

**REPORT OF THE**

Held in Rome, Italy  
25-29 October 1976

**TWENTIETH SESSION  
OF THE FAO DESERT LOCUST  
CONTROL COMMITTEE**



**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS**

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Rome, Italy  
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Plant Production and Protection Division  
Food and Agriculture Organization of the United Nations  
Rome, 1976

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION .....	1
Officers of the Session .....	2
Acknowledgements .....	2
Obituary .....	2
PARTICIPATION IN THE SESSION .....	3
Delegates from Member Nations of FAO .....	3
Observers .....	7
FAO Staff .....	8
Consultants .....	8
Interpreters .....	9
Secretaries .....	9
AGENDA .....	10
SUMMARY OF DISCUSSIONS .....	11
The Desert Locust Situation - October 1975 - October 1976 .....	11
General Features .....	11
South-West Asia .....	11
Near East .....	12
Eastern Africa .....	12
North-West Africa .....	13
West Africa .....	13
Reporting .....	14
Forecast .....	14
South-West Asia .....	14
Near East .....	14
Eastern Africa .....	15
North-West Africa .....	15
West Africa .....	15
Control Operations undertaken by various National and Regional Organizations ..	15
Training Project in Crop Pest Control with Special Reference to Desert Locust	
Control .....	15
Project Activities .....	16
Future Training Requirements .....	18
Training Course on Meteorology .....	18
FAO/SIDA Project .....	18
FAO/DANIDA Project .....	19
Recommendations on Insecticide Usage .....	20
Pilot Project on Application of Remote Sensing Techniques for Improving	
Desert Locust Survey .....	20
Gregarisation of the Desert Locust in 1974 in South-West Mauritania and	
Tamesna of Mali .....	22
International Trust Fund 9161 .....	23
Status of the various Desert Locust Regional Organizations .....	23
Commission for Controlling the Desert Locust in the Eastern Region of	
its Distribution Area in South-West Asia .....	23
Commission for Controlling the Desert Locust in the Near East .....	24
Commission for Controlling the Desert Locust in North-West Africa .....	24
Desert Locust Control Organization for Eastern Africa (DLCO-EA) .....	25
Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviaire	
(OCLALAV) .....	25
Regional Officers .....	26
Arabic Interpretation .....	26

DATE AND PLACE OF NEXT SESSION .....	<u>Page</u> 26
--------------------------------------	-------------------

APPENDICES

I	- Anti-Locust Measures undertaken by various countries from October 1975 - September 1976 .....	27
II	- Project (INT/71/030) Budget covering UNDP contribution .....	30
III	- Training Project INT/71/030 Trust Fund 9462 Budget .....	31
IV	- Training Requirements in Crop Protection and Locust Control for Years 1976 - 1982 .....	32
V	- Trust Fund No. 9161.00 - International (Desert Locust Control) - Final Statement of Account as at 31 December 1975 .....	33
	Breakdown of 1975 Expenditure .....	34
VI	- International Desert Locust Trust Fund 9161 - Budget .....	35
VII	- Trust Fund No. 9161 - International Desert Locust Control - Pledge Position as at 31 July 1976 .....	36
VIII	- List of Working Papers .....	37

## INTRODUCTION

The Nineteenth Session of the FAO Desert Locust Control Committee, which was held in Rome from 29 September to 3 October 1975, recommended that the next Session should be convened in the second half of October 1976. Accordingly, the Director-General invited the following Governments to be represented by Delegates at the Twentieth Session.

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

He also invited the representation of the Desert Locust Control Organization for Eastern Africa (DLCO-EA), Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviaire (OCLALAV), International African Migratory Locust Organization (OICMA), 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 and the World Meteorological Organization (WMO).

The Session was opened by Dr. E.J. Buyckx, Officer-in-Charge, Plant Protection Service, Plant Production and Protection Division, who, on behalf of the Director-General of FAO, welcomed all the participants to the Session; and reviewed some of the significant features and important developments of the locust programme since the last Session of the Committee. He congratulated the Member Countries and Regional Organizations for increased surveillance and timely destruction of incipient locust populations through a concerted and cooperative international effort. At the same time he sounded a word of caution that ecological events appeared to be working in favour of the Desert Locust. Increased locust activity had been reported from a number of areas and he emphasized the need for continuous vigilance and for careful review of the existing control potentials and full preparation for emergency control operations in the future. He further informed the Committee about the progress made in the Pilot Project to use satellite imagery to provide rapid and comprehensive information on the occurrence of potential Desert Locust breeding sites and hoped that the report on the subject would receive the Committee's careful consideration.

Officers of the Session

Chairman : Abdel Moneim Hassan Mohamed Karrar (Sudan)

Vice-Chairman : Ismael Kane (Niger)

Drafting Committee : The delegates of Algeria, Egypt, Niger, Pakistan and Somali Democratic Republic and the FAO Secretariat. Mr. J. Roy and Dr. J.S. Gill acted as Technical Secretaries and Mr. Gurdas Singh as Consultant.

Acknowledgements

The Delegates thanked the Chairman for conducting the proceedings efficiently and in a pleasant and courteous manner. They also wished to place on record their appreciation for the services rendered by the FAO Secretariat and for the facilities provided by FAO for convening the Session.

Obituary

The Committee learnt with deep regret about the sudden death in Paris of Professor J.R. Le Berre, an eminent teacher and researcher in Entomology and in particular in insect ecology, at the University of Paris-Sud in Orsay. Professor Le Berre was intimately associated with FAO and helped in the training of a number of research-fellows in his laboratory. He made a significant contribution in developing field research leading to a new approach for the prevention of the resurgence of the Migratory Locust, in particular the Malagasy species.

The Committee was also informed about the sad death of Captain A. Temple of USA, who had helped in the training of many pilots in Eastern Africa over a period of some 20 years. The Committee wished to record its appreciation of Captain Temple's services in the field of agricultural aviation.

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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 1975/76 and Forecast
6. Anti-Locust Measures Undertaken by Various Countries and Regional Organizations (October 1975 to September 1976)
7. Report on Pilot Project on Satellite Application for Improving Locust Survey and Control Techniques
8. Report on Training Project in Crop Pest Control with Special Reference to Desert Locust Control and Research; and Future Outlook; and Meteorology Training Course, Dakar
9. Progress Report on FAO/SIDA and FAO/DANIDA Projects
10. Study of Gregarization in South-West Mauritania and Tamesna of Mali in 1974
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. Any other business
14. Date and Place of Next Session
15. Adoption of the Report

## SUMMARY OF DISCUSSIONS

### The Desert Locust Situation - October 1975 - October 1976

#### General Features

1. The ecological conditions in many parts of the breeding area of the Desert Locust were highly favourable during most of the period under review : the winter-spring rains during 1975-76 were above average and were followed by equally well distributed and heavy summer rains over all the three major breeding regions of South-West Asia, the Near East and Africa. As a result of continual breeding, gregarious populations developed in these regions and it was apprehended that a new locust plague was in the offing. However, the situation was contained by careful surveillance and timely control. In South-West Asia there was rapid multiplication of locusts necessitating control operations during winter/spring period. Despite control operations, swarm formation took place on a small scale and was reported in August 1976 from areas along the Indo-Pakistan border. As a result, considerable numbers of locusts were expected to migrate towards the west. In the Near East swarms were reported from Saudi Arabia at the end of February, against which aerial control operations were organized and the situation was brought under control. For the first time after many years, groups of gregarious adults were reported from border area of Kuwait and Iraq in April-May requiring control operations. In Eastern Africa breeding was mainly concentrated in coastal areas of Sudan and Ethiopia particularly in the Tokar Delta. In other parts the situation was comparatively quiet. In North West Africa significant locust developments took place consequent to widespread and, at times, heavy rains during December 1975 to June 1976 : groups of hoppers, fledglings and adults in varying densities up to 2000 adults/ha were reported from a number of places in the Algerian Sahara and locations in Morocco, Libya and Tunisia. Control measures were adopted. In West Africa control operations, which commenced in Mauritania in September 1975, continued up to November; concentrations of locusts were again reported in the region of Tessalit of Mali in the north of Adrar des Iforas at the end of May 1976. Infestations developed in June/July in the North-West and Central Adrar. Control operations and lack of rains brought the situation under control. Rain in September favoured breeding at the extreme north of Mali at the Algerian/Mali border where control operations were undertaken. Elsewhere in West Africa the locust situation remained quiet with the exception of limited concentrations of hoppers in the north of Niger, which were controlled. In Mauritania insignificant locust populations were reported. Between May and September, important swarming populations and hopper concentrations were observed in the north of Adrar des Iforas in Mali.

#### South-West Asia

2. In the summer breeding areas, consequent to heavy and widespread rains, locusts in large numbers bred through one to two generations; and a few mature locust swarms, 3 to 26 Km<sup>2</sup> in size, were reported from India and Pakistan from September through November 1975. Most of those swarms and their progeny were controlled by extensive ground and aerial operations. The area was reported to be free of locusts in December as locusts escaping control would have migrated to the winter breeding areas. Scattered adults were reported from several places in coastal Mekran of Iran and Pakistan, in central Baluchistan and Sind in Pakistan and in Rajasthan in India between January and April. In Pakistan, control began in April against hoppers on the Mekran coast.

3. Adults and hoppers were again widely reported during May from south-east Iran to India including Southern Afghanistan. Control against hoppers and adults began in Jaz-Murian districts of Iran and was extended to central Baluchistan, Chagai and Quetta districts in Pakistan. Control continued during June in Mekran of Pakistan and Iran and Iranian Baluchistan in addition to areas referred to in May. Control was also adopted in Shorawak and Spin Buldak areas of Afghanistan in July. On 25 June, an immature swarm was sprayed with dieldrin, in the Lasbela district near the Iran border and another swarm was dusted at the end of June in Nushki near the Afghanistan border.

4. Scattered locusts were widespread in summer breeding areas of Pakistan and India during June and July. Most locusts were reported to be mature and rain was reported from several places: 70 mm at Jodhpur and 29 mm at Jaisalmer. A mature locust swarm was reported from Jaisalmer district in India. Control was also carried out against groups of hoppers. Further breeding took place in Rajasthan during August and September against which control was undertaken.

#### Near East

5. In Saudi Arabia, control was carried out against adults, fledglings and hoppers in the Tihamas in October and November 1975 and in December, groups of mature adults were reported from Quinfidah Tihama. From mid-December, following frequent falls of rain, several egg fields, measuring between 4 and 20 Km<sup>2</sup> were found over an area of 1000 Km<sup>2</sup> between Shaq-e-Shami and Habil. Scattered adults were also reported from numerous localities both in the interior and on the Tihama between July and December. More groups of mature and maturing adults were observed during January in Quinfidah area while scattered adults persisted in the interior. At the end of February, six mature locust swarms were reported to have entered southern Tihama and 33 swarm movements were recorded in the area during March. Breeding took place in February to early March over a large area. Hoppers of different stages were observed over an area of 500 square miles in March. Control operations started since December by ground teams were strengthened by obtaining an aircraft from DLCO-EA. Aerial operations were carried out from 20 March to 12 April covering an area of about 2000 Km<sup>2</sup>, using 27,000 litres of dieldrin 20% and malathion 97%. No gregarious locusts were observed during May, and only low density scattered locusts were found in southern Tihama and the interior at a number of places; no locusts were observed in the northern Tihama. Scattered locusts were reported during July-August on the foothills of Asir and Hijaz mountains, Taif and the Interior.

6. Scattered adults and hoppers were reported from Tihama of Yemen Arab Republic from July to September 1975. Control was carried out against isolated groups of mature adults, fledglings and hopper bands in November and December in the Highlands and the Tihama in November and December. No significant locust activity was observed during January to May 1976. An immature swarm, reported settled around Sana'a on 10 June, seemed to have scattered over the Highlands: only scattered locusts were reported in July and August. In the People's Democratic Republic of Yemen, control was adopted in September and October 1975 against hoppers and fledglings and again in June 1976, otherwise the locust situation remained relatively quiet.

7. Elsewhere, in the Eastern Arabian Peninsula, heavy rain fell in Kuwait, and the Sultanate of Oman from January to April. In spite of this widespread rainfall, there did not appear to be an increase in locust numbers except in the Sultanate of Oman. Scattered locusts were reported in February and March, but by April hopper bands with fledglings were present south of the Hajjar mountains and swarms were seen at the end of the month in the extreme east of the country. Control was carried out against these populations and further surveys in May and June indicated that only a few locusts remained. Locusts were also seen further south in Oman in June when there was a report of locusts on the Dhufar coast. On the Kuwait/Iraq border control was carried out in May against hopper bands and the area was reported clear in June. In the United Arab Emirates concentrations of hoppers and adults were reported during May and June; and they were controlled.

8. Other countries of the region were reported free from any locust activity.

#### Eastern Africa

9. In Sudan, scattered adults were reported in September and groups of adults near Khartoum in November and from Tokar Delta in early December. Rainfall was recorded in November to January creating a serious situation on the Red Sea coast of Sudan between January and April. Gregarious populations, including swarms and bands, were present in the Tokar Delta area and to the south, towards the border with Ethiopia. However, control was carried out against these locusts (the maximum infested area was 3,500 hectares in February) using 155,395 kilograms of BHC dust (Agrocide 7) 14,812 kilograms of BHC dust (Agrocide 3) 150,760 kilograms of poisoned bait, 2,275 litres of 20% dieldrin and 957 litres of 96% malathion. Control ended on 20 April and there have been no further reports of locusts in Sudan.



10. Populations similar to those in Sudan were probably present on the northern Red Sea coast of Ethiopia in January and February as locusts were seen in the border area by the Sudanese survey teams. Fifty-eight millimetres of rain fell at Massawa during February following a record daily total of 346 millimetres in December, so conditions were likely to have been suitable for breeding. However, the first definite report of locusts from northern Ethiopia was received in June when three mature locusts were caught in Asmara. There have been no other reports of locusts from anywhere else in Ethiopia. During regular surveys of the northern Somali Democratic Republic, scattered adults were found along the coast and inland from January to April. Heavy to moderate rainfall was reported over the Harar Hills of Ethiopia and north-western Somalia in April and May and 22 mm were recorded at Djibouti in June. During April and May mature adults were found in northern Somalia. Successful breeding occurred, which led to the formation during June of first instar hopper bands at Las Dureh, and groups of late instar hoppers near Galkayo. Transient adults were also seen near Las Dureh, Garot and Galkayo.

#### North-West Africa

11. In Algeria, solitary locusts in small numbers persisted in the Sahara and were reported from Wadis Botha, Teguelminine, Arak, Ameded, Toufin in August to December 1975. In January 1976, abundant rain, over 30 mm in 4 to 5 days, fell in central and western Sahara; rains were also received during February and March, and the ecological conditions remained favourable for breeding of locusts. An adult locust population, 10 to 30 locusts per hectare, was observed in the first week of March south of In-Sahah. At Assouf Mellene, fledglings at 2,000/hectare were recorded on 10 May over 500 hectares. In July and August localized breeding was observed in the region of In-Amena where control was carried out over an area of about 4,000 ha. Again in September hopper bands were reported in certain wadis south of the Hoggar mountains where control operations were in progress against adults and hoppers. In Libya, no locusts were reported in August to December 1975. During 1976, the winter-spring rains were good and widespread creating favourable conditions for breeding but no locusts were reported during January to March 1976. During April, a few solitary immature adult locusts were observed at three places: Wadi Tanazzuft; Libya-Tunisia border (3010N-1010E) and at Mizda region (3125N-1330E). In the months of June, July and August further locust infestations were found in Sebhü, Gahademes, Mizda, Ghat and Beni Oulid over a gross area of 89,100 hectares, out of which approximately 45,000 hectares were treated.

12. In Morocco, because of dry conditions, locust activity declined between September and December 1975. The breeding conditions remained unfavourable during January to May 1976 and only scattered locusts in small numbers were recorded in Morocco, but scattered hoppers over an area of 1,000 hectares in the areas of Tafraout and South Errachidia were treated during June and July 1976. In Tunisia, a number of solitary locusts were detected in the southern part of the country between Tiart (SP.3) and Bordj el Khadra along the Libyan-Tunisian border during July 1976.

#### West Africa

13. In Mauritania, locust activity was relatively important in September-October 1975. Control operations against adults and hoppers had covered 20,855 ha. Locust activity then declined quickly inspite of suitable ecological conditions particularly in the north of Plateau du Tagant which received rains in January 1976. Later on monsoon rains were scanty until early September 1976. Important rains occurred from the second half of September until 7 October in the west and north of Mauritania. Adult migrant population was reported in the Aleg region and was collected at night with the help of light traps.

14. In Mali, locust activity remained low from October 1975 to April 1976 inspite of suitable ecological conditions in several localities. At the end of May 1976, early monsoon rains fell on Adrar des Iforas. A heavy density immigrant mature adult population was observed over 5,000 ha at a density of 3,000 to 10,000 per ha. Subsequently hatching started on 15 June and fledglings of the new generation were observed in July/August 1976. Rains were very scanty in August and early September in Adrar where breeding was restricted to localized spots along the wadis. Starting 10 September important and widespread rains

created very favourable ecological conditions in Adrar and Tamesna on both sides of the Algerian/Mali border where ground control operations were undertaken from June to September over 10,235 ha. Aerial operations were in progress.

15. In Niger, control operations were undertaken in September 1975 against hopper concentrations covering 1,020 ha. Subsequently the locust situation remained calm until August 1976 when ecological conditions became more favourable. From end June to July 1976, important rains occurred in Tamesna and Afr. As was the case in Mali, adult populations invaded the area. From July to September, control operations covered a total of 3,785 ha. Following a dry period important rains fell starting 10 September making ecological conditions favourable for further breeding. Surveys were underway.

#### Reporting

16. The Committee drew the attention of the Governments to the need for regular surveys, collection of accurate information on locust incidence in their respective areas and its speedy onward transmission to the regional locust officers/organizations, FAO Rome and COPR London, regularly and in time.

#### Forecast

17. The significant feature of the locust situation during October 1975 to September 1976 was the occurrence of well-distributed and above-average rainfall over most of the breeding area. Consequently, extensive breeding took place in all the three - eastern, central and western - regions, with the production of large numbers of hopper bands and many small to medium sized swarms. Aerial and ground control operations against these infestations were carried out in some 16 member countries. As a result, most of the populations, which would have otherwise developed into a plague proportion, were brought under control. However, despite best efforts, some locust escapes are bound to occur and considerable numbers of locusts would move to winter-spring breeding areas. According to present indications significant locust migrations are expected into Mekran of Pakistan and Iran, and possibly to the eastern Arabian Peninsula. Locusts will most probably move from the south to the Tihamas of Saudi Arabia and from the summer breeding areas of West Africa to southern Algeria and Morocco. Further breeding is likely in Somalia, parts of northern Ethiopia and in the coastal areas of Sudan.

#### South-West Asia

18. Extensive breeding in Indo-Pakistan desert areas took place in the wake of heavy summer rains and small scale swarm formation was reported in August. These swarms and subsequent breeding were controlled by end-September. In early October, no important locust populations were observed in these areas. It is expected that remnant locust populations would have already started to move to Mekran where considerable breeding is likely to take place should the winter rains be widespread and sufficient. Some of these populations might move further and reach southern Iran and possibly Oman and breed there in the coming winter-spring.

#### Near East

19. In Saudi Arabia, only scattered locust populations were present along the coastal plains as well as in the Asir and Hijaz mountains. Ecological conditions in the above areas were not very favourable for the present for further multiplication. In the wake of expected rains in the winter, the situation could, however, change rapidly and extensive breeding might occur in the Tihamas. In the Tihama of the Yemen Arab Republic and in the breeding areas of the People's Democratic Republic of Yemen, where good amounts of rainfall had been received in August, suitable breeding conditions were present and there was every possibility that the existing locust populations in those areas would give rise to considerable numbers in the coming months.

#### Eastern Africa

20. In Eastern Africa, scattered adults in small numbers would continue to occur on the Red Sea coastal plains of Ethiopia and the adjacent coastal plains of Sudan, and small scale breeding might take place. In north eastern Somali Democratic Republic, adults in considerable numbers were present and these were likely to move north-westward and breed in the coastal areas of the Republic and some might reach as far as the Territory of the Afar and Issa Peoples.

#### North-West Africa

21. In Algeria favourable breeding conditions were present in August around the Hoggar mountains : rains were reported in September flooding the wadis south of Hoggar. Hopper bands in patches were already reported from south of Hoggar against which control operations were undertaken. Further breeding is likely to continue in the area. Scattered populations were likely to occur in southern Morocco and western Algeria where breeding might also take place.

#### West Africa

22. Scattered young adults in substantial numbers were likely to result from breeding in north-eastern Mali, north-western Niger and adjoining parts of Algeria. The heaviest infestation occurred in the Adrar des Iforas of Mali. Locusts in substantial numbers would have already moved northwards and started breeding in the vicinity of the Ahaggar mountains. Some might reach western Algeria, southern Morocco and northern Mauritania. It is expected that some scattered locusts would persist in north-eastern Mali and north-western Niger. Further breeding is expected in areas receiving rainfall in October/November especially in Tamesna of Niger, central and south-eastern Adrar des Iforas in Mali and in central and southern Mauritania.

#### Control operations undertaken by various National and Regional Organizations

23. There had been locust breeding resulting in hopper bands and swarms against which control operations were undertaken notably in Afghanistan, Algeria, India, Iran, Kuwait, Libya, Mali, Mauritania, Morocco, Niger, Pakistan, Saudi Arabia, Somali Democratic Republic, Sudan, United Arab Emirates, Yemen Arab Republic and PDR Yemen. On the whole, a total of 26,086 sq. kms. of infested area was treated with 102,033 litres of liquid insecticide, 164,557 kgs. of BHC dust and 236,518 kgs. of BHC bait. Details are given in Appendix I.

#### Training Project in Crop Pest Control with Special Reference to Desert Locust Control

24. The Project became operational at the end of January 1974 with the appointment of the Project Manager and was to last up to April 1977 but because of the UNDP financial crisis it was terminated prematurely with effect from 31 July 1976. The total expenditure envisaged under the project was \$1,644,750 of which \$618,750 was UNDP contribution and \$1,026,000 of participating governments. The actual expenditure against the budget was \$1,477,752 (Appendices II and III) of which UNDP spent \$561,881 and Trust Funds \$915,871 : a likely saving of nearly \$134,000 under the Trust Fund component (\$1,050,000 minus \$915,871).

25. The Committee was informed that three of the four Trust Funds had not been charged their full contribution for 1976 because of low balances : in effect, there were, thus, no cash savings. The exact quantum of savings, if any, under the Trust Fund 9462 component would be known only after the settlement of final accounts some time in 1977. The Committee after reviewing the utilization of likely savings, agreed that such a balance could be utilized to continue some of the training components such as training requirements of a specialized nature of certain member countries.

Project Activities

26. During the Project period of two and a half years, eleven training courses, seven on general crop pest and desert locust control and research in three languages viz., English, French and Arabic, two on aerial survey and spraying techniques, and two on radio operation and maintenance techniques, were organised successfully. All levels of field staff, including managerial and research personnel with responsibility for crop pest control, were included in the programmes. The group training courses were limited to field officers with some experience in locust and/or pest control. Group fellowships which had been awarded only during the first year of the Project were abandoned as it was found rather difficult to arrange tour itineraries suited to the convenience of all the participating senior officers. Instead more individual fellowships, both short- and long-term, were awarded to persons responsible for organisation and administration of larger units engaged in pest control or applied research work. A brief review of the courses arranged and persons trained in various special fields is given below:

A. Group Training Courses on General Crop Pest Control

<u>Language</u>	<u>Number of Courses</u>	<u>Number of Trainees</u>	<u>Total Period</u>
English	3	67	97 days
Arabic	2	61	66 days
French	2	56	66 days
	<u>7</u>	<u>184</u>	<u>229 days</u>

B. Group Training Courses on Aerial Survey and Spraying Techniques

<u>Language</u>	<u>Number of Courses</u>	<u>Number of Trainees</u>	<u>Total Period</u>
English/ French	2	56	60 days

C. Group Training Courses on Radio Maintenance and Operation

<u>Language</u>	<u>Number of Courses</u>	<u>Number of Trainees</u>	<u>Total Period</u>
Trilingual	2	58	180 days

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Gross totals for			
Group Training Courses	11	298	469 days

	<u>Number of Trainees</u>	<u>Total Period</u>
D. <u>Short-term Group Fellowships</u>	8	60 days
E. <u>Individual Short-term Fellowships</u>	19	1 - 6 months
F. <u>Individual Long-term Fellowships</u>	30	6 - 36 months

27. The Committee, while appreciating the work done during the short life of the project, was of the opinion that there was further scope for improvement and recommended that the following points should be taken into consideration while organizing any future training :

- (a) The principle of holding single-language courses evolved on the basis of previous experience was upheld as it ensured the optimum exchange of views between the experts and the trainees. But, it was observed that the level of trainees within a group varied considerably, despite efforts to ensure uniformity by prescribing minimum requirements for admission, creating problems in assimilation of the course content. It is, therefore, recommended that, in future, while organizing group courses in general pest control including locust control, the countries within a language group (English, Arabic and French) could be further sub-divided into two categories, (i) those with a number of qualified graduate and experienced staff and (ii) those with relatively fewer qualified persons, working in plant protection and locust control.
- (b) Member countries having sufficient qualified persons may consider nominating candidates either for long-term fellowships leading to post-graduate studies or to short-term fellowships and exchange visits in order to stimulate discussion on common problems with their counterparts in other countries. In-service refresher courses could be best organized at the national level. Requests for provision of experts in specific subjects to help conduct such courses might be accepted if requirements could not be met by the national institutions or universities.
- (c) In countries with insufficient number of qualified persons in the field of plant protection or where the field officers lack adequate experience, one of the two choices could be made :
  - (i) In-service training courses or seminars under local conditions may be organized either for one country or a group of adjacent countries with similar requirements with the help of consultants. This method should ensure practical training under local conditions and in a language and at a level easily understood by the participants : and could meet the training needs of the area effectively. The consultants should have adequate knowledge of local conditions and problems.
  - (ii) Selected senior staff could be trained at a national or regional institution outside the country and who could, on return home, organize national level in-service training groups or courses. It might be necessary to provide expert guidance, at least at the initial stage, to help develop the methods and materials for such courses and provide general guidance on how to conduct them.
- (d) The group training courses on Aerial Survey and Spraying and Radio Operation and Maintenance were highly appreciated by the trainees as adequate facilities in these specialized fields of training were not usually available in the majority of the member countries and the contents and quality of the courses were of a higher degree. Particular attention, therefore, needs to be paid to future requirements of training in these two fields and special group training courses on the lines already conducted should be held periodically. Besides, consultants in these fields could be made available to countries to help them in developing local facilities.
- (e) Lack of trained manpower in developing countries remains a great impediment towards the progress of agriculture as a whole and plant protection in particular. In order to overcome this problem a long-term training programme seems essential. As a follow-up to this Training Project and to evolve a more viable and meaningful training concept, the future training programmes should be institutionalized both for extensive and intensive training. There are a number of national, regional and international institutions which impart such training in plant protection and

could be sub-contracted for organizing those training courses.

- (f) In the selection of trainees, the Regional Locust Officer and FAO Country Representative should be more actively involved to seek cooperation of the member governments to nominate suitable candidates.
- (g) Attempts should be made to collect information from the member governments regarding their long-term and short-term plant protection policies and strategies vis-à-vis trained manpower requirements in different disciplines of crop protection and their capacity to absorb trained personnel. Such information though difficult to collect and not easily available for all the member countries should help in the better planning of training courses in future.
- (h) The organizing of training courses requires careful preplanning and a period of 6 to 9 months would be necessary to complete the necessary formalities of inviting nomination, making final selection, arranging lecturers, making travel and accommodation arrangements, etc. The administrative responsibility of all such arrangements should be delegated to the project staff as far as possible.

#### Future Training Requirements

28. As a follow-up action to the recommendations of the mid-term review of the project and also as a preliminary to the proposed meeting of senior agricultural officials on plant protection, the participating governments were requested to indicate their training requirements for the period 1976-1982. The requirements based on replies received so far are given in Appendix IV : Seventeen countries have put their requirements of training at 679 personnel under different categories of training while replies of some 17 countries/organisations are still awaited.

29. Pending the improvement in the availability of international aid funds, it is suggested that essential locust training components such as short- and long-term fellowships exchange visits, provision of short-term consultancies, etc. should be continued under the respective Trust Funds to meet the immediate requirements of the Regions.

30. Meanwhile efforts should be made to develop national and regional training facilities in crop protection including locust control at the national level to meet in-service requirements of practical training.

#### Training Course on Meteorology

31. On the request made by OCLALAV a Training Course on Tropical Meteorology as it relates to crop pests, locusts, granivorous birds, was held in Dakar from 16 to 25 February 1976. The course was organized with the active participation of the Agence pour la Sécurité de la Navigation Aérienne (ASECNA) and FAO. A total number of 17 persons including OCLALAV staff members, experts and advisors participated in the course. The course consisted of 12 lectures on various facets of meteorology ranging from basic meteorological observations to present and future meteorological satellite application together with projection of numerous films and slides and practical field work. The course provided a much clearer picture of the relationship between meteorological factors and the development and movement of insect pests. This knowledge would make it possible to improve the existing forecasting system, which would undoubtedly contribute to more effective and timely control operations.

#### FAO/SIDA Project

32. The Project continued its work of testing various insecticides with a view to finding new alternative compounds of short persistence which could be economically used for locust control to replace the persistent organochlorine compounds EHC and dieldrin.

33. A thriving culture of desert locusts is maintained together with a smaller number of the African Migratory Locusts, L. migratoria. Tests are 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, and spray application on to vegetation which enables the stomach toxicity to be determined at varying periods after the spray has been applied to the vegetation.

34. Tests with locusts and/or domestic animals have been done with a number of insecticides:

- (a) Fenitrothion is currently much used for adult control : tests with domestic animals showed that it met the safety requirements devised for the project.
- (b) Bendiocarb is very effective against locusts : some tests have been done using domestic animals. In these an aqueous suspension of bendiocarb (100 g/l) was sprayed at a dosage level of 2,000 g/ha, ten times the dosage calculated to be necessary for locust control. Goats were fed on the sprayed vegetation for 3 days. No visible symptoms of poisoning were observed and the feeding behaviour of the animals did not appear to be affected. However, acetylcholinesterase levels were considerably depressed in every exposed animal. This finding was at variance with some earlier results but indicates that bendiocarb cannot always meet the safety requirements demanded.
- (c) Carbofuran is another insecticide highly toxic to locusts and difficult to formulate. An aqueous suspension was sprayed over both desert and migratory locusts and from these tests the field dosages required for control were estimated to be 200 and 55 g/ha respectively. In tests with domestic animals fed with vegetation sprayed at an estimated ten times the field dosage it was shown that even against the migratory locust its safety was uncertain.
- (d) Few tests had been carried out using the insecticide mecarphon against locusts. When sprayed over adult desert locusts an LD-50 of 3.4 ug/g was obtained. However, against nymphs it was less effective. Although a deposit of 1.2 ug sprayed onto wheat seedlings killed all first instar nymphs when they were fed the vegetation immediately after spraying, when the seedlings were fed to the insects 2 days after spraying only 50% of the insects died. Against fifth instar nymphs a dose of 27 ug/nymph killed only 30% when fed to nymphs two days after application.
- (e) A new series of compounds have recently been received and work on them is proceeding : most of them seem to be very promising. Provisional results from the initial experiment, in which the insecticide was applied externally by microsyringe, gave the approximate LD-50s. All compounds with an LD-50 by this method of application of less than 10 ug/g are of possible practical use for locust control. Of particular note are Etrimphos, Salithion and S5602. It is hoped that time will permit an adequate study of these insecticides before the end of the project.

35. The Committee appreciated the valuable work done under the Project and requested FAO to convey its thanks to SIDA for financing such a worthwhile Project. At the same time the Committee placed on record its thanks for the facilities and cooperation received from the DLCO-EA and more particularly for the support received from its Director.

#### FAO/DANIDA Project

36. The Project was designed to monitor pesticide residues in the soil and became operational in October 1974. In the early stages of the Project, staff remained busy in establishing the laboratory in Teheran which is the headquarters of the Project and in carrying out some field trials. Subsequently the Chemist-in-Charge made field visits to India and Pakistan to study the conditions of use of dieldrin and BHC and to familiarize himself with the existing laboratory facilities. One hundred and thirty-six composite samples of soil were taken from some of the dieldrin tested areas in Pakistan and analysed in Teheran. The following were the results obtained from these samples :

- (a) At least 75% of dieldrin applied as a 20% E.C. in the desert areas studied disappears within one year of application and at least 97% disappears within 3 years of application. These values for rates of loss are derived from the highest residues found and the true values are likely to be much higher.
- (b) No evidence was obtained to show that dieldrin persists to any appreciable extent below the ground surface and the results indicate either retention of dieldrin and its photoisomers near the surface or migration of these compounds towards the surface.
- (c) These conclusions rely upon assurances that the sprayed areas had been correctly identified. Large areas, ca. 1 Km<sup>2</sup> in each case, had been comprehensively sampled to reduce the uncertainty in identifying such areas.
- (d) The higher residues of dieldrin were usually found in surface samples and were accompanied by residues of photodieldrin which is formed by the action of sunlight. It is likely that dieldrin at the surface will be lost by evaporation because of the high surface temperatures and wind action.

37. Experimental spraying will be conducted in a suitable area to study BHC and dieldrin residues to find more information about the field sample results. Further testing of field samples will be continued depending upon load of work.

38. The Committee noted with some relief that the results so far obtained indicated a fair possibility of the continued use of insecticides like dieldrin for locust control in the least populated desert areas and recommended that the current sampling and analysis work should be intensified to obtain concrete results in the near future. The delegates wished to record their appreciation of the assistance provided by DANIDA to undertake this important field research for the benefit of all concerned. The Committee also thanked the Government of Iran for providing numerous local facilities.

#### Recommendations on Insecticide Usage

39. The Committee noted the fact that despite screening of some fifty promising chemicals as substitutes for dieldrin and BHC for locust control under the SIDA Project, no suitable alternatives were available especially for control of nymphs and for barrier-spraying in remote and inaccessible areas. Besides, the substitution of dieldrin with new chemicals against hopper bands would cost about ten times more to apply. The Committee, considering the implications of these findings and the growing trend for banning of dieldrin, recommended that the use of dieldrin for control of nymphs should be continued until such time as equally effective and economical insecticides were found.

#### Pilot Project on Application of Remote Sensing Techniques for Improving Desert Locust Survey

40. The Committee, at its Nineteenth Session (Report, paragraphs 44-45) approved a programme for improving current Desert Locust survey methods by using remote sensing techniques. Accordingly, a Pilot Project was developed and experimental work was carried out at a selected test site in the Ahaggar, southern Algeria between 15 March and 30 June 1976. A detailed report on the Project was published (Report No. AGP:LCC/76/4).

41. The Committee considered the results achieved and conclusions drawn from the project and made the following recommendations :

- (a) Based on the results obtained by this Project, there was full justification to extend this work with the objective to further develop the designed methodology of using remote sensing techniques for improving current Desert Locust survey methods.



- (b) The weather satellite component should be further developed and its testing extended to cover, as far as possible, additional areas in North-West Africa, supported by one or two manned rain-gauge stations or automatic stations equipped with a data collection system (DCS) facility.
- (c) The Landsat component should be further investigated to make a definite recommendation about its usefulness as a survey aid over the vast breeding area of the Desert Locust. Efforts should be made also to improve the co-relation between ground vegetal cover and the satellite imagery by using, as far as feasible, interpretive technique other than visual viewing. Better results could be expected if such investigations were undertaken in an area with higher seasonal and annual rainfall.
- (d) Subject to the availability of funds, it would be useful if a light aircraft were made available to facilitate establishing the co-relation between the vegetation on the ground and its recorded spectral response by the satellite sensors.
- (e) A short training course should be arranged for field staff in order to provide them with the necessary background for using the currently applied remote sensing techniques.

42. The Commission for Controlling the Desert Locust in North-West Africa and the Near East had agreed to contribute \$10,000 each : it was most likely that a similar amount would be allocated by the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia, at its next Session scheduled to be held in December 1976. It was, thus, hoped that a minimum of \$30,000 would be available for continuing this experiment during 1977.

43. The following is the proposed budget :

	\$
Consultants	4,000
Data Processing	10,000
Travel	4,000
Training	2,000
Equipment : Rain-gauge stations	3,000
Ground teams (per diem, POL and miscellaneous)	5,000
Aircraft operation cost	2,000
Total	30,000

N.B. If necessary, FAO was authorized to transfer expenditure from one subhead to another provided the total of the budget is kept at \$30,000.

44. The Committee wished to express its appreciation to the Government of Algeria for the various facilities provided during the conduct of the Satellite experimental project during 1976, and very much hoped that during 1977 also, the ground transport and survey aircraft would be provided by the Government of Algeria along with surveyors, drivers and other support personnel, while POL and other miscellaneous expenditure could be met from the project funds.

45. The Committee examined the need for preparation of a comprehensive project, based on the satisfactory results achieved and to be obtained during the second phase of the project, designed to develop the use of satellite application to locust survey and control and was of the opinion that a well-planned, adequately staffed project was necessary to develop an international cooperative programme to provide rapid and comprehensive information on occurrence of potential Desert Locust breeding sites. Such a programme could be formulated

to monitor vegetal cover and related data in different complementary breeding areas especially in the wake of new satellites and ground tracking stations becoming operational over most of the locust breeding areas. The Committee requested FAO to explore possibilities of obtaining funds for such a project.

46. The Committee noted that there was a need to improve the quality of interpretation of satellite imagery and its quick transmission to the field staff, which could be brought about by additional equipment. The Committee recommended that, in the interest of efficiency of all the field projects, provision of adequate funds would be necessary for the purchase of such equipment for the Remote Sensing Unit.

Gregarisation of the Desert Locust in 1974 in South-West Mauritania and Tamesna of Mali

47. In accordance with the recommendation made by the Desert Locust Control Committee at its Nineteenth Session (Report, paragraph 40), a study on gregarisation of the Desert Locust in South-West Mauritania and Tamesna of Mali during 1974 was made by the FAO Locust Officer, Dakar. A detailed report would be published in the next issue of the Technical Series.

48. Locusts were very rare at the start of the 1974 summer breeding season in Mauritania, June and even July rains were light and well below the normal, whereas well distributed rainfall was received in August and September in south-west Mauritania in contrast with the other areas of the country. This resulted in the rapid development in the locust situation. Localized depressions and an exceptionally strong perturbation seemed to have resulted in the concentration of adult populations in S.W. Mauritania leading to very high density concentrations/small swarms which bred in the area giving rise to hopper bands. The quick desiccation of vegetation at the end of September-early October in the same region favoured further concentration, laying and rapid gregarisation of hoppers.

49. All over the upsurge zone, a very heavy density of *Oedaleus senegalensis* hoppers was observed which might have probably augmented the gregarisation of Desert Locust hoppers. Similar observations on the same phenomena were made earlier in India on a number of occasions.

50. A similar situation developed in N.E. Mali within the saharian belt. Only scattered adults were present until the end of September in Adrar des Iforas and in Tamesna. As in Mauritania, very exceptional rainfall in the Sahelo-Saharan zone (Tamesna) and even the Saharian zone (Tinkar), had permitted a very fast development of the situation and the repetition of phenomena described by Popov and Roffey in 1970 concerning the Tamesna in 1967 : multiplication - densation - gregarisation. This happened only over a period of 2 months, i.e. October and November.

51. The study further confirmed the possibility of rapid gregarisation and formation of hopper bands and swarms over a single rainy season starting from very low density populations early in the season.

52. Detailed analysis of the situation showed that the development of gregarious locust populations originated from local solitary populations and this took place in two separate areas in S.W. Mauritania and Tamesna of Mali quite independent of each other.

53. The importance of regular and intensive surveys in the Sahelian and Saharian zones, particularly during monsoon season, was re-emphasized together with regular assessment of scattered locust populations. Special attention should be paid to vast areas of Azaouad, Timetrine, Tamesna, Azaouak and Afr in Mali and Niger to detect rainfall areas and to organize subsequent surveys.

54. The Committee expressed its appreciation of the study carried out by Mr. R. Skaf and reiterated its earlier conclusions (Reports of Eighteenth Session and Nineteenth Session, paragraphs 43 and 39 respectively) 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 new plague in the next one or two generations.

#### International Trust Fund 9161

55. In accordance with paragraph 69 of the Report of the Ninth Session of the DLCC, the Committee reviewed the statement of accounts of the Trust Fund for the year 1975 (Appendix V) and the budget for 1977 (Appendix VI) and found it in order. The Committee, however, requested that whilst submitting future budgets it would be necessary that the budget for the previous year should also be indicated.

56. Details of outstanding contributions as at 31 July 1976 are given in Appendix VII. Arrears prior to 1974 were still outstanding from some of the Member Governments, and the Committee requested the Director-General of FAO to use his good offices to approach such Governments to bring their contributions up to date at the earliest.

57. The Committee, having noted that the reserve fund accumulated over the years had been very much depleted, requested FAO to cut down on expenditure from the Trust Fund wherever possible with a view to rebuilding the reserve fund.

#### Status of the various Desert Locust Regional Organizations

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

58. The Eleventh Session of the Commission was held in Karachi, Pakistan, 8 - 12 December 1975.

##### The Commission:

- (a) reviewed the locust situation in the Region and noted that, because of good rains in the winter of 1974 and spring and summer of 1975, renewed locust breeding had started in the region. One mature locust swarm was reported from India in end-September and extensive solitary and some gregarious breeding was observed in Pakistan. Some locusts were reported from Iran but very few from Afghanistan.
- (b) noted that despite extensive ground and aerial operations in India and Pakistan some locusts would escape to winter-spring breeding areas and multiply further in the wake of good rains.
- (c) recommended that effective surveillance of the suspected breeding areas should be maintained and special surveys of strategic areas continued.
- (d) appreciated the FAO study of the circumstances leading to the 1974 locust upsurge and hoped that such studies would be made on other suitable occasions as well.
- (e) considered that inadequacies in personnel and equipment of existing resources resulted in locust populations not being detected in time in certain areas and recommended that survey resources should be suitably strengthened.
- (f) reiterated that it would not be prudent to overlook scattered populations especially in areas of good rainfall as they can build up rapidly into swarm proportions possibly starting a plague in one or two generations.

- (g) made several recommendations on locust research undertaken at the field research stations.
- (h) emphasised the important role played by the FAO Regional Officer in implementing the programme of the Commission, particularly, in matters of coordination of locust survey and control.
- (i) approved the programme of work for 1976 and accounts for 1974.
- (j) noted the progress of FAO/DANIDA Project and made recommendations for obtaining early results on the implications of residues of dieldrin and BHC.

Commission for Controlling the Desert Locust in the Near East

59. The Seventh Session of the Commission for Controlling the Desert Locust in the Near East and the Sixth Session of its Executive Committee scheduled to be held in Khartoum at end-July were held from 18-22 October 1976, Rome, Italy. The Commission considered the following important matters :

- (a) significant developments in the locust situation, forecast, survey and control activities.
- (b) the report of the pilot project on satellite application to Desert Locust survey and control; and allocated \$10,000 for the next experimental phase out of its Trust Fund.
- (c) assistance to member countries.
- (d) coordination of Desert Locust control and research in the region.
- (e) the Programme of Work and Budget for 1977 and Accounts for 1975.
- (f) training and fellowships.

Commission for Controlling the Desert Locust in North-West Africa

60. The Fifth Session of the Commission and the Fourth Session of its Executive Committee were held in Rome from 30 June to 7 July.

The Commission:

- (a) discussed the locust situation and noted that because of considerable winter-spring rains over several areas in the region, significant locust activity was reported from all the member countries.
- (b) recommended that effective surveillance of the locust-infested areas should be maintained and control operations undertaken promptly where necessary.
- (c) noted the new developments in the locust situation in OCLALAV region and hoped that similar measures for surveillance and control would be made by that Organisation.
- (d) took a special note of the prevalent ecological conditions and the possibility of rapid multiplication of locusts resulting in swarm formation and recommended that special measures should be taken to strengthen surveillance and control.
- (e) re-emphasised the need for timely transmission of locust information to the secretariat of the Commission and vice versa, to ensure proper liaison with other countries and organisations.

- (f) recognising the present importance of the locust situation, the Commission recommended maintaining the nucleus locust staff on a regular basis within the national plant protection organisation and earmarking of adequate reserve stocks of pesticides, equipment and transport to institute emergency control operations.
- (g) took note of the encouraging results of the Satellite Pilot Project and recommended its continuation; and agreed to contribute \$10,000 for 1977 experimentation subject to approval of the Project by the DLCC.

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

61. The Twentyfirst Session of the DLCO-EA Council of Ministers was held in Addis Ababa from 11 - 13 May 1976 and was attended by Mr. J. Roy on behalf of FAO. The organization continued to provide useful services to the member countries in the matters of locust control and general plant protection.

62. The Council authorized that during the locust recession periods the spare capacity of aircraft could be utilized for assisting in control of armyworms, Quelea birds and the tse-tse flies, while Member Governments would supply chemicals and other logistic support.

63. Efforts were continued to augment the existing resources of the organization for applied research and control potential by seeking external assistance. At the same time, it is essential that the Member Governments ensure adequate and regular funding to the organization to maintain its operational efficiency at the required level.

64. FAO continued to maintain cordial relations with DLCO-EA in matters of common interest.

65. Apart from the Sudanese Tokar Delta and possibly Eritrean province of Ethiopia, the locust situation in the region continued to remain calm. However, extensive surveillance was exercised to detect possible locust developments, especially in Ethiopia and Somalia. Assistance for aerial control operations against locusts was provided to Saudi Arabia and Sudan.

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

66. FAO continued to maintain its cordial relations with OCLALAV in matters of mutual interest. Besides the FAO/UNDP small scale locust project on locust field research, cooperation was extended to other related fields such as grasshopper control. Financial assistance was made available for locust survey and training in locust meteorology.

67. The Administrative Council of OCLALAV met at Yaoundé (Cameroun) from 28 to 31 July 1976. The Council :

- (a) took several important decisions concerning the improvement of the financial situation of the organization;
- (b) accepted unanimously Gambia as a member of the organization;
- (c) appreciated FAO's help and assistance in the fields of Desert Locust and grain-eating birds research as well as in training on control of other pests;
- (d) requested Member Countries to support the extension of the UNDP/FAO Project RAF/72/002 - Research on the Desert Locust in Western Africa;
- (e) requested OCLALAV to secure the coordination of research and training in the field of crop protection;
- (f) expressed its concern for the extensive breeding of the Desert Locust in 1974-75-76 in Western Africa and emphasized the necessity of strengthening preventive control measures against this plague and of continuing the assistance to Member Countries in plant protection against other pests, particularly grasshoppers.

Regional Officers

68. The Committee, referring to its earlier recommendations made at its Nineteenth Session (Report, paragraph 82), noted with satisfaction that all the posts of the Regional Officers had been included in the Regular Programme of the current biennium. Emphasizing the importance of these posts, the Committee requested FAO to ensure their continuity in future on a permanent basis.

Arabic Interpretation

69. In order to facilitate better communication and expression of views during discussions, the Arabic speaking members of the DLCC requested FAO to give consideration to the use of the Arabic language for interpretation along with French and English in the future sessions of the Committee.

DATE AND PLACE OF NEXT SESSION

70. The Committee recommended that the Director-General of FAO should convene the next Session of the Committee in early October 1977 at a place and date to be determined by him.



LOCALITY	MONTH AND YEAR	TYPE OF INFESTATION (SWARMS, SCATTERED ADULTS, HOPPERS)	INFESTED AREA	INSECTICIDES USED				METHOD OF APPLICATION (AIR OR GROUND)
				EHC DUST IN KGS	MALA-EHC THION	LIQUID IN LITRES	OTHERS IN LIT/KGS	
Somali Democratic Republic								
Las Dureh	June to August 76	Adults and hoppers	-	-	200	650	-	Ground
Bar-Hiss								
Arar-Tug								
Afghanistan								
Shorewak	July 1976	Hoppers	20,000/ha	12%	-	-	-	Ground
Spin Buldak	July 1976	Hoppers	2,000/ha					
India								
Jaisalmer	Sept. 1975	Swarms, hoppers	3,716 Km <sup>2</sup>	33,000	1,633	5,423	910	Ground and Air
Bikaner	Oct. 1975	adults						
Ganganagar	Aug. 1976	Hoppers	1,500 Km <sup>2</sup>	20,000	-	1,700	50	Ground
Jaisalmer	Sept. 1976							
Iran								
Jiroft	June 1976	Adults, hoppers	5,402/ha	Spraying and baiting with EHC and dieldrin				
Serdiz	July 1976							
Gangle-Abad								
Pakistan								
Cholistan	Oct. 1975	Adults, hoppers	1,000 Km <sup>2</sup>	Spraying with dieldrin and dusting with EHC				
Mirpur	Nov. 1975	Swarms, adults	12,405 Km <sup>2</sup>	2,267	-	36,687	-	Ground and Air
Tharparkar	Dec. 1975	hoppers						
Nushki								
Quetta	Apr. 1976	Adults, hoppers		EHC and dieldrin used over patchy infestations as a preventive control measure				
Kulanch								
Chagai								
Mekran	May 1976	Adults, hoppers	620 Km <sup>2</sup>	Strip spraying with dieldrin -				
Lasbela	June 1976	hoppers	820 Km <sup>2</sup>	Sprayed with dieldrin				
Pishin	July-Sept. 76	Swarms, adults, hoppers						
Panjgur								
Algeria								
Assouf, Mellene, In-Aménas	July-August 1976	Adults, hoppers	4,000/ha	20%	-	-	-	Baiting
Libya								
Derg, Misda, Sebha, Gahademes, Ghat, Beni Oulid	June 1976	Adults, hoppers	89,100/ha	550	4550	-	1150	Ground and Air



LOCALITY	MONTH AND YEAR	TYPE OF INFESTATION (SWARMS, SCATTERED ADULTS, HOPPERS)	INFESTED AREA	INSECTICIDE USED			METHOD OF APPLICATION (AIR OR GROUND)
				BHC DUST IN KGS	MALA-THION	LIQUID IN LITRES BHC DIELDRIIN OTHERS IN LIT/KGS	
<u>Morocco</u> South Errachidia Tafraout	July 1976	Adults, hoppers	1,000 ha	50,000		poisoned bait	Ground
	Sept. 1976	Adults, hoppers	8 ha	400		poisoned bait	Ground
<u>Mauritania</u>	Sept. 1975	Hoppers	7,000 ha	-			Ground
	Oct. 1975	Adults, hoppers	13,855 ha	-			Ground
	June 1976	Hoppers	1,510 ha	-	50	1150 (5%)	Ground
	July 1976	Hoppers, adults	1,500 ha	-		spraying with dieidrin 5%	Ground
<u>Mali</u>	Aug. 1976	Hoppers, adults	840 ha	-		600 (5%)	Ground
	Sept. 1976	Hoppers, adults	6,385 ha	-		3900 (5%) & 500 (20%)	Ground
	Sept. 1975	Hoppers, adults	1,020 ha	-		spraying with dieidrin 5%	Ground
	July 1976	Hoppers	380 ha	-		400 (5%)	Ground
<u>Niger</u>	Aug. 1976	Hoppers, adults	885 ha	-		1020 (5%)	Ground
	Sept. 1976	Hoppers	885 ha	-		570 (5%)	Ground

PROJECT BUDGET COVERING UNDP CONTRIBUTION

(in US Dollars)

	<u>TOTAL</u> m/m	<u>1974</u> m/m	<u>1975</u> m/m	<u>1976</u> m/m
<u>PROJECT PERSONNEL</u>				
10. <u>Experts</u>				
11.01 Project Manager	30.1	11.1	12.0	7.0
11.02 Technical Officer I	25.1	6.1	12.0	7.0
11.03 Technical Officer II	20.9	7.9	12.0	1.0
11.04 Consultant (Training Methodology)	2.0	1.7	0.3	-
11.05 Consultants	20.5	3.1	7.4	10.0
11.99 Sub-Total m/m	98.6	29.9	43.7	25.0
Sub-Total \$	322,527	74,577	152,950	95,000
13. Adm. Support Personnel	53,376	9,379	29,997	14,000
15. Travel	15,000	-	-	15,000
16. Mission Costs	5,395	2,845	2,550	-
19. Component Total	396,298	86,801	185,497	124,000
30. Training (Lecturers)				
39. Component Total	18,353	1,070	2,283	15,000
49. Equipment	99,434	70,552	17,382	11,500
59. Miscellaneous	47,796	15,961	21,835	10,000
<b>UNDP TOTAL CONTRIBUTION</b>	<b>561,881</b>	<b>174,384</b>	<b>286,997</b>	<b>160,500</b>

APPENDIX III

TRAINING PROJECT INT/71/030 TRUST FUND 9462 BUDGET  
in US Dollars

<u>Trust Fund Code</u>		<u>Budget Provision</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Outstanding Obligations</u>	<u>TOTAL</u>
80	<u>Fellowships, Grants &amp; Contributions</u>						
81.01	Individual Short-Term Fellowships	90.000	5.750	65.229	90.690	190.684	352.353
81.02	Individual Long-Term Fellowships	300.000					
82.01	Group Study Tours	90.000	13.368	5.300	853	-	19.521
82.02	Training Courses	420.000	38.600	234.777	115.614	42.530	431.521
		900.000	57.718	305.306	207.157	233.214	803.395
92	Project Servicing Costs (14%)	126.000	8.081	42.743	29.002	32.650	112.476
		1.026.000	65.799	348.049	236.159	265.864	915.871

TRUST FUND CONTRIBUTION TO INT/71/030 (TF 9462)

	<u>Budget</u>	<u>Paid 1974</u>	<u>Paid 1975</u>	<u>Paid 1976</u>	<u>Outstanding Obligations</u>
<u>TF 9161</u>	375.000	125.000	125.000	110.000	15.000
<u>TF 9123</u>	150.000	50.000	50.000	50.000	-
<u>TF 9409</u>	375.000	125.000	125.000	60.000	65.000
<u>TF 9169</u>	150.000	50.000	42.000	42.000	16.000
	<u>1.050.000</u>	<u>350.000</u>	<u>342.000</u>	<u>262.000</u>	<u>96.000</u>

APPENDIX IV

Training Requirements in Crop Protection and Locust Control for  
Years 1976 - 1982  
 (Member Governments/Organisations of DLCC)

Country	Group Training in Locust and Crop Protection	Indvd. short term felship.	Indvd. long term felship.	Radio Mntnance.	Aerial Opts
A.R. EGYPT	-	16	8	2	1
CAMEROON	1	11	4	-	-
CHAD	5	4	4	-	-
DAHOMEY	13	20	8	-	-
INDIA	14	2	-	4	-
IRAN	20	24	-	-	-
IRAQ	-	19	-	-	-
JORDAN	10	7	-	-	-
KENYA	28	-	-	-	-
LIBYAN ARAB REPUBLIC	-	48	10	-	-
MALI	60	16	-	-	-
P.D.R. YEMEN	26	26	14	11	-
SENEGAL	60	9	-	-	-
SOMALI DEM. REPUBLIC	22	40	8	-	-
SUDAN	-	4	2	4	4
SYRIAN ARAB REPUBLIC	21	7	7	-	-
UNITED ARAB EMIRATES	20	30	5	-	-
	<u>300</u>	<u>283</u>	<u>70</u>	<u>21</u>	<u>5</u>

Note: Replies are awaited from member countries: Afghanistan, Algeria, Bahrain, Ethiopia, Ghana, Morocco, Niger, Pakistan, Saudi Arabia, Sierra Leone, Tanzania, Tunisia, Turkey and Yemen Arab Republic.

Trust Fund No. 9161.00 - International (Desert Locust Control)

Final Statement of Account as at 31 December 1975  
(expressed in US dollar equivalents)

Receipts

Balance as at 1 January 1975		203,394.93
Contributions from various governments	95,347.38	
Interest credited	5,820.05	
<u>Less: Transfer to TF 9462.00</u>	<u>(125,000.00)</u>	<u>(23,832.57)</u>
		179,562.36

Deduct:

Cash Expenditure 1975

Personal Services	13,608.56	
Official Duty travel	4,028.29	
Contractual Services	1,330.91	
General Operating Expenses	-	
Supplies and materials	6,504.50	
Furniture and equipment	32,861.22	
Acquisition and Improvement of Premises	-	
Fellowships, Grants and Contributions	1,595.90	
	<u>59,929.38</u>	
Project Servicing Costs 14%	8,390.11	68,319.49
		<u>111,242.87</u>

Breakdown of 1975 Expenditure

		<u>Total</u>
<u>Personal Services</u>		
<u>DLCC and Satellite Project Consultation</u> (including, interpreters, overtime, etc.)	10,398	
<u>Consultants</u>	<u>3,211</u>	13,609
<u>Official Travel</u>		
DLCC Interpreters	1,360	
Consultant	507	
HQ Staff	1,526	
Exchange Visit	<u>1,315</u>	4,028
<u>Contractual Services</u>		
Consultant editor	57	
Printing	<u>1,274</u>	1,331
<u>Supplies and Materials</u>		
Saudi Arabia (non-swarming locust research material)	1,867	
Somalia (met. and laboratory supplies)	3,160	
Ethiopia (control supplies)	<u>1,477</u>	6,504
<u>Equipment</u>		
Mauritania (radio testing equipment)	367	
Somalia (radio and laboratory equipment)	13,146	
Ethiopia (two Land Rovers, radio parts, exhaust nozzle sprayers, holder sprayers)	19,281	
Insurance	<u>67</u>	32,861
<u>Fellowships and Training</u>		
Hammam (Egypt)	369	
Nyariro (DLCO)	178	
Nuthania (DLCO)	<u>1,049</u>	1,596
		<u>59,929</u>

APPENDIX VI

INTERNATIONAL DESERT LOCUST TRUST FUND 9161

BUDGET

<u>Code</u>		<u>US\$</u>	
		<u>1976</u>	<u>1977</u>
10	<u>Personal Services</u>		
	Research projects, lecturers, advisory visits, technical editors, etc.	10,000	10,000
20	<u>Travel and Official Business</u>		
	Research projects, advisory visits	15,000	15,000
30	<u>Contractual Services</u>		
	Research projects, publications and miscellaneous	30,000	10,000
50	<u>Expendable Supplies</u>		
	Research material	4,100	4,100
60	<u>Equipment</u>		
	Research and demonstration equipment	5,000	25,000
80	<u>Fellowships and Training</u>	5,000	5,000
90	Project Service Costs (approximate) 14%	9,674	9,674
		78,774	78,774
	Unallocated Balance	2,142	2,142
		<u>80,916</u>	<u>80,916</u>

The Director-General of FAO was empowered by the 14th Session of the DLCC, 1970, to change the allocation of sums allotted to different chapters in order to meet the changing needs of the locust situation, subject to the total annual expenditure not exceeding the total budget.

APPENDIX VII

TRUST FUND No. 9161 - INTERNATIONAL DESERT LOCUST CONTROL

Pledge Position as at 31 July 1976

	<u>Outstanding Contribs. 1969-73</u>	<u>Outstanding Contribs. 1973-74</u>	<u>Outstanding Contribs. 1974-75</u>	<u>Outstanding Contribs. 1975-76</u>	<u>Outstanding Contribs. 1976-77</u>	<u>Total due at 31.7.76</u>
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	1,800.00	8,400.22
Egypt	-	-	-	-	3,920.00	3,920.00
Ethiopia	-	-	-	-	2,180.00	2,180.00
France (Territory of Afars and Issas)	-	-	-	-	420.00	420.00
Ghana	-	-	-	-	(2,397.82)	(2,397.82)
India *	-	-	-	-	10,000.00	10,000.00
Iran	-	-	-	-	3,690.00	3,690.00
Iraq	-	-	-	-	2,480.00	2,480.00
Jordan	-	-	-	-	1,730.00	1,730.00
Kenya	-	-	-	1,800.00	1,800.00	3,600.00
Kuwait	-	-	-	420.00	420.00	840.00
Lebanon	-	-	-	1,350.00	1,350.00	2,700.00
Libya	-	-	-	-	1,820.00	1,820.00
Mali	7,200.00	1,800.00	1,800.00	1,800.00	1,800.00	14,400.00
Mauritania	-	-	-	-	1,305.09	1,305.09
Morocco	-	-	-	-	2,990.00	2,990.00
Niger	-	-	-	-	1,800.00	1,800.00
Nigeria	-	3,650.00	3,650.00	3,650.00	3,650.00	14,000.00
Oman	830.00	830.00	830.00	830.00	830.00	4,150.00
Pakistan *	-	-	-	-	5,860.00	5,860.00
Qatar	-	-	-	-	830.00	830.00
Saudi Arabia	-	-	-	-	1,830.00	1,830.00
Senegal	-	-	-	-	1,575.39	1,575.39
Sierra Leone	(265.03)	358.00	358.00	358.00	358.00	1,166.97
Somali Republic	-	-	-	-	1,456.85	1,456.85
Spain	-	-	-	-	2,400.00	2,400.00
Sudan	-	-	-	-	2,250.00	2,250.00
Syrian Arab Republic	-	-	2,010.00	2,010.002	2,010.00	6,030.00
Tunisia	-	-	-	-	-	-
Turkey	-	-	-	-	5,350.00	5,350.00
Uganda	-	-	-	-	1,200.00	1,200.00
United Arab Emirates	-	-	-	-	5,500.00	5,500.00
Yemen Arab Republic	1,360.00	1,840.00	840.00	1,840.00	1,840.00	7,720.00
Yemen, PDR	240.00	-	-	-	120.00	360.00
	<u>10,565.19</u>	<u>10,278.00</u>	<u>11,288.00</u>	<u>15,858.00</u>	<u>79,377.51</u>	<u>127,366.70</u>

\* India and Pakistan reported to have paid their respective contributions.



LIST OF WORKING PAPERS

- AGP:LCC/76/1 - Agenda
- AGP:LCC/76/2 - The Desert Locust Situation: October 1975 - September 1976
- AGP:LCC/76/3 - Anti-locust measures undertaken by various countries and Regional Organisations (From October 1975 to September 1976)
- AGP:LCC/76/4 - Pilot Project on the Application of Remote Sensing Techniques for Improving Desert Locust Survey and Control: Summary and Conclusions and Recommendations
- AGP:LCC/76/5 - Progress Report on the Training Project (December 1975 to July 1976)
- AGP:LCC/76/6 - Progress Report on the FAO/SIDA Locust Project
- AGP:LCC/76/7 - Monitoring of Pesticide Residues in Areas Sprayed for the Control of the Desert Locust - Project Background and Activities to June 1976 - FAO/DANIDA Project-TF INT/100 (DEN)
- AGP:LCC/76/8 - International Desert Locust Trust Fund 9161
- AGP:LCC/76/9 - Status of the various Desert Locust Regional Organisations
- AGP:LCC/76/10 - Report of the OCLALAV/FAO/ASECNA Training Course in Tropical Meteorology as it relates to Locusts
- AGP:LCC/76/11 - Study on Gregarisations of the Desert Locust in 1974 in South-West Mauritania and Tamesna of Mali - Summary