

REPORT OF THE

**TENTH SESSION OF THE COMMISSION
FOR CONTROLLING THE DESERT LOCUST
IN THE EASTERN REGION
OF ITS DISTRIBUTION AREA
IN SOUTHWEST ASIA**

**Held in Rome, Italy
11-15 November 1974**



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Earlier reports of the preparatory meetings on the establishment of the Eastern Regional Commission for the Control of the Desert Locust and its regular sessions were issued as follows:

Special FAO Meeting on the Eastern Desert Locust Region, held in Teheran, Iran, 1-4 October 1962

FAO Meeting of the Proposed Eastern Regional Commission for the Control of the Desert Locust, held in Rome, Italy, 2-3 May 1963

First Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Teheran, Iran, 16-20 December 1964

Second Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Teheran, Iran, 5-8 March 1966

Third Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in New Delhi, India, 6-9 March 1967

Fourth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Kabul, Afghanistan, 21-24 February 1968

Fifth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Karachi, Pakistan, 10-13 March 1969

Sixth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Teheran, Iran, 14-18 April 1970

Seventh Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in New Delhi, India, 15-18 February 1971

Eighth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Teheran, Iran, 3-6 June 1972

Ninth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia, held in Rome, Italy, 10-13 December 1973.

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Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
Rome, 1974

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Officers of the Session

The following officers were elected:

Chairman: Dr. S.N. Banerjee, India

Vice-Chairman: Mr. A. Shakouie, Iran

The work of preparing the draft report was entrusted to the FAO Secretariat. Mr. Gurdas Singh and Mr. S.S. Pruthi of the FAO Secretariat acted as Technical Secretaries.

Acknowledgements

At the close of the Session, Delegates expressed their appreciation of the tactful manner in which the Chairman conducted the deliberations. They also wanted to place on record their thanks to the FAO Secretariat for their prompt and efficient service.

INTRODUCTION

The Director-General of the Food and Agriculture Organization of the United Nations convened the Tenth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia in Rome from 11 to 15 November 1974. The four Member Nations of the Commission, namely Afghanistan, India, Iran and Pakistan were represented by delegates.

The Session was opened by Mr. Gurdas Singh, Senior Officer, Locust Control and Emergency Operations, Plant Protection Service, AGP Division, who extended a warm welcome to the participants on behalf of the Director-General. He stated that FAO was grateful to the Member Governments of the Commission for their keen interest in Desert Locust control and was sure that the deliberations of the Session would be carried out in a spirit of cooperation which already existed and that decisions would be arrived at with regard to further improving the strategy for countering the menace posed by the age-old enemy. He congratulated all concerned on the recent success they had achieved in stamping out the locust population in all Member Countries of the Commission in the autumn of 1973 and summer of 1974. He, however, warned that there was no cause for complacency and advised all concerned to remain on the alert and fighting fit as any efficient fire-brigade to continue to prolong this man-made recession and to successfully tackle this formidable enemy which is capable of springing a surprise at any time.

He assured the delegates that FAO on its part would continue to support research work in making new approaches towards discovering solitary populations, in studying diurnal and nocturnal displacement of solitary populations, in finding alternate pesticides which would be less hazardous to man and the environment and in the assessment of pesticide residues in the areas sprayed for locust control. During the current year, FAO had embarked upon a huge venture in organizing training for locust and pest control officers in countries of the Desert Locust invasion belt in Afro-Asia and it was hoped that Member Governments would take full advantage of these facilities.

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PARTICIPANTS

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

Delegates from FAO Member Countries

Afghanistan

A.R. Saboury
Director-General
Plant Protection and Quarantine Organization
Ministry of Agriculture and Irrigation
Kabul

India

S.N. Banerjee
Plant Protection Adviser to the Government of India
and Director, Locust Control
Room 409, Wing B
Shastri Bhavan
New Delhi-1

Iran

Akbar Shakooie
Technical Adviser
Plant Protection and Quarantine Organization
Ministry of Agriculture and Natural Resources
Teheran

Pakistan

Farid Uddin Ahmad
Plant Protection Adviser and Director
Department of Plant Protection
Ministry of Food, Agriculture and Under-developed Areas
Jinnah Avenue, Malir Halt
Karachi-27

FAO Staff

Gurdas Singh
Senior Officer
Locust Control and Emergency Operations
Plant Protection Service
Plant Production and Protection Division
FAO, Rome, Italy

S.S. Pruthi
FAO Regional Locust Officer
FAO Regional Locust Secretariat
P.O. Box 1555
Teheran, Iran

AGENDA

Heshamul Huque
 Project Manager
 Training in Crop Pest Control with Special Reference
 to Desert Locust Control and Research (INT/71/030)
 P.O. Box 1555
 Teheran, Iran

Sardar Singh
 Consultant
 A-2/72 Rajouri Garden
 New Delhi-27
 India

Clara Hemsted
 Agricultural Officer (Desert Locust)
 Locust Control and Emergency Operations
 Plant Protection Service, AGP Division
 FAO, Rome, Italy

1. Opening of the Session
2. Election of the Secretary
3. Adoption of the Agenda
4. Election of the Members of the Executive Committee
5. The Desert Locusts and the Mediterranean Region
6. A Review of the Desert Locust Survey Carried out by the Member Countries during 1973
 Plans for the Future
 - (a) Coordination of Desert Locust Research
 - (b) Training and Control
 - (c) Election of the Executive Committee
8. Accounts for 1972 and 1973 and Programme of Work and Budget for 1974
9. Anti-locust Survey and Control Potentials available in the Member Countries of the Commission
10. (a) Special Surveys Carried out in Southern Iran and South-West Afghanistan during 1974 and Plans for the Future
 (b) Strategic Surveys of Indo-Pakistan border areas
11. Any Other Business
12. Date and Place of Next Session
13. Adoption of the Report

PART II
AGENDA

1. Opening of the Session
2. Election of the Chairman and Vice-Chairman of the Commission
3. Adoption of the Agenda
4. Election of the Drafting Committee
5. The Desert Locust Situation during 1973/74 and Forecast
6. A Review of the Desert Locust Survey and Control Activities Carried out by the Member Countries during 1973/74 and Plans for the Future
7. (a) Coordination of Desert Locust Research in the Region
(b) Training and Fellowships
(c) Election of the Chairman and Vice-Chairman of the Executive Committee
8. Accounts for 1972 and 1973, and Programme of Work and Budget for 1975
9. Anti-Locust Survey and Control Potentials available in the Member Countries of the Commission
10. (a) Special Surveys Carried out in Southern Iran and South-West Afghanistan during 1974 and Plans for the Future
(b) Strategic Surveys of Indo-Pakistan border areas
11. Any Other Business
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Farid Uddin Ahmad
Plant Protection Adviser and Director
Department of Plant Protection
Ministry of Food, Agriculture and Under-developed Areas
Jinnah Avenue, Malir Halt
Karachi-27

FAO Staff

Gurdas Singh
Senior Officer
Locust Control and Emergency Operations
Plant Protection Service
Plant Production and Protection Division
FAO, Rome, Italy

S.S. Pruthi
FAO Regional Locust Officer
FAO Regional Locust Secretariat
P.O. Box 1555
Tehran, Iran

SUMMARY OF DISCUSSIONS

Desert Locust Situation during 1973/74

1. The Commission received from the FAO Secretariat a summary of the Desert Locust situation in the countries of the region during 1973/74 and this was supplemented by the delegates.
2. In Afghanistan, no locusts were reported from October 1973 until March 1974 when countless adult population infiltrated from across the Pakistan border along with a dust storm and due to favourable conditions, oviposition occurred in small patches. In the beginning of May, scattered mature adult population at a maximum density of 15000 per square kilometer and widespread I to IV instar hoppers including fresh emergences were recorded in Shorawak area of Kandahar province and the same warranted control. In early June, hoppers of all instars, fledglings and new generation adults were observed over a fairly large area in Shorawak valley. Control operations were carried out against these infestations during May and June. At the end of June, the area was reported to be dry. Thereafter no locust activity was reported up to October.
3. Indo-Pakistan Desert - October - December 1973: During October 1973, twenty-two reports of mature and immature swarms, varying from 3 to 83 square kilometers in size were received from the Cholistan and Nara deserts in Pakistan. Also there were eight sightings of mature and immature swarms in the Jaisalmer and Bikaner districts in India, the largest swarm reported covered 83 square kilometers. Over 200 hopper bands of all instars were reported from a total infested area of 600 square kilometers in Pakistan; in India the total area infested by adults and hoppers was estimated at 10000 square kilometers. Laying continued until 19 October. Aerial and ground control operations continued in Pakistan, and ground operations commenced in India. Between 26 and 31 October a sudden rise in locust numbers was reported from Las Bela district and Karachi; this probably indicated the first westward movement of adults produced in the Nara, Cholistan and west Rajasthan desert areas.
4. In November, hoppers continued to be found on both Pakistani and Indian sides of the border. In Pakistan the infested area was estimated at 15540 square kilometers, and more than 2800 hopper bands, many very large and of mostly late instar, were found and controlled. In India, control, mainly of late instar hoppers, continued in the Jaisalmer district. Immature swarms, swarmlets and groups of adults were reported throughout the month. In Pakistan some 70 swarmlets were located. Most of these were in Cholistan and Nara deserts and were controlled. Subsequently a swarm covering 62 square kilometers was reported at Pasni on 1 November, and another at Gadani on 29 November.

5. High density populations of adults were also reported from Mirpur Khas, Las Bela and Mekran districts, and scattered adults were seen at Panjgur and Nushki in Baluchistan. Control operations in the Cholistan and Khairpur desert areas ended in November although a few immature swarms remained in Surian and Derawar sectors of the infested area in December. Other swarms appeared in the Thana Bula Khan, Las Bela, Mekran and Khuzdar areas in that month. A total of 35 reports of, mostly, immature swarms were received from Pakistan during December and a further eight from Jaisalmer tehsil in India. Fifth instar hoppers were reported in the first fortnight of December in Surian and Derawar sectors but none were found subsequently.

6. Iran-Pakistan border: Two immature swarms were reported from the border area of Iran and Pakistan at the end of November and three at the end of December. Groups of adults were also reported and controlled in the Jask and Bandar Abbas areas of coastal Iran in late November and December.

7. Iran-winter spring 1974: Four immature swarmlets were observed during January/February at Zaboli, Iranshahr and Khash in Baluchistan and high population of settled copulating adults was recorded in Iranshahr area in 34 hectares on 28 February and in approximately 500 hectares on 23 March. Low density scattered yellow adult populations were observed in Chabahar area in the first fortnight of March and early April. During April scattered adults were also recorded in Bandar Abbas and Jiroft area. Soil moisture was generally favourable for oviposition. III and IV instar hoppers were controlled in about 2 square kilometers in Iranshahr in the beginning of April and II to III instar in 20 hectares in Chabahar area and II to V instar in 1580 hectares in Iranshahr in May. Control was also carried out against adults in 450 hectares in Jazmurian in May. Scattered adults at a density of 3 - 4 thousand per square kilometer and six III - V instar solitary hoppers were observed between Lar and Bastak on 14-15 May. By May, conditions for breeding became unfavourable except in cultivated fields and from June to early October only a few scattered adults were recorded in Bandar Abbas, Jiroft and Chabahar areas.

8. Pakistan-winter spring breeding: A number of pink swarms and swarmlets continued to be found in Bahawalpur and Sind deserts in the first fortnight of January when 16 fifth instar hopper bands and fledglings were reported from five localities in Cholistan desert. They were controlled by dusting and exhaust nozzle spraying. Pink swarms were also reported from Kharan, Turbat, Khuzdar and Las Bela during this period. Large population and groups of immature adults were present along Las Bela and Mekran coasts and valleys in the hinterland. Low density population was recorded in Panjgur in the latter half of January and in Mekran, Khuzdar and Nushki in February. On 8 March a large scattered pairing swarm was recorded in Kharan and on 9 March another 5 square kilometers mixed swarm was sprayed in this area. Control

against concentrations of mixed adults scattered in about 26 square kilometers in wheat cultivation was carried out in Kachhi district on 9 March. Although eggbeds were sprayed in Kharan, emergence occurred there and control was started in latter half of March which continued during April and May. Presence of hoppers and fresh emergence was recorded in Khuzdar during April and control in this area and Kachhi district was concluded during May.

9. Pakistan-summer-monsoon breeding: Three small swarms were controlled near Kharan between 17-20 May and about the middle of May solitary hoppers of all stages were recorded in Kharan and Chagi district in a gross area of 1950 and 520 square kilometers respectively. They concentrated and formed bands which resulted in loose swarmlets of varying sizes. Control was carried out against these infestations by exhaust nozzle sprayers and aircraft. A large population of solitary hoppers, of all stages but mostly IV and V, reported from Bannu district in the North West Frontier Province (NWFP) during the first fortnight of June was controlled. Control operations in Chagi district along Afghanistan border against advanced stage hoppers, fledglings and two loose swarms measuring 104 and 125 square kilometers were concluded in the beginning of June. Escapes from winter-spring breeding started moving towards summer breeding areas in the beginning of June. On 4 June, a loose mixed swarm heading east was observed at Nawabshah and this crossed into India. Thereafter no major locust activity was reported from Pakistan and only scattered mature and maturing adults were recorded in Las Bela district and Bahawalpur and Sind deserts from June to October.

10. India-monsoon breeding: Low density overwintering adults were observed in western Rajasthan from January to April. Infiltration of exotic adults started in May when a maximum population of 24000 immature and mature adults per square kilometer was recorded in Jaisalmer and in the beginning of June countless population was observed in Barmer district. This was followed by about half a dozen mature and of mixed maturity small to medium size swarms of moderate density. In all about 139 swarm movements were recorded from Jaisalmer, Bikaner and Ganganagar districts between 13 June and 21 July. / Jodhpur

11. Conditions were ideal for breeding after exceptionally heavy early monsoon rainfall and oviposition commenced on 14 June and continued up to 20 July. 143 villages with a gross area of 6810 square kilometers were infested. The hopper bands were mostly of small size although in a few localities large bands were also encountered. Control operations were carried out from 26 June to 19 August. Barrier spraying from air was also undertaken in 80 square kilometers on two occasions in July.

12. During August and October scattered immature and maturing adults were reported from several localities of western Rajasthan and Banaskantha district of Gujrat and the maximum population was countless in one locality of Phalodi tehsil of Jodhpur district in the first fortnight of September. A few solitary hoppers of II to V instars were also detected from Bikaner, Jodhpur and Nagaur district. Drought conditions prevailed in the desert areas.

13. The Commission learnt with appreciation that during the monsoon breeding season in India the survey parties spotted almost all the egg-infested areas prior to hatching. This enabled timely action against the hoppers in early stages, thus contributing to successful conclusion of operations in 1974.

Forecast

14. Only low-density populations remained in the Indo-Pakistan desert areas as a result of the intensive control measures undertaken by the respective locust control organizations. Some scattered populations were present in Jiroft area of Iran. Rains received in the last week of September were likely to lead to renewed activity on a small scale. The remnants and any other locusts that might have been raised by the sporadic breeding activity as a result of the late rains were likely to migrate to the winter-spring breeding areas of Pakistan and Iran, possibly concentrating in suitable pockets. It would be necessary to keep such areas under surveillance.

Desert Locust Survey and Control during 1973/74 and Plans for the Future

15. There had been considerable locust activity in the southwest Asian region from September 1973 and extensive control operations were undertaken. The position with regard to the activities in each country is given below and the control data in Appendix I.

Afghanistan

16. The joint Indo-Afghan special survey of southwestern Afghanistan recorded scattered adult population at a maximum density of 15000 per square kilometer and widespread presence of I to IV instar hoppers including fresh emergences in Sherawak area of Kandahar province in the beginning of May and hoppers of all instars, fledglings and new generation adults over fairly large area in early June. Control operations against these infestations were carried out during May and June by dusting and a total of 3975 kgs 12% BHC was used for clearing 285 hectares.

India

17. Thirty four locust outposts continued to be maintained in the scheduled desert areas of Rajasthan, Gujarat and Haryana. Extensive and intensive surveys were carried out paying special attention to the areas which received rainfall. Aerial reconnaissance was also carried out when necessary, especially to demarcate green areas which were subsequently surveyed by the ground teams.

18. Several small to medium size hopper bands, fledglings and fresh adults in large numbers were detected in Jaisalmer and Bikaner districts from September to October 1973 over an area of about 10500 square kilometers along the Indo-Pakistan border. In all about 109 movements of swarmlets were observed or reported from end of October to 31 December. Control operations were instituted against hopper bands, fledglings and swarms consuming 7724 litres of liquid insecticide and 61785 kgs BHC dust and 10 kgs 50% W.P.

19. No locust swarm movement was observed after 31 December and apparently the remnant swarms migrated to the winter-spring breeding areas. The individual locust population also dwindled through January to April 1974. It rose in May and early June in several localities of Bikaner and Jaisalmer districts along the Indo-Pakistan border on account of influx from across the border. A population of 24000 adults per square kilometer was recorded at Ghotaru on 30 May and several localities in Barmer district harboured countless population which was mature and ready to lay eggs. However, the soil moisture conditions were not conducive and these populations got dispersed during June-July.

20. About half a dozen locust swarms invaded India from 13 June onward and 139 swarm movements were reported from Jaisalmer, Bikaner, Jodhpur, Churu and Ganganagar districts up to 21 July. These swarms laid eggs in 143 villages. Control operations were started soon after emergence and the hoppers were mostly controlled in young stages. Aerial operations were conducted on two occasions on 20 and 24 July. In all 32955 kgs. of BHC 10% dust and 920 litres dieldrin 10% solution were used and the control operations concluded on 17 August.

Iran

21. Iran continued to maintain regular surveys of the desert areas. No significant locust activity was reported during October 1973 but there was influx of a couple of loose immature swarms and high population of adults from Pakistan at the end of November requiring control.

22. Control operations by baiting and spraying were undertaken against two loose immature swarms and groups and concentrations of immature adults in the coastal areas of Bandar Abbas, Jask and Chabahar in late November and December and against another loose immature swarm in Pishin area near the Pakistan border on 31 December and 1 January 1974. Four immature swarmlets and a large population of copulating adults were controlled in an area of the Iranshahr area from January to March and II to V instar hoppers in April and May. Breeding was also recorded in Chabahar and Jazmurian in May and the same was controlled. The total gross infested area was about 100 square kilometers.

Pakistan

23. The country maintained regular surveys in the summer and winter/spring breeding areas and 13 additional temporary outposts were established in the summer breeding areas of Sind and Bahawalpur deserts in order to keep proper surveillance over the strategic areas along the Indo-Pakistan border. Ground surveys were supplemented with aerial surveys whenever necessary.

24. During October 1973, bands of various sizes of hoppers of all stages and fresh emergences in about 224 square kilometers in Bahawalpur and Khairpur deserts were controlled by dusting with BHC 10% and exhaust nozzle spraying with dieldrin. Four laying swarms and 19 pink swarms/groups were sprayed with exhaust nozzle and one mature swarm was sprayed by aircraft. Control operations were further intensified by deploying more spray aircraft and exhaust nozzle sprayers. About 18588 square kilometers of hopper and swarm infested area in Bahawalpur, Rahimyar Khan and Khairpur deserts was cleared by dusting with 80960 kgs BHC and spraying 85941 litres liquid insecticide from ground and air up to end of 1973.

25. As a result of widespread rains in many parts of Baluchistan, conditions for breeding in spring 1974 became very favourable. Control was organized as soon as breeding was noticed in Kharan and Khuzdar districts. 1096 hopper bands and large number of hopper concentrations were controlled and 390 square kilometers eggbeds were sprayed in Kharan district. Three hundred and seven hopper bands and 2407 small concentrations were controlled by dusting and exhaust nozzle spraying in Khuzdar district. Dense adult population and 75 hopper concentrations of all stages were located in Kachhi district mostly in cultivated fields over a gross area of about 390 square kilometers and the area was cleared by mid-May by dusting BHC and spraying dieldrin. Further breeding was recorded in Kharan and Khuzdar districts where hoppers had reached advance stage and some fledglings

also occurred in Kharan where two spraying aircraft were deployed which cleared 6240 square kilometers in Kharan in two days. The ground parties controlled 254 hopper bands of all stages by dusting. In Khuzdar district 349 fifth instar hopper bands and 1990 concentration/groups of all stages of hoppers were controlled by middle of May.

26. High density populations of all stages of solitary hoppers in small groups and bands and also groups of fresh and other adults were reported over a vast area of about 13500 square kilometers in Nushki-Dalbandin sector where 9 exhaust nozzle sprayers and two aircraft to spray inaccessible hilly areas were deployed at the end of May. Two pink swarmlets were sprayed in Khuzdar district. In the first week of June loose swarms and hopper bands infiltrated into Nushki area from Afghanistan. 1659 groups/bands of fifth stage hoppers, 159 groups of fledglings and two swarms measuring about 104 and 125 square kilometers were controlled. A large population of solitary hoppers of all stages in 390 square kilometers in Bannu district of NWFP was cleared by spraying and dusting during the first fortnight of June. Escapes from winter/spring breeding started moving towards summer breeding areas in early June and a loose mixed swarm heading east was observed at Nawabshah on 4 June which crossed into India. No major locust activity was recorded thereafter.

27. The control data from October 1973 to September 1974 are given in Appendix I.

28. The Commission noted with satisfaction that timely and intensive control operations undertaken in all the countries of the region brought the locust populations to a very low density and thus not only helped in the continuation of the present recession but also saved the crops from any damage.

Coordination of Research

29. The Commission reviewed the work done in India and Pakistan during 1972/73, a summary of which is given in Appendix II.

30. The Commission noted that in Pakistan the field investigations on Desert Locust, which were being conducted in the Department of Plant Protection, were taken over by the Agricultural Research Council under the reorganization scheme and was of the opinion that since these studies were more concerned with field observations rather than basic research, it should more usefully be allowed to continue to remain the responsibility of the Department of Plant Protection from the operational point of view making suitable arrangements for liaison and coordination with the Agricultural Research Council through its relevant subcommittee.

31. The Commission took note of the research projects undertaken at the various field research stations and observed that work on the displacement and migration of solitarious populations, light-trap studies and anti-feedant qualities of neem should be intensified.

32. The Commission at its Ninth Session recognized the need for reviewing the field investigations being undertaken at the various research stations in the region and decided to appoint a short-term consultant, having considerable experience of the region, to undertake a study of the investigations being carried out and to prepare plans for future work for the consideration of the Commission.

33. Accordingly, Dr. Sardar Singh was appointed as a consultant and undertook the assignment on 1 October which is to continue up to 30 November 1974. He gave a preliminary verbal report of his visits to the Field Station for Investigations on Locusts at Bikaner in India, Teheran and Jiroft in Iran and Kabul in Afghanistan and submitted a tentative programme of work for the three stations and a project for strengthening plant protection work in Afghanistan.

34. It was pointed out that work on diurnal and nocturnal displacement of solitary locusts through the different seasons, light trap studies, comparative value of newer alternative insecticides for locust control and studies on biology of the Desert Locust under natural and semi-natural conditions needed to be intensified at Bikaner. One of the bottlenecks for stepping up the pace of work had been the difficulties encountered in rearing and maintaining a large culture of various stages of the Desert Locust for marking and releasing or for spraying purposes. The officer in charge of the station had visited COPR London, locust laboratories in Paris and DICO-EA Headquarters in 1973 on the Commission's fellowship where he had the opportunity to learn raising of locust cultures. It was hoped that he would streamline the procedures for mass rearing of locusts.

35. In Iran, the Desert Locust Research Station at Bandar Abbas was proposed to be shifted, in the very near future, to Jiroft at the site of the Locust Outpost in the city, since it had a more conducive microclimate, was protected from hot and sandy winds, shade for cages was available and food for locusts could be grown. It was immediately available for occupation. Location of the laboratory in the city, with various civic, communication and educational facilities available, might be a further incentive to the staff to devote undivided attention to the work. On the other hand the Research Laboratory of the Jiroft Development Organization at Aliabad, 20 kilometers away from Jiroft, might

take about two years to become suitable for research work and another two years for windbreaks and other greenery to establish for fixing up cages and residences and other facilities for staff. Both the sites were equally distant from Tohan, where solitary Desert Locust population was available and where biology of the locusts could be studied in field cages. It was suggested that suitable research staff, preferably M.Sc.s' Agriculture from a closeby university at Ahwaz may be recruited.

36. The details of a project for strengthening the aerial unit and plant quarantine wings of the Organization were discussed and outlines for a plant pest and disease reporting service on the lines of the Desert Locust were supplied.

37. In Afghanistan, there were no formal arrangements for research on Desert Locust but note was taken of the Desert Locust intelligence, communications and control wings working at a high level of efficiency during the recent upsurge in Kandahar Province. Observations made during special surveys could be considered as applied field research.

38. A \$ 1.8 million project for strengthening the Plant Protection Organization, already drafted for submission to UNDP, was considerably recast to focus attention on an operational research programme for pest control, establishing a plant pest and disease reporting service, setting up plant quarantine inspection and fumigation stations at the seven land barrier points and organizing on-the-job training of about 2 dozen B.Sc. (Agri.) and 4 dozen under-graduates. The project would be implemented in two phases as advised by UNDP. Both the authorities of the Government and UNDP reacted favourably to the revised project.

39. The Commission evinced interest in the preliminary report of the consultant and looked forward to receiving his full report in due course.

Fellowships and Training

40. The Commission noted with great satisfaction the progress made in the training programme. Mr. Mohammad Shafi of Pakistan concluded his fellowship at the Reading University in the first week of July and was awarded Ph.D. Mr. M.V. Venkatesh of India concluded his studies at the COPR, London and returned to India in January 1974 after short visits to Paris and Addis Ababa. Mr. Ali Mohammad of Afghanistan visited India for four weeks from 1 February 1974 to acquaint himself with the work at the Indian Plant Protection and Quarantine stations at Delhi, Bombay and Calcutta.

41. Mr. A.A. Soltani of Iran was continuing his studies at the Imperial College, London, and was expected to complete his work by the end of 1974. Mr. Darab Khastoo of Iran finished his preliminary training at Newcastle and was preparing his thesis. It was assumed that he would be starting studies for M.Sc. degree during the current term. Mr. Hayatullah Hayat of Afghanistan continued his studies for M.Sc. at the Punjab Agricultural University, Ludhiana, India. Mr. Ahmad-u-din Wais of Afghanistan was admitted as a regular student at the Teheran University from the September 1974 session.

42. Mr. Kawoos Nasr of Iran and Mr. Mohammad Jan of Afghanistan proceeded to London in September on a group study tour and Mr. Ali Sadeoghi, also of Iran, in the beginning of October 1974 on seven months' fellowship in plant protection management. On completion of his training in the U.K., Mr. Sadeoghi would go to Karachi for working with the Department of Plant Protection for a period of five months.

43. Mr. Malik Akhtar of Pakistan was accepted at the York University in the U.K. from October 1974 for higher studies leading to Ph.D. degree. Mr. A.R. Saboury of Afghanistan could not be accommodated for a Ph.D. course in U.K., and proposal for his placement at the Punjab Agricultural University, Ludhiana, for July 1975 had been sent. Final decision with regard to admission of Mr. Satish Chandra of India for Ph.D. course was awaited.

44. Messrs. Zainulabidin Pardes, Mohammad Omar and Hashim Khoram of Afghanistan, Messrs. Ahyabhai Jivaji Hathi and Jaswant Singh of India, Messrs. Manoutchehr Rouhani, Kamil Javadpour, Hooshang Shirany and Mansour Liravi of Iran, Messrs. Mohammad Akram and S.M. Rafi Zaidi of Pakistan and Dr. Ibrahim Gumussuyu of Turkey attended the Training Course on Crop Pest and Desert Locust Control and Research at Teheran from 21 September to 21 October 1974.

45. Mr. Mohamed Nasir Didar of Afghanistan, Mr. Ram Chanda of India and Messrs. Mirza Sattar Beg and Ashfaq Ahmed Qureshi of Pakistan were attending the three-month training course for radio operation and maintenance which commenced in Beirut, Lebanon, on 24 October 1974.

Sessions of the Executive Committee

46. The Commission decided that future sessions of the Executive Committee might be convened if and when considered necessary. All technical, financial and other matters generally considered by the Executive Committee could be discussed at the sessions of the Commission.

47. The Commission elected Pakistan and Afghanistan as Chairman and Vice-Chairman of the Executive Committee respectively for 1974/75.

Administrative Budget and Accounts - FAO Trust Fund 9123

Accounts for the year ending 31 December 1973 and Outstanding Contributions

48. The Commission examined the final and audited statement of accounts for the year ending 31 December 1972 (Appendix III) and approved it.

49. All contributions due up to 1972 had been paid by the Member Governments. The position for 1973/74 is given below:

	<u>Yearly Contributions</u>	<u>Paid 1973</u>	<u>1974</u>	<u>Outstanding as at 31.8.74</u>
Afghanistan	2,750	-	-	5,500
India	27,000	26,316	-	27,804
Iran	25,000	25,000	12,500	12,500
Pakistan	16,700	16,700	8,350	8,350
	<u>71,450</u>	<u>68,016</u>	<u>20,850</u>	<u>54,154</u>

50. All the delegates pointed out that their respective contribution for 1974 had been paid at their end and would soon be received at FAO Headquarters.

Programme of Work and Budget for 1975

51. The Ninth Session of the Commission held in December 1973 approved the Programme of Work and Budget for the five years 1975/79 commencing 1 January 1975 (Appendix IV) with the provision that it would be reviewed at the annual sessions of the Commission and that savings under any of the expenditure headings could be utilized to meet shortages under any other headings. Similarly, unspent surpluses at the end of any calendar year would be available to supplement allocations under the same headings or any other headings as might be required. The Programme of Work and Budget was subsequently approved by the FAO Finance Committee in April 1974. Since no radical change in the locust situation was expected, the Commission adopted the budget for 1975 as approved at its Ninth Session.

Survey and Control Potentials

52. The Commission reviewed the survey and control potentials available in the Member Countries and brought this information up-to-date. (Appendix V).

53. The delegates of Afghanistan, India, Iran and Pakistan made requests for providing some additional equipment and supplies to supplement their present resources. It was agreed that the Governments concerned would submit detailed lists of their requirements to FAO. Depending upon the availability of funds, FAO Secretariat would review such lists and take appropriate action to meet the needs to the extent possible.

Special Surveys

54. The Commission received from the FAO Secretariat an account of the special surveys undertaken in southern Iran and Pakistan and in southwestern Afghanistan during 1974. A summary of these surveys is given below :

Southern Iran and Pakistan

55. The present survey was carried out by two technical officers and one maintenance assistant from Pakistan and two technical officers, four drivers and one maintenance assistant from Iran. Transport was provided by the Government of Iran and POL by FAO. The Iranian team arrived at Zahedan on 30 March and was joined there by the Pakistani team on 1 April.

56. The survey of important areas of southern Iran commenced from Zahedan on 3 April and the joint team visited Khash, Iranshahr, Bandar Lingeh, Bastak, Lar, Shiraz, Jiroft, Ziarat, Jazmurian, Iranshahr and Zahedan areas up to 6 May. They left Zahedan on 8 May and entered Pakistan at Mand on 9 May for survey of Pakistan area where they visited Dasht Valley, Suntsar, Gwadur, Pasni, Turbat, Awaran, Uthal and Bhawani areas and reached Karachi on 23 May. The Pakistani team stayed behind and the Iranian team left Karachi for Zahedan on 26 May and reached there on 30 May.

57. During survey of Iranian area, 110 scattered adults at a density of 90 per square kilometer were observed in Dalgan area on 6 April and two at Belesar in Chabahar area on 11 April. In Bandar Abbas area, 12 scattered adults were observed at Deh Nou, 5 at Jalabi and 3 at Chah Fallah on 17, 18 and 19 April respectively and the population ranged between 20 to 140 per square km. Three scattered adults were observed in Dasht-e-Kaloes in Bastak area on 22 April and 21 in cultivated fields at Bagherabad in Jiroft area on 30 April. From 1 to 6 May scattered adults and solitary hoppers of all instars were observed in several widely spread localities which were mostly restricted to cultivated and harvested fields.

58. A 2 to 3 square kilometers dead yellow swarm was observed in Chah Hashem area (about 25 km. SW of Dalgan) on 7 April. Control was carried out in this area against pairing adults at the end of March.

59. Third and fourth instar hoppers in about 2 square kilometers each at Kalechar and Sheerabad in Iranshahr area were observed by the survey party on 5 April which were controlled by BHC baiting and dusting with good results.

60. During survey of Pakistan area from 9-23 May, only one adult locust with yellow hind wings giving a population of 20 per square km. was observed at Chashani Chah in Pasni area on 12 May. The areas visited were dry and unsuitable for locust breeding.

Southwestern Afghanistan

61. The joint survey programme of strategically important areas, which were not adequately surveyed, was initiated in 1965 on the recommendation of the FAO Desert Locust Control Committee and has since been carried out regularly every year under the aegis of FAO. The present survey was the tenth in the series; the two Indian technical officers arrived at Kabul on 25 April and along with the Afghan team proceeded to Kandahar on 29 April.

62. The survey commenced from Spin Buldack in Kandahar province on 1 May and the desert areas of Chah-i-Surkh and Sherawak in Kandahar province, Darweshan and Spin Masjid in Helmand province and Farah and Herat provinces were surveyed up to 6 June.

63. In Sherawak valley, a scattered adult locust population ranging from nil to 15,000 per square kilometer was observed from 4 to 8 May. On enquiries, it was learnt that large adult populations infiltrated into the area from the east along with a dust storm in the second fortnight of March and since conditions were favourable for oviposition, egg-laying occurred in small concentrations over a fairly large area. As a result solitaria emergence probably commenced in the middle of April and continued until the third week of May over a widespread area. On 9 May, eight mature adults were flushed in Spin Buldack area during a vehicle traverse and when this area was resurveyed on 30-31 May parent generation adults at a maximum population of 1,125 per square kilometer were still present and solitaria hoppers, mostly in the I instar were also found over a large area.

64. Sherawak valley was resurveyed from 1 to 4 June when it was found that in a number of areas hoppers had concentrated

and formed into small to medium size bands and it was noted that III to V instar hoppers along with I to II instar were present over a fairly large area. Hoppers in early stages were green in colour which developed black pigmentation in later stages. Advanced stage hoppers had attained yellow colour with well developed black pigmentation in the V instar. In some areas fledging had also commenced. In Shorawak east, a significant population of selitaria hoppers in 2 x 1 square kilometer was spotted on 7 May and fresh emergence was also in progress but on 1 June when the area was re-examined very low density III instar hoppers of fawn colour were found and it was observed that they could not survive in large numbers due to very dry conditions and non-availability of green vegetation.

65. In other areas only two female adults with grey body and bright yellow wings, giving a population of 50 per square kilometer, were observed in Darweshan area of Helmand province on 13 May whereas no locust activity was recorded in Farah and Herat provinces.

66. On locating the locust breeding in Shorawak valley, the special survey team reported the situation to the Department of Plant Protection in Kabul and control operations were initiated which were further intensified when more breeding was discovered in the first week of June. In view of the very difficult terrain, some of the areas might not have been reached and escapes were likely. The situation was reported to the Director and Plant Protection Adviser, Department of Plant Protection, Pakistan, and he was advised to keep strict vigilance over the Pakistan areas bordering Spin Buldack - Shorawak sector of Afghanistan and also prepare for control of any infiltrations from across the border.

67. The Commission reiterated its earlier decision for the continuation of special surveys in view of their usefulness and requested FAO to take necessary action in this regard.

Survey of strategic areas

68. In accordance with the recommendation of the Commission at its Ninth Session (Report, paragraph 15) concerning survey of Indo-Pakistan border areas, both the Governments of India and Pakistan had undertaken extensive surveys of this important area during monsoon breeding season of 1974. Recognizing the importance of these surveys which involved an extensive area and in view of the increase of costs of POL and other operational charges, FAO in consultation with the two Governments concerned increased the allocation of funds from Rs. 15,000 to Rs. 30,000.

CONTROL DATA FOR SOUTH-WEST ASIAN REGION
October 1973 - September 1974

LOCALITY	MONTH AND YEAR	TYPE OF INFESTATION (Swarms, Adults, Hoppers)	INFESTED AREA IN SQ. KMS.	INSECTICIDE USED				METHOD OF APPLICATION (AIR/GROUND)
				BHC DUST IN KGS.	MALATHION ULV.	BHC LIQUID IN LITRES	OTHERS IN LIT.	
<u>Afghanistan</u>								
Shorawak (Kandahar Province)	May-June 1974	Adults, Hoppers	2.85 (net)	3975	-	-	-	Ground
<u>India</u>								
Jaisalmer	Oct-Dec 1973	Swarms, Adults, Hoppers	10500	61785+ 10 kgs 50% W.P. 13075	70	7305	349	Air & Ground
Bikaner	June-Aug 1974	Hoppers	3400	13075	-	-	-	Ground
Jaisalmer	July 74	Hoppers	60	1550	-	-	-	Ground
Jodhpur	June-July 1974	Hoppers	350	7750	-	920	-	Air & Ground
Ganganagar	July-Aug 74	Hoppers	3000	9950	-	-	-	Ground
<u>Iran</u>								
Baluchistan	Nov. 73	Swarms, Adults, Hoppers	100	1670	-	987	-	Ground
Bandar Abbas	- May 1974	Hoppers						
Kerman								
<u>Pakistan</u>								
Rahimyarkhan	Sept.-Dec 73	Swarms, Adults, Hoppers	18588	80960	-	998	544	Air & Ground
Khairpur								
Bahawalpur deserts								
Baluchistan	Jan-June 1974	Swarms, Hoppers	22070	7313	-	27795	5110	Air & Ground
Bannu District (NWFP province)	Jan-June 1974	Adults, Hoppers	415	-	-	545	-	Air & Ground
		Total Insecticides used :	188,038	70	998	121,941	6,013	

A SUMMARY OF THE DESERT LOCUST RESEARCH WORK
CARRIED OUT DURING 1973-1974 AND FUTURE PLANS

INDIA

Ecological Studies

The seasonal variations and breeding behaviour of the Desert Locust was studied under two different conditions.

Semi-Natural Conditions

A population of 150 Desert Locust adults, collected from Jaisalmer area, were released in a 23' x 15' x 10' field cage in September 1971. The population had been left to itself undisturbed except for periodic observations made on its status. Out of the original 150 adult locusts, 13 adults and 30 hoppers survived by the end of November 1973. Twenty eight hoppers fledged to adults during December and two during January 1974. The adults copulated in February and laid eggs; hoppers emerged in March-April and fledged between April-June. Egglaying again took place in July and adults started emerging in August and there were 31 adults in September. The population thus went through three generations between November 1973 to September 1974 and their number remained almost static.

Natural Field Conditions

Six well separated localities within a radius of 30 kilometers of Bikaner were chosen to record observations on locust population dynamics. One square kilometer area

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APPENDIX II

was divided into 10 equal plots and 10 such plots were studied randomly every month, each plot being examined in the evening and the following morning by line transect method. Locusts were found during December - June in four out of six localities, with a population of density 1 to 3 adults per 2000 square metres. The population density in one locality was significantly higher than others which might be due to ecological differences to be analysed further. In July - August, locusts were found in all the six localities, indicating a possible influx of exotic locusts.

Behaviour studies on Desert Locust

Observations on crawling, roosting, feeding and marching behaviour of hopper bands - progeny of an exotic locust swarm, were recorded from 20 June to 18 July 1974 in Kalasar - Sawaisar area of Bikaner district. The observations were started with I stage hopper bands and the movement, etc., of the band was followed through V stage.

First band (30 June - 30 July)

<u>Observations</u>	<u>Timings (start of observations)</u>		
Morning crawling	0600	to	0800 hours
Evening crawling	1600	to	1815 "
Evening grouping	1800	to	1900 "
Noon roosting	0900	to	1215 "
Feeding	0655	to	1130 "
	1630	to	1930 "
Night displacement	0 to 60 metres per night		
Distance traversed	2794 metres	}	Total distance covered from I to V stage.
Net displacement	1951 metres		

Second band (I stage) 14-18 July

Distance traversed	232 metres
Net displacement	190 metres

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One hundred II instar hoppers of the Desert Locust were examined for their sex ratio and colour pattern; sex proportion was 61% males and 39% females. Black markings on different body parts were as under:

Name of body part	Black markings (number of specimens)				Total
	Nil	Light	Intermediate	Predominant	
Wing pad	21	42	28	9	100
Abdomen	22	41	28	9	100
Pronotum	18	45	28	9	100
Hind femur	19	44	28	9	100

Parasites and Predators

There was a large mortality in the rearing stock of Schistocerca and 4113 adult locusts were dissected for the presence of parasites; only one Megaselia sp. (Phoridae, Diptera) was collected from the dead locusts. A bacterium, Edwardstella sp. was identified from some of the infected locusts.

Biotic factors

The population of the Desert Locust and the lizard, Acanthodactylus cantoris cantoris was studied over 912 transects of 100 metres each in a sandy habitat in west Rajasthan from May 1972 to December 1973. It was observed that the Desert Locust and the lizards occurred in 22.6% and 27.1% of transects surveyed respectively. Their joint occurrence was observed in 7% of transects. The population range in respect of Desert Locust per 100 metre transect varied from nil to 10.25 adults in different months whereas it was 0.08 to 2.2 in case of the lizard.

Biology

Egg laying data of 570 females of Desert Locust adults collected from Jaisalmer/Bikaner districts during October to December 1973 were examined. It was observed that on an average those females laid only 0.59 egg-pods (range 0 to .10), which is far below the known average. Further, major number of locusts when dissected showed very little

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or no eggs in them although neither there was any evidence of their having laid earlier nor any infection or parasitisation noticed in them.

Morphometrics

i) Seven hundred twenty adults of the Desert Locust collected singly or on light trap, etc. were biomorphically examined. Their composition of eye-stripes, sex ratios and phase status by biometrics revealed that the population observed from June 1974 onwards had acquired gregarization tendency.

ii) Morphometric analysis of the Desert Locust population observed in Jaisalmer and Bikaner districts during October to December 1973 was done. Mean measurements at C, P, E and F for different localities were computed. Multivariate analysis for size and phase-form was done and canonical variate values calculated. It was inferred that concentrations observed in Bikaner and Jaisalmer areas during 1973 were solitari-form.

Toxicological Studies

Preliminary field trials with fenitrothion and dursban at dosages of 50, 70 and 100 g./hectare were conducted against loose hopper bands of 4th and 5th instars of the Desert Locust during October 1973. Both the insecticides were found to be almost equally effective at all the dosages tried. Cent percent kill of 4th instar hoppers was obtained at the minimum dose of 50 g./hectare applied. However, mortality of 5th instar hoppers was found to be below 5% at 50 g., around 55% at 70 g., and about 80% at 100 g. per hectare.

The comparative toxicity of four organophosphate insecticides viz. quinalphos, phenthoate, fermothion and elsan was tested against I instar Desert Locust hoppers by using contact-film technique: 45-60 nymphs of 1st stage were exposed for a period of 1-3 hours. Within half an hour of exposure, 100% kill of test insects was obtained in case of phenthoate (elsan) at 100-500 ppm concentrations. But concentrations of 1-10 ppm proved non-toxic even after 3 hours of exposure. Fermothion and quinalphos gave 96% and 56.6% mortality respectively at 500 ppm after 3 hours of exposure.

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Deterrent action of neem

Aqueous suspension of neem (Azadirachta indica) seed kernel at a concentration of 0.05 and 0.1% sprayed on bajri (Pennisetum typhoideum) leaves gave complete protection against Desert Locust under laboratory conditions. Application of 0.1% aqueous suspension of seed kernel with a high volume sprayer on bajri under field conditions protected the plants completely for one day, 60% during the first week and 54% during the first fortnight of the treatment.

Papers Published

1. Some observations on Tribulus alatus and its role as a preferred habitat of the Desert Locust.
FAO Technical Series No. AGP/DL/TS/14: 28-34.
2. Reaction of gravid females of the Desert Locust (Schistocerca gregaria Forsk.) to some soil types.
FAO Technical Series No. AGP/DL/TS/14: 53-60.
3. Some field studies on the numerical association between Desert Locust/grasshoppers and the common sand lizards (Acanthodactylus cantoris cantoris Gunther).
FAO Technical Series No. AGP/DL/TS/14: 61-66.
4. Mortality of immature Desert Locust (Schistocerca gregaria Forsk.) adults on application of sub-lethal doses of Dieldrin.
FAO Technical Series No. AGP/DL/TS/14: 38-41.
5. Fluctuation behaviour of recession population of the Desert Locust (Schistocerca gregaria Forsk.) in India during 1963-71.
United Nations Development Programme Desert Locust Project Progress Report No. AGP/DL/TS/14: 42-52.
6. Trend of seasonal changes in non-swarming population of the Desert Locust in relation to rainfall in the Bikaner zone of Rajasthan, India during the period 1963-71.
FAO Technical Series No. AGP/DL/TS/15: 26-37.
7. A note on the toxicity of Garlic oil to Desert Locust (Schistocerca gregaria Forsk.).
UNDP Desert Locust Project Progress Report No. AGP/DL/TS/14: 38.

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PAKISTAN

The plan of work set out for the year 1973-74 could not be satisfactorily carried out during the year under report because the Desert Locust research section, which used to be an integral part of the Plant Protection Organization, was transferred to the Agricultural Research Council under the reorganization of the research scheme. In the process of transfer of schemes the work received a set back. Efforts would be made to continue the plan of work proposed at the Ninth Session of the Commission. However, a summary of the work done during 1973-74 is given below:

Effect of Temperature and Humidity on Desert Locust

High mortality was recorded among hoppers and adults during winter under laboratory and field conditions and from June to August 1973 with Aspergillus flavus due to high humidity. It was also observed that sufficient percentage of hoppers completed their nymphal period in four instars and the adults thus produced were 5-eyestriped. Their wings and other body parts were shorter than the normal adults although the nymphal period was almost the same as in the normal adults. Their progeny was normal.

Morphometric Studies

The phase status of 1973-74 population was studied. The locusts collected from Lasbela area were solitari-form and there was no trend towards gregarisation. The locust specimens collected from Bahawalpur desert in October and November 1973 campaign were solitaria tending towards gregarisation during the first breeding and the specimens collected from the second breeding in the same area were of solitary and gregarious forms. More than 95% of these were gregari-form.

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Light Trap Studies

Light trap observations with mercury vapour lamp using red, blue, green and yellow lights were undertaken during dark nights in the field. It was noticed that locusts were attracted irrespective of colour. Other fauna attracted to light was collected and identified.

Residual effect of Dieldrin on Desert Locust Eggs

Eight mature females (2-3 days before oviposition) in each group were offered contaminated sand in tubes containing 0.5, 1, 2 and 10 ppm of dieldrin for oviposition and for the control group only moistened sand was used. The following observations had been made so far:

- i) The frequency of oviposition was irregular in the treated sand than in the control.
- ii) The average number of pods/female decreased as the amount of insecticide increased in the soil.
- iii) At doses of 10 ppm the females which once bored probably failed to lay again and consequently died.
- iv) The emergence from the egg-pods laid in the treated sand was abnormal. In case of 2 and 10 ppm, the egg development was normal but the vermiform larvae failed to moult into 1st instar and died thereafter. In case of 1 ppm the emergence was normal in a few egg-pods but the hoppers died within 24 hours after hatching. In case of 0.5 ppm, the eggs hatched normally; majority of hatchlings died within 48 hours but some reached 5th stage and then died.

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Effect of Sub-lethal Doses of Dieldrin on the Progeny of Desert Locust

Two batches of 10 locusts each were given doses of dieldrin at 5 ug/g. (solution prepared in Ethyl Methyl Ketone) body weight and two were kept as control. In 10 ug/g. dose no egg-laying was observed whereas in 5 ug/g. dose egg-laying was normal but hatching was abnormal and most of the hatchlings died within 72 hours. Only three females and two males reached the adult stage which were smaller than the normal locust adult. All the adults died within 10 days.

Locust Repellents and Anti-feedants

A number of plants found in the desert were screened which locust do not accept at all or consume very little when forced to feed on. More than 30 desert plants had been tried so far. Studies to see the effect on the rate of development and maturation period of Desert Locust on different desert plants were in progress.

Neem (Melia azadirachta Linn.) leaves in powdered form mixed with wheat bran in ratio of 1:4, 1:8 and 1:16 was offered to three pre-starved groups of III stage hoppers; each group containing 25 hoppers. A control group was also kept for comparison. It was observed that the survival of hoppers decreased with the increase of neem leaves powder.

Effect of Sub-lethal Doses of gamma radiation on the Progeny of Desert Locust

Fresh male and female fledglings were irradiated at 1 kr. and 0.5 kr. to see the effect of smaller doses of gamma radiation on the progeny of Desert Locust and a control group was kept for comparison. At 1 kr. dose, none of the irradiated male and female matured even after six weeks of their irradiation and all died within two months.

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Cluster of Locust Outcasts
Including virgins and sexual
individuals

Normal egg-laying and hatching took place in the control group. At 0.5 kr. dose, only one egg-pod was laid after three months but all the 52 eggs failed to hatch. Trials on still lower doses were in progress.

Parthenogenesis

This experiment on the asexual mode of reproduction was continued during the period under report. The F-2 generation remained alive for about 1 1/2 month, few reached the adult stage but all died without any laying. As the aim was to reproduce five generation parthenogenetically, the experiment was repeated. The following facts had been recorded so far and the experiment was being continued in the second generation.

- i) Average number of pods per female and average number of eggs per pod of asexual group (only females) was less than the control group (male and female).
- ii) Mortality in asexually produced hatchlings was much higher than in normally produced hatchlings (control).
- iii) Both male and female hatchlings were produced in control group whereas only female in asexual group.

Note:

Effect of Sub-lethal Doses of Gamma Radiation on the Progeny of Desert Locusts
Fresh male and female fledglings were irradiated at 1 kr. and 0.5 kr. to see the effect of smaller doses of gamma radiation on the progeny of desert locust and a control group was kept for comparison. At 1 kr. dose, none of the irradiated male and female matured even after six weeks of their irradiation and all died within two months.

Plan of research work for the year 1974-75

Code	1975	1976	1977	1978	1979	Total
10 PERSON						
1. Ecological studies, population dynamics, behaviour and migration of Desert Locust in the field.	1,000	1,000	1,000	1,000	1,000	5,000
20						
2. Effect of known conditions of temperature, moisture and food on the development, behaviour and phase of Desert Locust in the laboratory and under semi-field conditions.	1,000	1,000	1,000	1,000	1,000	5,000
40						
3. Collection of fauna and flora from Desert Locust habitat and its correlation with locust population and its gregarisation.						
40						
4. Taxonomy and biology of grass hoppers found in the locust habitat.						
50						
5. Morphometric studies of Desert Locusts collected from the field.						
60						
6. Research on the possible application of malathion as a standard locusticide to replace dieldrin in Pakistan.						
70						
7. Locust repellents and anti-feedants.						
80						
8. Effect of radiation on locust biology.						
90						
Supplies and Materials						
Furniture and Equipment						
Acquisition and Improvement of Premises						
Fellowships, Grants and Contributions						
Total	10,000	10,000	10,000	10,000	10,000	50,000

Note: Project Servicing Costs 5% on codes 50 and 60
 in the Eastern Region of its District Area in South-West Pakistan shall be regarded as eligible (subject to the overall limit of expenditure to be regarded as eligible for the purpose of this plan) for the purpose of this plan.

Trust Fund 9123 - International - Commission for Controlling the
Desert Locust in the Eastern Region of its Distribution Area in
Southwest Asia

Statement of Account as at 31 December 1973

(expressed in US dollar equivalents)

<u>Receipts</u>			
Balance as at 1 January 1973			323,084.34
Amounts received from : Government of India			
	(part 1972 and 1973)	26,469.39	
	Government of Pakistan		
	(part 1972)	12,525.00	
Interest credited		8,913.62	
			<u>47,908.01</u>
			370,992.35
<u>Deduct :</u>			
<u>Cash Expenditure 1973</u>			
00	Personal Services	262.64	
20	Official Duty Travel	17,975.14	
30	Contractual Services	216.95	
40	General Operating Expenses	(720.42)	
50	Supplies and Materials	2,582.38	
60	Furniture and Equipment	64,795.67	
70	Acquisition and Improvement of Premises		
80	Fellowships, Grants and Contributions	21,039.39	
			<u>106,151.75</u>
	Project Servicing Costs 5% on codes 50 and 60		
	14% on other items	8,797.21	
			<u>114,948.96</u>
Balance as at 31 December 1973			<u>256,043.39</u>

APPENDIX I V

TRUST FUND No. 9123

BUDGET FOR THE FIVE YEARS 1975-1979

BUDGET EXPRESSED ACCORDING TO FAO EXPENDITURE CODES

Code		1975	1976	1977	1978	1979	Total
10	<u>PERSONAL SERVICES</u>						
	Short-term experts	1,000	1,000	1,000	1,000	1,000	5,000
	Casual labour	1,000	1,000	1,000	1,000	1,000	5,000
20	<u>TRAVEL</u>						
	Sessions of Commission	5,000	5,000	5,000	5,000	5,000	25,000
	Consultants	2,000	2,000	2,000	2,000	2,000	10,000
	Survey teams	10,000	10,000	10,000	10,000	10,000	50,000
	Co-ordination	3,000	3,000	3,000	3,000	3,000	15,000
30	<u>CONTRACTUAL SERVICES</u>						
	Translation, printing	1,000	1,000	1,000	1,000	1,000	5,000
40	<u>GENERAL OPERATING EXPENSES</u>						
	Freight	1,000	1,000	1,000	1,000	1,000	5,000
	Incidentals	1,000	1,000	1,000	1,000	1,000	5,000
	POL, Transportation	2,000	2,000	2,000	2,000	2,000	10,000
50	<u>SUPPLIES AND MATERIALS</u>						
	Insecticides	10,000	10,000	10,000	10,000	10,000	50,000
	Other supplies	2,000	2,000	2,000	2,000	2,000	10,000
60	<u>EQUIPMENT</u>						
	Control equipment	15,000	15,000	15,000	15,000	15,000	75,000
	Transport "						
	Radio "						
	Survey "						
	Reserves "						
80	<u>FELLOWSHIPS AND GRANTS</u>						
	High-level fellowships	7,000	7,000	7,000	7,000	7,000	35,000
	Short-term fellowships	3,000	3,000	3,000	3,000	3,000	15,000
90	<u>PROJECT SERVICING COST</u>						
	5% of \$ 27,000 - \$ 1,350	6,530	6,530	6,530	6,530	6,530	32,650
	14% of \$ 37,000 - \$ 5,180						
	<u>UNALLOCATED</u>	920	920	920	920	920	4,600
	TOTAL	<u>71,450</u>	<u>71,450</u>	<u>71,450</u>	<u>71,450</u>	<u>71,450</u>	<u>357,250</u>

Note : As agreed by the Fifth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia, the budget should be regarded as flexible (subject to the overall limit of expenditure and to the type of activities specified), in that the amount allocated for a particular purpose may be increased or decreased at the discretion of FAO to meet the changing needs of the locust situation.

APPENDIX V

SURVEY AND CONTROL POTENTIALS
IN THE MEMBER COUNTRIES
OF THE COMMISSION
1973/74

APPENDIX V

Trust Fund for the Control of Desert Locusts in the Eastern Region of its Distribution in South-West Asia

Total	1973	1972	1971	1970	Code
AFGHANISTAN					
The Department of Plant Protection and Quarantine, Ministry of Agriculture and Irrigation, continued to maintain an Anti-Locust Service. The details of staff and other available resources are given below:					
					Department of Plant Protection and Quarantine, Ministry of Agriculture and Irrigation, Kabul.
					President
					Mr. Ali Mohammad
					Director General
					Mr. M. Siddiq Zikri/Vacant
					Director
					Mr. Ali Ahmed Naikzada
					Technical Staff
					30
					Administrative Staff
					4
					Transport and General Services Staff
					20
					Number of outposts
					6
					Transport
					Light
					10
					Heavy
					5
					Ground Machinery
					Sprayers and dusters
					340
					Exhaust nozzle sprayers
					10
					Insecticides
					Liquid
					Nil
					Dust (BHC 12%)
					50,000 kgs.
					Wireless Sets
					10

Note: An agreed by the Fifth Session of the Commission for Controlling the Desert Locusts in the Eastern Region of its Distribution Area in South-West Asia, the budget should be regarded as flexible (subject to the overall limit of expenditure and to the type of activities specified), in that the amount allocated for a particular purpose may be increased or decreased at the discretion of FAO to meet the changing needs of the locust situation.

INDIA

Number of Locust Outposts
including circle and semi
headquarters

India maintains a permanent Locust Warning Organization as a wing of the Directorate of Plant Protection, Quarantine and Storage, Ministry of Agriculture. For purposes of survey, the regular breeding areas, spread over two hundred thousand square kilometers of desert in the States of Rajasthan, Gujarat and Haryana, are divided into circles, zones and outposts with a field headquarters at Jodhpur. At present, there are 34 locust outposts in the desert. The details of the organization and the control potentials available with it by way of transport, insecticides, equipment and aircraft are given below:

<u>Title and full address</u>	Directorate of Plant Protection, Quarantine and Storage
	i) N.H. IV, Faridabad (Haryana)
	ii) Room No. 409, B-Wing, Shastri Bhavan, New Delhi
<u>Director</u>	Dr. S.N. Banerjee
<u>Assistant Director</u> (Locust Control)	Dr. J.S. Gill
<u>Locust Entomologist</u> , <u>Field Station for</u> <u>Investigations on Locusts</u> , <u>Bikaner</u>	Mr. M.V. Venkatesh
<u>Deputy Locust Entomologist</u> , <u>Locust Sub-Station, Jodhpur</u>	Mr. K.R. Bhatia
<u>Other Technical Personnel</u>	154
<u>Senior Administrative and</u> <u>Transport Staff</u>	8
<u>General Service Staff</u>	180

Number of Locust Outposts including circle and zonal headquarters 34

Transport

Light 69
Heavy 22
Tractors 3

Ground Machinery

Power sprayers 80
Hand sprayers 62
Power dusters 173
Hand dusters 8135
Exhaust Nozzle sprayers 23

Wireless Sets 54

Spray Aircraft

Government 3
Private 21

Helicopter

Fixed Wing

Total

8 11
17 38

Insecticides

Liquid 25,000 litres
Dust 755,000 kgs.

Note:

For cultivated areas, the states maintain a large stock of power and hand operated equipment for locust control and plant protection work.

Sprayers and dusters	340	
Exhaust nozzle sprayers	10	General Service Staff
<u>Insecticides</u>		
Liquid	25,000	
Dust (BHC)	755,000 kgs.	
<u>Wireless Sets</u>	54	

IRAN

The Government of Iran continued to maintain an Anti-Locust Service as a part of the Plant Protection and Quarantine Organization, Ministry of Agriculture and Natural Resources, on a permanent basis. The details of staff and other resources are given below:

<u>Title and full address</u>	Plant Protection and Quarantine Organization, Avenue Pirasteh Evin, Teheran
<u>Director</u>	Dr. A. Zomorodi
<u>Other Technical Staff</u>	42
<u>Senior Administrative and Transport Staff</u>	4
<u>General Service Staff</u>	46
<u>Number of Permanent Outposts</u>	6
<u>Number of Auxiliary Outposts</u>	10
<u>Transport</u>	
Light	100
Heavy	15
<u>Ground Machinery</u>	
Power sprayers	620
Hand sprayers	1500
Hand dusters	40
Exhaust nozzle sprayers	25
<u>Wireless Sets</u>	16

Spray Aircraft

Super Piper Cubs	18
Cessna	2
Trash Commander	5

Insecticides

Liquid	33,075 litres
Dust	35,000 kgs.
Bran	100,000 kgs.

Note:

- (a) The above-mentioned vehicles are used for both plant protection and locust control and survey in the southern part of Iran.
- (b) If any unforeseen situation arises, the vehicles and equipment from other provinces can be used.
- (c) The vehicles are mostly driven by the technical staff.

100
15

light
Heavy

Ground Machinery

820
1500
40
25
16

Power sprayers
Hand sprayers
Hand quaters
Exhaust nozzle sprayers

Wireless Sets

PAKISTAN

<u>Title and full address</u>	Department of Plant Protection Ministry of Food and Agriculture Government of Pakistan Jinnah Avenue, Malir Halt, Karachi-27
<u>Plant Protection Adviser and Director</u>	Mr. Farid Uddin Ahmad
<u>Other Technical Staff</u>	140
<u>Administrative and General Service Staff</u>	305
<u>Transport</u>	
Light	132
Heavy	13
<u>Ground Machinery</u>	
Power sprayers	193
Hand sprayers	433
Power dusters	31
Hand dusters	246
Bait mixer	12
Exhaust nozzle sprayers	99
<u>Wireless Sets</u>	29
<u>Spray Aircraft (Beaver)</u>	29
<u>Insecticides</u>	
Liquid	174,495 litres
Dust	93,755 kgs.

SUMMARY

Afghanistan India Iran Pakistan TOTAL

Staff
 Technical 30 154 42 140 366
 Non-technical 24 188 50 305 567

Transport
 Light vehicles 10 69 100 132 311
 Heavy vehicles 5 22 15 13 55
 Tractors - 3 - - 3

Insecticides
 Liquid (in 1000 litres) - 25 33 174.5 232.5
 Dust (in 1000 kgs.) 50 755 35 93.7 933.7

Aircraft - 11 25 9 45

Power driven ground machinery 10 276 645 323 1254

Hand driven ground machinery 340 8197 1540 679 10756

Wireless sets 10 54 16 29 109

FAO Reserve of Insecticide (in litres)

Bandar Abbas: BHC ULV 15% 4,500
 Bandar Abbas: Acrodel 1,894.5
 Kerman: " 405
 Zahedan: " 10,935
 Ahwaz: Ensodil 7,155
 Teheran: Diazinon 95C 500
 Karachi: Dieldrin 20% 17,887.5

List of Working Papers

- | | | |
|-----------------|---|--|
| AGP:DL/SWA/74/1 | - | Programme of Work and Budget
Trust Fund 9.123 |
| AGP:DL/SWA/74/2 | - | The Desert Locust Situation during October
1973 - September 1974 and Forecast |
| AGP:DL/SWA/74/3 | - | Desert Locust Survey and Control Activities
Carried out by the Member Countries during
October 1973 - September 1974 |
| AGP:DL/SWA/74/4 | - | A Summary of the Desert Locust Research Work
Carried out during 1973-1974 and Future Plans |
| AGP:DL/SWA/74/5 | - | Fellowships |
| AGP:DL/SWA/74/6 | - | Survey and Control Potentials in the Member
Countries of the Commission 1973/74 |
| AGP:DL/SWA/74/7 | - | Special Surveys |