusts were reported to be present in Algeria, Mali, Morocco Mauritania and Spanish Sahara. In view of the favourable ecological conditions, these populations were likely to increase and move northwards during the coming months and multiply further. It would therefore be necessary to keep the potential breeding areas in this region under sustained vigilance and special watch should be kept for any breeding which might take place during autumn and winter-spring months, particularly in northern Mauritania, Spanish Sahara, Southern Morocco and Southern Algeria.

33. The Committee considered that due to the widespread rainfall in most of the breeding areas in several countries within the invasion zone of the Desert Locust, favourable ecological conditions existed for breeding during the coming months. At the same time there were locust populations present in almost all the Regions ranging from scattered individuals to swarms. If there were further rains particularly during the winter-spring period of 1975/76, there was every likelihood that an alarming situation would develop. In view of this, the Committee recommended that all national and regional anti-locust organisations should keep their respective areas under strict vigilance and also arrange for adequate resources to meet any eventuality.

34. The Committee requested that while preparing future Desert Locust situation summaries, it would be desirable to include reference to any relevant meteorological and ecological factors which normally influence locust multiplication and displacement of populations. This would facilitate better understanding of the prevailing locust population dynamics.

Control Operations Undertaken by various National and Regional Organisations

35. There had been locust breeding in Algeria, Libya, Mali, Mauritania, Morocco, Niger, Pakistan, Saudi Arabia, Sudan and PDR of Yemen where control operations had to be carried out. On the whole a total of 2799.3 sq.kms. infested area was treated with 20,295 litres of liquid insecticide, 72,047 kgs. of BHC Dust and 255,860 kgs. of BHC bait. Details are given in Appendix I.

Upsurge of the Desert Locust in the Indo-Pakistan area during 1973-74

36. The Committee noted with satisfaction that as a follow-up of the statement made at the Eighteenth Session of the DLCC (Report, para 45), a study of the Desert Locust upsurge in the Indo-Pakistan area during 1973-74 and the effect of the control operations undertaken had been completed and a report thereon was available for consideration.

37. A large tract of the summer breeding area on both sides of the Indo-Pakistan border which had been almost free from any significant locust activity for some months until May 1973 transformed itself during the next five months into an area of intensive locust activity with a number of swarms and hopper bands. This situation could be attributed to favourable ecological conditions created by good rainfall during July and August 1973 and presence in the area of a sizeable locust population which could take advantage of this situation for rapid multiplication.

38. The Committee noted that the upsurge had all the features of a continuing one, and would have further intensified and enlarged due to favourable ecological conditions in the complementary areas. It was due to extensive control operations undertaken both in India and Pakistan that the situation was brought under control with the exception of some escapes, which subsequently bred in winter-spring breeding areas of Pakistan. In spite of active control operations in that area some swarms escaped and moved eastwards in early June and concentrated in the Indian summer breeding areas. In the wake of favourable rainfall extensive breeding took place over a large area. Prompt control operations successfully controlled all the infestations and there were virtually no escapes, with the result that the winter-spring breeding areas did not receive any significant locust populations during the usual westward migration after the summer breeding

39. The Committee reiterated its earlier conclusions (Eighteenth Session Report, para 43) that it would not be prudent to overlook scattered populations specially in areas of good rainfall, as such populations could rapidly build-up into large numbers with potentials for initiating a plague in the next one or two generations. At the same time the Committee agreed that control operations played an important role in containing the plague in its early stage and recommended that the present preventive policy of locust survey and control be continued to be followed vigorously in future.

40. The Committee appreciated the study made by Mr. M.V. Venkatesh and hoped that similar studies would be made in other areas on suitable occasions.

Satellite application for improving locust survey techniques

41. The Committee considered the report of the Expert Consultation on Satellite Application for Improving Locust Survey and Control Techniques held in Rome from 25 to 26 September and agreed to its recommendations, details of which were given in the following paragraphs (paragraphs No. 42 - 49).

42. The Desert Locust breeds on seasonal rainfall over a vast tract in arid and semi-arid areas of western and eastern Africa, the Near East and South-West Asia. At present, it was not possible for locust organisations to survey breeding areas comprehensively and rapidly using traditional techniques, which often resulted in delayed control operations against initial build-up of locust populations. The Desert Locust, therefore, still represents a continuing threat to agriculture in some 55 territories. The Project was designed to develop a cooperative international programme, initially as a pilot project, to use satellites to provide rapid and comprehensive information on the occurrence of potential Desert Locust breeding sites.

43. To achieve the above objectives (para.42) it was proposed to use during the Phase I satellite data to:

(a) provide information on the presence of standing water, identify wet areas from dry areas and, in particular, indicate the presence of ephemeral vegetation and as far as possible state of the possible vegetation (e.g. green, drying or dry);

(b) provide the information in (a) as soon as possible or at least at about fortnightly intervals for the summer breeding areas, and at slightly longer intervals in the winter-spring breeding zones;

(c) make such information available in a form which will enable field teams to be directed to potential breeding areas.

44. The Committee noted with interest that the previous trails conducted with the data obtained from existing satellites had demonstrated a reasonable possibility of providing information mentioned in para 43 above which could lead to identification of the location of potential Desert Locust breeding sites; and that now was the most opportune time to further field test and develop the use of satellite data techniques to detect and monitor potential locust breeding areas. While doing so, care should be exercised to select only potential breeding areas for observation on a limited scale and extend such work further to Phases II and III of the project, if the initial results in the Phase I proved encouraging. Phase II could cover North-West Africa in general and Phase III both Africa and the Near and Middle East.

45. Keeping the above objectives in view, the Committee recommended the following:

(i) Satellite Imagery

that the imagery for interpretation should be of two types scanned sequentially:

(a) from meteorological satellites (NOAA and similar other satellites)

(b) from Earth Resources Technological satellite LANDSAT-2 of areas thus selected to obtain confirmation of the presence of conditions favourable for locust breeding.

(ii) Interpretation of Data

arrangements would be made to collect satellite imagery, interpret it at the FAO Remote Sensing Unit in Rome and transmit it to ground teams in the experimental site. In addition the Remote Sensing Unit would receive from the field information concerning areas of soil moisture and vegetation observed by the ground teams.

(iii) Operational Area

it was suggested that for the period from February-June 1976, the main test area would be in the vicinity of the Ahaggar massif in central-southern Algeria, from about latitudes 21-28°N and longitudes 1-7°E, i.e. an area of approximately 800 x 700 km. This area had been selected because of high frequency of breeding even during recession periods and because it was covered by a LANDSAT receiving station, that of Telespazio, Italy. Historically the desert locust breeds in this area between March and June, and the area was routinely surveyed by Algerian ground teams.

(iv) Ground truth data

Special surveys would be arranged to make ground observation in the selected operational area to collect data on rainfall, flooding, soil moisture, vegetation coverage and other ecological conditions. This data would be used for correlation with the satellite imagery.

(v) Headquarters and management

FAO Headquarters at Rome would be responsible for obtaining agreements with various cooperating agencies, for selecting satellite imagery to be used, interpretation of satellite imagery, planning of survey to collect ground truth data and its correlation with satellite imagery and finally communication of results to concerned anti-locust organisations.

Source of Funding

46. The Commissions for Controlling the Desert Locust in North-West Africa and the Near East had agreed to contribute $10,000 each, and it was most likely that a similar amount would be allocated by the Commission for Controlling the Desert Locust in its Distribution Area in South-West Asia at its next session scheduled to be held in December 1975. It was hoped that a minimum of $30,000 would be available for this experimental work by the end of 1975.

Budget and Expenditure Estimate

47.

Consultants	$ 9,000
Travel	3,000
Aircraft operational cost	2,000
Equipment	3,000
Cost of imagery, interpretation and computer analysis	8,000
Travel of ground teams, including per diem, POL and miscellaneous	5,000
	$30,000

If necessary FAO was authorised to transfer expenditures from one heading to another keeping the total budget at $30,000.

48. It was understood that the ground transport and a survey aircraft would be provided by the Government of Algeria along with surveyors, drivers, and any other essential personnel. Since the test area was routinely covered by ground survey parties of the Government, the special survey would not entail extra expenditure to the government as such. FAO would pay per diem to the Algerian staff and also pay for POL and day to day maintenance of transport.

49. The Committee hoped that a report on the findings of Phase I would be available for its consideration at the next Session in Autumn 1976.

Progress Report on Training Project INT/71/030

50. The Committee received a report on the progress of training activities since its last Session held in October 1974, a summary of which was given below:

(i) Training Courses

(a) Radio Operation and Maintenance Course: This course was held in Beirut from 24 October 1974 to 23 January 1975 and was attended by 25 trainees from 20 countries. Training was provided in installation, operation, maintenance and repair of radio transreceivers already in use for anti-locust work. To meet the language requirements of various trainees coming from different countries, instructions were given in Arabic, English and French with emphasis on practical work.

(b) Arabic Training Course on general crop pest control and Desert Locust Control and Research: This was the first course in Arabic and third in the series on general crop pest and locust control courses. It was held in Jeddah, Saudi Arabia from 1 February to 5 March 1975 and was attended by 37 participants from 11 countries. The course provided training in general crop pest control including the Desert Locust covering a wide range of subjects, namely: insect taxonomy, pest distribution in relation to plant zonation in the Near East, modern concepts of pest management, principles of crop loss assessment with types of insect damage, applied research techniques, meteorology and surveys of migrant pests and their control (with special reference to Desert Locust), rearing techniques of insect pests and of parasites and predators,

integrated pest control methods and their practical applications, selected problem from the region, survey methods and sampling of crop pest populations, seleotion and usage of insecticides with reference to modern trends in their application and their impact on the environment, plant quarantine control equipment, cotton pests, pests of stored products, general aspects relating to aerial spraying, vertebrates harmful to agriculture large scale campaigns and their economics. Twenty scientists and executives from Saudi Arabia, FAO and other countries participated in imparting the training, comprising of 46 lectures and supplemented by 21 films, many slides, charts and several demonstrations. Field trips were organised for demonstrations of control equipment and for visiting the locust research station.

(c) French Training Course on General Crop Pest Control and Desert Locust Research and Control: The course was held at Dakar, Senegal from 17 February to 21 March 1975. It was attended by 34 participants from eleven countries and two regional organisations, OCLALAV and OICMA. The subject-matter, on the lines of the Arabic course mentioned above, was presented by 27 lecturers in 49 lectures, and there were 13 visits to laboratories and field research stations.

(d) Training in Aerial Survey and Spraying Techniques against Crop Pests with Special Reference to Desert Locust: Nairobi, Kenya, 1 to 30 April 1975. The objective of the course was to provide instructions in the latest techniques of aerial application with special emphasis on locust and crop pest control to the senior plant protection officers, pilots and mechanios. The course was bilingual (English and French) and 30 participants from 14 countries/organisations (Algeria, Egypt, India, Iran, Iraq, Jordan, Pakistan, Sudan, Tanzania, Tunisia, DLCO-EA, OCLALAV, OICMA and IRLCO) attended the course. The flight portion of the course consisted of eight, fifty-minute flight periods, for each trainee pilot. Ground training consisted of classroom instructions, workshop sessions and field trips, with a total of 104 hours for ground instructions. Eight relevant technical films were shown and 13 publications were distributed.

(ii) Fellowships

There were 12 fellows studying or in the process of being admitted for Ph.D., 8 for M.Sc. and one for B.Sc. degree courses. The fellowship component had almost reached saturation point. In view of the very tight budget situation it would not be possible to award any further fellowship at least up to 1976 when the whole position would be reviewed. Details of fellowship grants were given in Appendix II.

Mid-Term Review of the Training Project INT/71/030

51. The Committee considered the report of the mid-term review jointly conducted by UNDP and FAO with a view to evaluating the extent to which objectives of the project were being attained and to identifying the factors which might have facilitated or deterred the achievement of the project's immediate purposes and ultimate objeotives.

52. While recognising the importance of general crop pest control and the need for adequate crop protection measures in the developing countries, the Committee emphasised that although considerable success had been achieved in abating large-scale outbreaks of the Desert Locust, nevertheless this pest still stands as a formidable barrier against the attainment of the targets of agricultural production and the need for constant vigilance and control at initial stages of outbreaks was to be continued without relaxation.

53. The Committee considered the various findings and recommendations contained in the report of the Mid-Term Review and noted as under:

(a) While recognising the need for examining the future manpower needs for crop pest control of individual countries to develop training programmes at the national, sub-regional and regional levels, the Committee was of the opinion that it would be rather difficult for most of the developing countries to work out in realistic terms their future manpower needs due to lack of forward planning and their changing priorities in the

agriculture sector vis-a-vis other development programmes. Nevertheless, the Committee recommended that Member Governments should make an effort to examine their future needs as already requested by the Project Manager so that a meaningful training programme could be worked out at the conclusion of the INT/71/030 project.

(b) The Committee endorsed the recommendation made in the report of the mid-term review that:

- the project should be continued for the period originally envisaged and that in all future courses more emphasis should be given in the syllabus to the communication techniques including preparation of extension material;
- as far as practicable number of guest lecturers be reduced and more stress placed on practical work and on important regional pest control problems;
- more care should be exercised in selection of trainees so that they could derive full advantage from the training imparted to them; and pass on the information to other colleagues on return to their countries.

(c) The Committee noted that the Project Manager had already initiated the necessary action in implementing some of the above recommendations.

54. The Committee noted with concern that representatives from the Member Governments who were contributing 70% cost of the Project were not invited to participate in this mid-term review; and considered that such participation would be necessary in any future review so as to achieve a more meaningful and objective evaluation of the activities and future needs. The Committee further requested that its concern be transmitted to UNDP.

55. The Committee appreciated the efforts made by the project staff in the timely implementatio of these complex and diverse series of training activities and recommended that training at all levels, which is a continuous requirement of the developing countries, should be continued in future.

56. The Committee heard with interest that as a follow-up of the recommendations of the World Food Conference, arrangements were in hand for assessing future plant protection needs of the developing countries and financing them by contribution from donor countries. FAO will soon be convening meetings to be attended initially by senior agriculture, production and protection officials with subsequent participation of the appropriate ministers. On the basis of the recommendations of the above meetings, necessary arrangements would be made to continue the training according to the needs of the developing countries.

Progress Report on FAO/SIDA Project

57. Work on most of the activities reported at the Eighteenth Session of the DLCC was continued. In addition to the Desert Locust culture, the Addis Ababa laboratories at the DLCO-EA Headquarters were also maintaining a thriving culture of African Migratory Locust as there were some important differences between the species in their susceptibility to insecticides. Tests were carried out in several ways; micro-drop application to determine contact toxicity primarily as a screening test; spray application to determine the toxicity of actual spray formulations by contact; spray application onto vegetation which enables the stomach toxicity to be determined after varying periods of time have elapsed. Finally insecticides might be mixed with bran and fed to nymphs to determine their effectiveness as baits.

58. No insecticide had been found more promising than chlorpyriphos and cyanophos as contact poisons nor phoxim as a bait as mentioned at the Eighteenth Session of the Committee (Report paras. 52 - 58). Tests with fondaren, GS 25087 and P 2188 against fifth instar nymphs gave LD-50s of 13,5, 10.1 and 15 $\mu g/g$ whilst against adults GS 25087 had an LD-50 below 10 and P 2188 below 5 $\mu g/g$. These experiments and others were continuing.

59. Triazophos (Hostathion) is an insecticide which had been used for the control of grasshoppers in the USA. A study with the Desert Locust showed the LD-50s to be too high to justify further work, e.g. fifth instar nymphs ca 100 ug/g. However, in correspondence with the manufacturer it became clear that triazophos is much more toxic to the Migratory Locust, than to the Desert Locust. More detailed studies were made including tests with Locusta. These confirmed the manufacturer's findings that Locusta was extremely susceptible to triazophos and also the importance of the site of application on toxicity. The extremes of toxicity were S. gregaria fifth instar nymphs with a dose of 100 ug/g applied to the abdomen which killed less than half and a dose of 5 ug/g applied to the neck of L. migratoria nymphs which killed 80%. These experiments illustrated the need to carry out laboratory tests under conditions as nearly approaching those of the field as possible. Further tests were in progress.

60. Field tests had been carried out with a number of insecticides in which Acacia bushes and the nearby undergrowth had been sprayed and goats tethered to the bushes so that they had to feed on the sprayed vegetation. Tests had been done with fenitrothion as the reference standard, oyanophos, chlorpyriphos, beniocarb and carbofuran. A dosage of around 400-600 g/ha of fenitrothion is required for killing adult locusts and this dosage is expected to result in a contamination level of 62-92 mg/kg on Acacia twigs. Applying a tenfold factor for safety would give contamination levels in the range of 600-900 mg/kg. Estimated contamination levels ranged from 580 to 1600 mg/kg. In three separate experiments using seven goats any depresssion of cholinesterase activity observed was so small as to be uncertain. These results were in complete contrast to those with carbofuran.

61. A complete list of papers accepted for publication and reports dealing with the work of the project is given in Appendix III.

62. Experiments carried out under the project on domestic animals indicated that drift spraying as carried out for locust control was unlikely to result in more than 1.4 mg/kg of active ingredient being ingested by animals for each 100 g/ha insecticide applied. In view of the high toxicity of dieldrin and BHC to locusts, and on the basis of these and other results, the Committee recommended that dieldrin and BHC should continue to be used for locust control until such times as suitable alternate insecticides equally effective and economical were found. The Committee, however, emphasised that all necessary safety precautions should be taken in proper handling and application of these insecticides.

63. The Committee appreciated the continued assistance provided by the Desert Locust Control Organisation for Eastern Africa (DLCO-EA) to the Project in its day-to-day activities. The Committee noted that the SIDA project which was initiated in 1971 was due to run until October 1976 in its present form, thereafter with diminishing FAO involvement in 1977 and 1978. Keeping in view the importance of this work, the Committee recommended that consideration should be given to continue this project in one form or the other. The Delegates expressed their great appreciation of the work undertaken by this project and noted with satisfaction that the project had provided opportunities to train the local staff to carry on the work in future with the existing equipment.

Progress Report on FAO/DANIDA Project

64. This project was formulated in 1973 with the aim of determining the likely effects of the use of persistent pesticides for controlling the locust by present methods, bearing in mind the safeguarding of wildlife and the environment. A laboratory to carry out analytical studies was in the process of being equipped with the equipment supplied under the project and was near completion.

65. The expert had made a number of field trips to select suitable sites for preliminary studies on persistence which would be necessary before any large scale monitoring of treated areas could be undertaken. Conditions under which degradation of dieldrin could take place under desert conditions were carefully considered. It was apparent that persistence pattern for dieldrin under desert conditions would be complicated by the varying environmental factors involved and it would show two stages. The first would be a short term persistence pattern where the governing factors, soon after application, might be appreciable evaporation and photo degradation; and a long term pattern, with slower evaporation and degradation, which

would be erratic and perhaps difficult to quantify because of the irregular dispersion and burying of treated soil by wind disturbance. In case of BHC the situation was different because it was much more volatile than dieldrin and its photodegradation products, if any, were of less concern.

66. Studies would be conducted to find a simple and efficient technique for extracting dieldrin, its photo-isomers, and BHC from treated desert soils. (These compounds might vary in extractability, particularly from weathered soils; some pesticides were best extracted with solvent after drying the soil, others after permitting absorption of the pesticide depending on soil type.) Exposure studies would be made to assess the extent and rate of dieldrin photo-isomer formation and if this was appreciable analytical conditions would have to be established for a convenient method of their estimation via GLC and prevention of their interference with dieldrin estimations (normally about 8 injections could be made per hour on the GLC for dieldrin estimations but the photo-isomers emerge much later than dieldrin and could obscure the dieldrin response from subsequent injections).

67. A suitable site within reasonable distance from the laboratory would be selected for experimental spraying trials and subsequent sampling. During these trials climatic data would be recorded, marked plots would be photographed at intervals to gain an idea of the rate and extent of wind disturbance of the soil surface and dune formation. This would be followed by monitoring of areas of known spraying records in different countries.

International Desert Locust Trust Fund 9161

Financial Report

68. The Committee received a report on the expenditure incurred during the year ended 31 December 1974 (Appendix IV).

Annual Budget for 1976

69. The Committee reviewed the annual budget of the Trust Fund and agreed to maintain it at the same level as approved by its Fourteenth Session (Appendix V) subject to any change which might be necessary from one code to another without exceeding the total limit of the budget.

Contributions

70. The Committee noted with some concern that contributions of some of its Member Governments were in arrears (Appendix VI) and requested FAO to approach such countries for an early payment to ensure timely implementation of the activities planned under the Trust Fund Programme.

Status of various Desert Locust Regional Organisations

Commission for Controlling the Desert Locust in North-West Africa

71. The Fourth Session of the Commission for Controlling the Desert Locust in North-West Africa and the Third Session of its Executive Committee, were held in Tunis, Tunisia, on 28 to 30 April and 23 to 25 April 1975, respectively.

The Commission:

(a) noted with satisfaction that the overall locust situation in the member countries and other regions remained under control. It appreciated the prompt and effective control operations carried out in the Indo-Pakistan region during June-August 1974, which helped to prevent further breeding during the summer months. It recommended effective surveillance over strategic breeding areas on a continual basis.

(b) emphasised the need for rapid exchange of information amongst countries of its Region and those of OCLALAV to enable all concerned to undertake immediate action in the event of a serious development in the locust situation; and suggested that

such circumstances would warrant holding of meetings between the countries under immediate locust threat.

(c) showed its keen interest in the Food and Agriculture Organization's proposal to initiate a project for exploring possibilities of utilising satellite monitoring techniques for survey of locusts, and agreed to allocate $10,000 as its contribution to the project.

(d) recommended an increased scale of annual contributions effective 1976, by the member countries to the Commission's Trust Fund No. 9169, in consistence with changes in the world economic conditions and higher cost of commodities and services, and the continued need for implementing its programmes effectively to prevent losses by locusts.

Commission for Controlling the Desert Locust in the Near East

72. The Sixth Session of the Commission for Controlling the Desert Locust in the Near East, and the Fifth Session of its Executive Committee, were held in Kuwait from 30 August to 3 September, and 26 to 28 August 1975, respectively.

The Commission:

(a) appreciated the timely action taken by the member countries of the Commission and other national and regional organisations generally against several small scale serious developments in locust situations, which helped to maintain the present recession in locust activity.

(b) recommended that special survey of strategic areas, especially those of the Tihama in Saudi Arabia and in Oman should be continued to enable timely detection and destruction of locusts.

(c) approved the programme of work and budget for 1976 and accounts for 1974, and recommended an increase of $50,000 in the annual budget to be paid by the Member Governments on the basis of an agreed revised scale of contributions.

(d) noted with satisfaction the excellent all-round progress made by the regional Training Project (INT/71/030) in implementing its programme as per the plan of operations; and recommended that, in view of the very useful and significant contributions being made by the Project to locust control and general crop protection potential and the need for training of staff in latest technology on a regular basis, the activities of the Project be extended further.

(e) emphasised the need for strengthening the programme of field research especially relating to the behaviour of solitary locusts vis à vis ecological conditions and made several recommendations to stimulate further research and exchange of information amongst workers.

Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia

73. The Tenth Session of the Commission was held in Rome, Italy, 11 to 15 November 1974 and was preceded, as usual, by a three-day Session of its Executive Committee.

The Commission:

(a) noted with satisfaction that the potentially explosive and dangerous locust situation in the Indo-Pakistan subcontinent was under complete control through extensive and timely control operations by the national locust control organisations.

(b) pointed out the possibility of further build-up of residual locust populations to swarming levels in the wake of good winter-spring and summer rains, and emphasised the need for effective surveillance of strategic areas.

(c) recommended the continuation of special surveys of strategic locust areas.

(d) suggested undertaking of a special study of the circumstances leading to the development of serious locust situation of 1973-74 to prevent its recurrence in future.

(e) made several recommendations for field research programmes in the Region.

(f) emphasised the vital role played by the FAO Regional Officer in implementing its programme, particularly, in matters of coordination of locust survey and control.

(g) approved the programme of work for 1975 through 1979 and accounts for 1973.

Desert Locust Control Organization for Eastern Africa (DLCO-EA)

74. The Twentieth Session of the DLCO-EA Council was held in Kampala, Uganda, 5-6 May 1975. The Organisation continued to provide efficient and useful services to the member countries, as usual, in matters of locust control and general plant protection. It was planned to augment the existing arrangements for applied research and control potential by seeking assistance of such organisations as UNEO, FAO and ODM. FAO continued to maintain good relations with DLCO in matters of common interest.

75. The Council had appointed a Review Commission to re-examine and regularise any inconsistencies in the personal emoluments, terms of services, pension indemnity, salary scales and allowances, and to review pest control and the expiring convention. The Review Commission consisting of all the member Governments and consultants from the FAO, COPR and OAU, would report its findings to the Council for approval. The final report of the Review Commission would be approved in January 1976.

76. The DLCO-EA was prepared to make available a spray aircraft with pilot and engineer, if the locust situation in Saudi Arabia and neighbouring countries so demanded; however, the need did not arise during the financial year 1973-74.

77. The Organisation was now processing requests for further funds fron UNEO, FAO and ODM of U.K. for the urgent requirements of replacement of equipment and to augment its stock of insecticide and spare parts.

Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviaire (OCLALAV)

78. FAO continued to maintain its cordial relations with OCLALAV in matters of mutual interest. Besides the FAO/UNDP small scale regional project on locust field research, cooperation was extended to other related fields such as grasshopper control. It was proposed to extend the project further.

79. The Administrative Council of OCLALAV met recently and discussed the control of the Desert Locust, grasshoppers and other crop pests. It was decided that the officers in charge of the national plant protection services should meet before the meeting of the Administrative Council of OCLALAV. The Council also stressed the need for better collaboration with North-West African countries in matters of common interest. In view of serious drought conditions which prevailed in the region OCLALAV would need continued international assistance to carry out its various activities.

80. The Council thanked the donor countries and Organisations, in particular OSRO, for the assistance given to national and regional plant protection services and very much hoped that such assistance would be continued. The Council prescribed the terms of reference for the

59 Inter-State Committee for drought control; and recommended that its meeting, including heads of plant protection sections of member states, regional organizations and representatives of donor countries should be organised in September 1975 in order to formulate a three-year plan of needs of member countries in plant protection. Such a conference actually took place in Ouagadougou from 18 to 22 September.

Assistance to Locust Organizations

81. The Committee was informed that some of the regional organizations might need assistance to keep up their present level of efficiency in locust survey and control. It was suggested that such organizations might consider sending details of the assistance needed to FAO for exploring the possibility of securing assistance from certain donor countries.

Regional Officers

82. The Committee was informed that FAO had taken action to fund the posts of Regional Locust Officers at Algiers and Jeddah by modifying the terms of reference to two new Plant Protection posts proposed for the Regional offices in the Near East and in Africa and in the case of the third post located in Teheran by transferring one existing Headquarter's post in the locust Control Group to Teheran with changed terms of reference. While appreciating the action taken by FAO to continue these posts for the present, the Committee hoped that in the case of the two posts in Algiers and Jeddah these were only interim arrangements and FAO would in future include these posts in the Regular Programme with full time responsibilities for locust control work.

Future Scope of DLCC and other plant protection problems

83. The Committee considered the question of enlarging the terms of reference of the DLCC to include other locusts and extend its cope into a global scale. After giving consideration to the various factors involved in such a rationalisation, the Committee decided that the status-quo should be maintained.

84. With regard to various general plant protection problems, which countries face at national and/or regional levels, the FAO in pursuance of the recommendations of the World Food Conference will soon be sending to the Governments relevant documentation with the request to provide detailed information on their plant protection problems and their needs to cope with them. On the basis of information received, and taking into consideration such decisions which were likely to be taken at the ministerial level, FAO will prepare a properly coordinated programme at national, regional and international levels, and make appropriate arrangements to implement such a programme through the proposed international secretariat with funds likely to be contributed by various interested donor countries.

General Comments

85. The Committee heard with interest the statement made by the delegate of U.K. and agreed that there was urgent need for providing assistance to various national and regional organisations in the form of resources, equipment and supplies in order to ensure the implementation of the various recommendations made by the Committee in relation to survey and control of the Desert Locust.

DATE AND PLACE OF NEXT SESSION

86. The Committee recommended that the Director-General of FAO should convene the next session of the Committee possibly in the second half of October 1976 in Rome at a date to be determined by him.

APPENDIX I

ANTI-LOCUST MEASURES UNDERTAKEN BY VARIOUS COUNTRIES AND REGIONAL ORGANIZATIONS (FROM OCTOBER 1974 TO SEPTEMBER 1975)

LOCALITY	MONTH AND YEAR	TYPE OF INFESTATION (SWARMS, SCATTERED ADULTS, HOPPERS)	INFESTED AREA IN SQ. KMS.	INSECTICIDE USED					METHOD OF APPLICATION (AIR OR GROUND)
				BHC DUST IN KGS.	LIQUID IN LITRES			OTHERS IN KGS.	
					MALATHION ULV	BHC	DIELDRIN		
Pakistan									
Kandenwari Watha Dhora Kulaunch Shadi Kaur Phore Shooli Nawan Kot Bijnor	June 1975 July 1975 Aug. 1975	Hoppers Adults	843	135	-	-	960	-	Ground
Saudi Arabia									
Rabigh Badar Yanbou Jeddah Wadi Fatma Jizan Nastura Quinfida Asir Hijaz Umlej	Nov. 1974 Dec. 1974 Jan. 1975 Feb. 1975	Swarms, scattered adults, hoppers	600	12,750	850	-	800	5,700 (poison bait)	Ground
Sudan									
Sinkat Haiya Gash El-Hassaneya Tokar Delta	Sept. 1974 Oct. 1974 Nov. 1974 Dec. 1974 Jan. 1975 Feb. 1975 Mar. 1975	Swarms, adults, hoppers	300	100 2,032	8,774	2,034	227	122,160 (poison bait)	Air and ground

LOCALITY	MONTH AND YEAR	TYPE OF INFESTATION (SWARMS, SCATTERED ADULTS, HOPPERS)	INFESTED AREA IN SQ. KMS.	INSECTICIDE USED					METHOD OF APPLICATION (AIR OR GROUND)
				BHC DUST IN KGS.	LIQUID IN LITRES			OTHERS IN KGS.	
					MALA-THION	BHC	DIELDRIN		
Yemen, People's Democratic Republic of									
Markha Rumh Sofra Diysur Shaahbainah Jhahr-Mustdyia Shugraana-Ahwar	Sept. 1974 Oct. 1975	Adults, Hoppers	600	12,000	-	400	200	-	Ground
Mali and Niger	Dec. 1974	Adults, Hoppers	270	-	-	-	300	-	Ground
Mauritania									
Aleg Mondjeria	Oct. 1974	Adults, Hoppers	20.3	-	(not available)		-	-	Ground
Boutilimit	Sept. 1975	Adults, Hoppers	70	-	-	-	-	-	Ground
Morocco	Dec. 1974 Jan. 1975	Adults	30	30,000	-	3,500	-	-	Air, Ground
	July 1975		10	-	-	-	-	-	Ground
Algeria	June 1975 July 1975	Adults, Hoppers	20	15,000	-	-	-	-	Air, Ground
Libya									
Korel Gifa Wadi Soff el gine Wadi Zamzem Sokna	Nov. 1974 Mar. 1975 June 1975 Sept 1975	Adults, Hoppers	36	30	-	-	2,350	128,000	Ground
			2,799.3	72,047	9,624	5,934	4,737	255,860	

Appendix II

DETAILS OF INDIVIDUAL FELLOWSHIPS

Fellows Name	Field of Studies	Dates Appointment	Dates Starting	Dates Conclusion	Duration (months)	Countries of Study
Afghanistan						
A.R. Sabourry	Ph.D. Plant Pathology	27.1.75	27.2.75		36	Punjab Agricultural University, India
Algeria						
A. Benkara-Mostefa	Ph.D. Plant Protection	24.10.74	3.11.74		32	Faculté de Sciences Université Paris-Sud Orsay, France
M. Sitouh	Locust Control	19.9.74	24.10.74		12	OCLALAV, Senegal Morocco
Arab Republic of Egypt						
H.H.H. Metaweh	Bio-assays and insecticide residue problems	21.3.75	6.5.75		1	Ethiopia
S.I. Ibrahim	Ph.D. General Plant Pathology				36	
Bahrain						
S.S. Al-Alawi	Post diploma crop protection	27.5.75	Sept. 75		10	Harper Adams. Agric. College, Shropshire United Kingdom
Dahomey						
P. Houtondji	Nematology				3	
Ethiopia						
T. Gebre Hiwot	Insect Identification		July 1975		12	ICIPE, Kenya
A. Wodageneh	M.Sc. Entomology				24	
Ghana						
G.K.A. Buahin	Integrated Pest Control				9	ICIPE, Kenya
India						
N.M. Pant	Ph.D. Plant Protection	16.4.75	Oct. 75		36	University College of Wales, Aberystwyth United Kingdom
S. Chandra	Ph.D. Insect Control				36	
Iran						
A. Sadoughi	Plant Protection Management	19.9.74	3.10.74		9	United Kingdom
M.A. Kaveh	Ph.D. Cereal Protection	28.5.75	August 75		36	Faculté de Sciences Université Paris-Sud Orsay, France

Appendix II

Fellow's Name	Field of Studies	Dates Appointment	Starting	Conclusion	Duration (months)	Countries of Study
Iraq						
M.S.A. Al-Momen	M.Sc. Crop Protection (Palm Tree Pest Control)				24	
A.I. Sheet	Fruit Tree Pests				11	United Kingdom
A.H. Alwan	Nematology				12	United Kingdom
Jordan						
A.S.M.S. Khasawneh	M.Sc. Plant Protection and Locust Control				12	
Lebanon						
M. Mawlawi	Plant Protection				3	Federal Republic of Germany
M.W. Hijazi	Plant Protection				3	Federal Republic of Germany
Libya						
A.A. Kadoora	Plant Quarantine	26.2.75	28.3.75		5	Arab Republic of Egypt
F.M. Karrah	Plant Protection				3	United Kingdom
Pakistan						
M. Akhtar	Ph.D. Entomology, Ecology and Locust Behaviour	18.9.74	27.10.74		36	University of York United Kingdom
S.U. Siddiqui	M.Phil. Entomology Ecology and Locust Behaviour				12	
Saudi Arabia						
A.M. Swaid	Crop Pest Control (Desert Locust)				1	Arab Republic of Egypt
A.A. Asaad	Crop Pest Control (Desert Locust)				1	Arab Republic of Egypt
A.M.A. Al-Halwani	M.Sc. General Plant Protection				24	
Syria						
A.A. Mahmoud	Planning Crop Pest Control Campaigns	2.12.74	22.4.75		2	Federal Republic of Germany
Tunisia						
C. Bouraoui	Pest Control	10.1.75	3.3.75		4	France

Appendix III

List of papers published concerning the work of the FAO/SIDA project

(i) Letter to the Editor (re-suitability of synthetic pyrethroids for locust control). R.D. MacCuaig (1974) PANS 20 (1) 161-163.

(ii) Pesticide residues in Ethiopia, R.D. MacCuaig (1974) In. Proceedings 4th Annual Research Seminar, 24 to 26 October, 1973. Institute of Agricultural Research, Addis Ababa, Ethiopia.

(iii) The FAO/SIDA project "Study of alternative insecticides for locust control" R.D. MacCuaig (1974) Technical Series of Reports from the Desert Locust Field Research Stations, No. AGP/DL/TS/14, FAO, Rome, February 1974.

(iv) Deposits on sheep and vegetation following exhaust nozzle spraying. R.D. MacCuaig (1974) Technical Series of Reports from the Desert Locust Field Research Stations, No. AGP/DL/TS/15, FAO, Rome, June 1974.

(v) Exposure of domestic animals to pesticide sprays of possible use for locust control. R.D. MacCuaig (1974). (Paper given at the 3rd International Congress of Pesticide Chemistry, Helsinki, July 1974) to be published in Environmental Quality and Safety.

(vi) Occurrence and movements of pesticide residues in Ethiopia. R.D. MacCuaig (1974). (Paper given at the 3rd International Congress of Pesticide Chemistry, Helsinki, July 1974) to be published in Environmental Quality and Safety.

(vii) An unexpected case of dieldrin poisoning in goats. R.D. MacCuaig. Technical Series of Reports from the Desert Locust Field Research Stations - in press.

(viii) Radiometric estimation of blood cholinesterase levels in domestic animals. R.D. MacCuaig. Int. J. Appl. Radiation and Isotopes, in press.

(ix) The detection of insecticides in animals and man. R.D. MacCuaig. (Paper given at the 5th Annual Research Seminar of the Institute of Agricultural Research, 30 October to 1 November 1974, Ethiopia).

(x) Insecticide Index, 1974 Supplement. R.D. MacCuaig, AGPP:MISC/17, FAO, Rome, 1975.

DLCO-EA Technical Reports :

No. 57 A trial with fenitrothion sprayed against cotton pests at Golgota farm near Metahara, Ethiopia. R.D. MacCuaig & Abreha Tecle, January 1973.

No. 58 Copulatory potential of desert locust males. R.D. MacCuaig & Gezachew Sahle, July 1973.

No. 59 Laboratory tests of alternative insecticides for use in locust baits : (1) BHC. R.D. MacCuaig & Gezachew Sahle, November 1973.

No. 60 Laboratory tests of alternative insecticides for use in locusts baits : (2) cyanophos, fenitrothion and phoxim. R.D. MacCuaig & Gezachew Sahle, March 1974.

No. 61 An examination of DLCO insecticide stocks in Kenya and Tanzania. J.L. Amisi & Gezachew Sahle, March 1974.

No. 62 The toxicity of some insecticides to fifth instar and adult desert locusts : R.D. MacCuaig & Amare Beiene, November 1974.

No. 63 Radiometric Estimation of Blood Cholinesterase Levels in Domestic Animals. R.D. MacCuaig. (Slightly different from paper in Int. J. Appl. Radiation and Isotopes).

Appendix IV

BU 6/3 TF 9161.00 - INTERNATIONAL DESERT LOCUST CONTROL

Statement of account as at 31 December 1974
(expressed in US dollar equivalents)

Receipts

Balance as at 1 January 1974		276,895.15
Transferred to TF 9462 (Training Project)		125,000.00
Received in 1974	87,828.48	151,895.15
Interest credited	5,050.67	92,879.15
		244,774.30

Deduct :

Cash Expenditure 1974

10.	Personal Services	2,965.73	
20.	Official Duty Travel	8,671.92	
30.	Contractual Services	432.58	
40.	General Operating Expenses	6,786.68	
50.	Supplies and Materials	2,760.70	
60.	Furniture and Equipment	9,376.37	
70.	Acquisition and Improvement of Premises	-	
80.	Fellowships, Grants and Contributions	5,303.72	
		36,297.70	
90.	Project Servicing Costs 14%	5,081.67	
			41,379.37
Balance as at 31 December 1974			203,394.93

Appendix V

INTERNATIONAL DESERT LOCUST TRUST FUND 9161

ANNUAL BUDGET 1 JULY 1971 ONWARDS

Code		US$
10	Personal Services	
	Research projects, lecturers advisory visits, technical editors, etc.	10,000
20	Travel on Official Business	
	Research projects, advisory visits	15,000
30	Contractual Services	
	Research projects, publications and miscellaneous	30,000
50	Expendable Supplies	
	Research material	4,100
60	Equipment	
	Research and demonstration equipment	5,000
80	Fellowships and Training	5,000
90	Projects Service Costs (approximate) 14%	9,674
		78,774
	Unallocated Balance	2,142
		80,916

Appendix VI

TRUST FUND No. 9161.00 - INTERNATIONAL DESERT LOCUST CONTROL

Outstanding Contributions as at 30 September, 1975

	1969-72	1972-73	1973-74	1974-75	1975-76	Total Due at 30.9.1975
Afghanistan	-	-	-	-	1,910.00	1,910.00
Algeria	-	-	-	-	2,580.00	2,580.00
Bahrain	-	-	-	-	720.00	720.00
Chad	-	1,200.22	1,800.00	1,800.00	1,800.00	6,600.22
Egypt	-	-	-	3,920.00	3,920.00	7,840.00
France (Territory of Afars and Issas)	-	-	-	-	420.00	420.00
Ghana	-	-	126.48	1,950.00	1,950.00	4,026.48
India	-	-	-	-	10,000.00	10,000.00
Iran	-	-	-	-	3,690.00	3,690.00
Jordan	-	-	-	-	1,730.00	1,730.00
Kenya	-	-	-	-	1,800.00	1,800.00
Kuwait	-	-	-	-	420.00	420.00
Lebanon	-	-	-	-	1,350.00	1,350.00
Mali	5,400.00	1,800.00	1,800.00	1,800.00	1,800.00	12,600.00
Mauritania	-	-	-	-	1,720.00	1,720.00
Morocco	-	-	-	(404.24)	2,990.00	2,585.76
Niger	-	-	-	30.37	1,800.00	1,830.37
Nigeria	-	-	3,650.00	3,650.00	3,650.00	10,950.00
Oman	-	830,00	830.00	830.00	830.00	3,320.00
Pakistan	-	-	-	-	5,860.00	5,860.00
Qatar	-	-	-	-	830.00	830.00
Saudi Arabia	-	-	-	-	1,830.00	1,830.00
Senegal	-	-	-	-	(434.61)	(434.61)
Sierra Leone	-	(265.03)	358.00	358.00	358.00	808.97
Somali Republic	-	-	-	(151.57)	1,450.00	1,298.43
Spain	-	-	-	-	2,400.00	2,400.00
Sudan	-	-	-	2,250.00	2,250.00	4,500.00
Syrian Arab Republic	-	-	-	2,010.00	2,010.00	4,020.00
Tunisia	-	-	22.56	1,990.00	1,990.00	4,002.56
Uganda	-	-	-	(2,100.00)	1,650.00	(450.00)
United Arab Emirates	-	-	-	-	5,500.00	5,500.00
Yemen Arab Republic	5,520.00	1,840.00	1,840.00	840.00	1,840.00	11,880.00
Yemen, PDR of	240.00	120.00	120.00	120.00	120.00	720.00
Total $	11,160.00	5,525.19	10,547.04	18,892.56	72,733.39	118,858.18

Appendix VII

LIST OF WORKING PAPERS

AGP:LCC/75/1	-	Agenda
AGP:LCC/75/2	-	The Desert Locust Situation - October 1974 - September 1975
AGP:LCC/75/3	-	Anti-Locust Measures undertaken by various countries and Regional Organizations (October 1974 - September 1975)
AGP:LCC/75/4	-	A Study of the Desert Locust Upsurge in the Indo-Pakistan Summer Breeding Areas during 1973-74 - Possible Causes and Impact of Control Operations
AGP:LCC/75/5	-	Progress Report on the Training Project (November 1974 - July 1975)
AGP:LCC/75/6	-	Progress Report on the FAO/SIDA Locust Project
AGP:LCC/75/7	-	Monitoring of Pesticide Residues in Areas Sprayed for the Control of the Desert Locust - Project Background and Activities to June 1975 - FAO/DANIDA Project
AGP:LCC/75/8	-	International Desert Locust Trust Fund 9161
AGP:LCC/75/9	-	Status of the Various Desert Locust Regional Organizations
AGP:LCC/75/10	-	Report of the Mid-Term Review on the Inter-regional Training Project in Crop Pest Control with Special Reference to Desert Locust Control and Research
AGP:LCC/75/11	-	Enlargement of the Scope of the Desert Locust Control Committee
AGP:LCC/75/12	-	Report of the Expert Consultation on Satellite Application for improving Locust Survey and Control Techniques