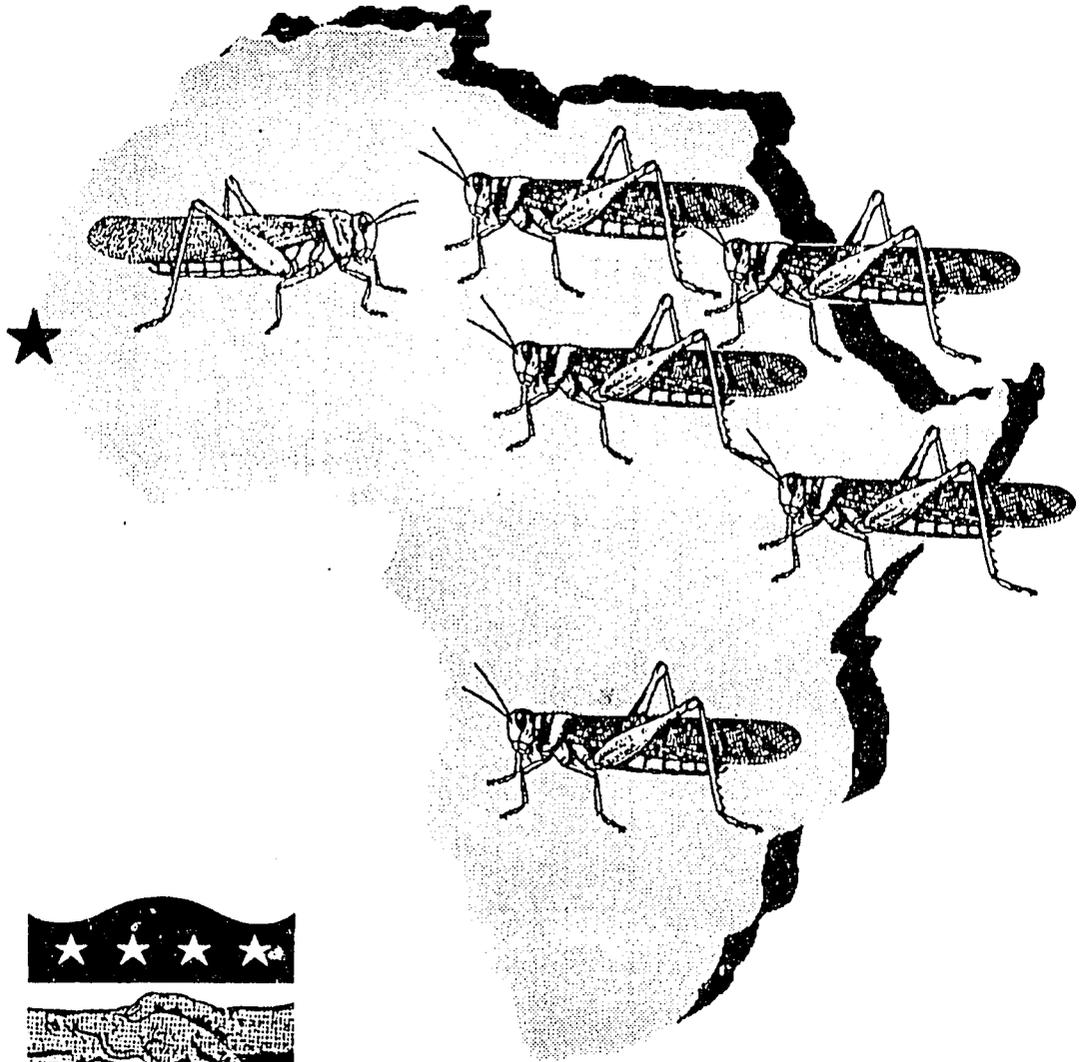


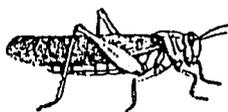
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LOCUST/GRASSHOPPER MANAGEMENT WORKSHOP



Agency for International Development

Dakar, Senegal
February 6-9, 1989



**LOCUST/GRASSHOPPER CAMPAIGN
WORKSHOP
February 6-9, 1989**



Purpose

The purpose of this workshop is to plan the 1989 campaign and provide direction for future campaigns.

Type of Meeting

Interactive problem solving

Desired Outcomes

1. Definition of the roles of OFDA and the Regional Bureaus.
2. A statement of the optimum desired state for 1989 African locust/grasshopper campaigns, strategies for implementation, and understanding of the barriers.
3. An action plan for implementation.

Workshop Products

1. A report of the workshop discussions and recommendations.
2. An action plan.

Definitions

Optimum desired state. The ideal campaign.

Strategies: What approaches can be taken to achieve the optimum.

Barriers: What are the obstacles to implementing strategies.



ACKNOWLEDGEMENT

Workshop organizers and participants greatly appreciated Mission Director Sarah Jane Littlefield's gracious offer to host the 1989 Africa Locust Management Workshop in Dakar, Senegal. Conference facilities at the Meridien Hotel were excellent, providing a productive environment for discussions. Also, Mission personnel provided continuous conference support in a very helpful and cordial manner. We especially want to acknowledge the assistance of Dave Robinson, Marie Faye, Ibrahima Ba, Reynault Gousse, and all of the others who made our stay in Senegal so pleasant.

Merci beaucoup!

AFRICA LOCUST MANAGEMENT WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1989

INTRODUCTION

USAID and other international donors have developed a well-funded and comprehensive locust and grasshopper control program since 1986 that has been operational across the Sahel and in North Africa. It is valuable to periodically review program results periodically to improve future responses. With this purpose in mind the Desert Locust Task Force, AID/ Washington, organized the February 1989 Locust Management Workshop in Dakar, Senegal, to review the 1988 campaign, plan for an effective 1989 campaign, share information, and resolve significant locust control issues.

In January 1988 personnel from the Office of U.S. Foreign Disaster Assistance, the Africa Bureau, Asia/Near East Bureau, USAID Missions, and the State Department, and technical specialists met at Harpers Ferry, West Virginia, to evaluate the 1986 and 1987 control campaigns and develop direction for the development and production of a "Locust/Grasshopper Management Operational Guidebook" that would assist Missions in conducting effective control programs. Copies of the Guidebook were published in January and distributed to participants at the Senegal workshop in February. During the course of the 4-day workshop in Dakar, it often turned out that the answer to people's questions often were "in the book". Participants at the 1989 workshop also received a book that contained a report of the Harpers Ferry Workshop, a chronology of the 1986/1987 campaigns, the questionnaire survey response, and a report of "Lessons Learned".

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AFRICA LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1989

Monday, February 6

WELCOME -- Sarah Jane Littlefield, Director, USAID Mission, Senegal

List of "Truisms" in combatting Grasshoppers/Locusts:

1. Survey --

- Absolutely Important! Early survey must be accurate and credible.
- Look toward Donor countries to help.

2. Timeliness --

- between cooperating agencies, host and donor countries, etc.
- stress importance of treating areas immediately for best success; six to seven weeks from hatch to swarm.

3. Instrumentation --

- Look at what is most appropriate for each circumstance and situation.
- Avoid getting into fruitless discussions and arguments over appropriateness of various equipment, instruments, etc.

4. Regional Cooperation --

- Locusts do not recognize international borders.
- Missions within each country should encourage and facilitate cooperation between countries with shared borders.

WORKSHOP OBJECTIVES -- Bob Huesmann

1. Provide realistic information and forum for exchange of information

- Programs
- Problems
- Solutions
- Technology/programs that worked

2. Need to continue to identify gaps in the transfer of information and technology.

Prefaced remarks by highlighting coordination and cooperation during last campaign and reiterated need to continue to act as a team. |

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Bob also shared some information of interest to participants:

- Cable from Jordan, Friday, 3 February, says that 20 swarms came into Yemen from Saudi Arabia on 1 February
- Pakistan has sent/is sending aircraft into middle east in cooperative effort to deal with locusts

WORKSHOP GUIDELINES -- Jerry Williams, Workshop Facilitator

1. Stay on Schedule
2. Hold all "problem solving" questions, discussions until Wednesday Session
3. No Smoking!
4. Be On Time (that way, we can stay on schedule!)

HARPERS FERRY WORKSHOP -- Bob Mutch, USDA, Forest Service, Disaster Assistance Support Program Manager, Washington D.C.

1. Harpers Ferry Workshop, held January 1980, was oriented to produce a guidebook for the USAID Missions. The main product was the development of the Africa Locust Control Guidebook and a discussion of major issues and concerns which were identified by questionnaire responses received from various USAID Missions, CPS Personnel, and Cooperators. Copies of the Guide Book and Workshop Proceeding will be distributed to participants of this workshop.
2. This workshop is intended to be oriented toward the needs of USAID Mission personnel who are on the leading edge of the Grasshopper/Locust Control effort. This is Your workshop!

GUIDEBOOKS -- Jerry Williams

Guidebooks distributed to AID Mission personnel

Discussion of translating Guides into different languages such as French and Arabic. No firm plans as of yet. For the present, Guidebooks are intended for use by our USAID personnel. After their use, evaluation, and modification (feel free to critique them), the topic of translating will be addressed.

May be able to produce an abbreviated book for CPS personnel by deleting AID references and other info not relevant to needs of Host country CPS.

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CURRENT LOCUST PLAGUE STATUS AND PROJECTIONS -- J. Roffey, FAO

See handout in your packet, Paper #2

BRIEF CHRONOLOGY OF EVENTS SINCE 1986

- 1986 -- Migration was primarily east, starting in eastern Sudan, and stopped at Red Sea.
- 1988 -- Spring migration was primarily north and northeast, crossing Red Sea.
- 1989 -- Movement is expected to start at Red Sea (winter breeding area), proceeding west and east.
 - Pink swarms, immature adults
 - Yellow swarms, mature adults, laying eggs
 - It is extremely important to conduct surveys and share information in order to effectively combat the problem.
 - Need to identify how much surveying is being conducted, where, and how?
 - Share all reports -- even a negative finding -- with other USAID Missions and cooperators
 - If info is sketchy, it may mean no sightings or that no survey teams are out looking -- a big difference
 - Usually the invasions/migrations begin from the spring breeding areas in the interior. We can probably expect patten to repeat.

FORECAST --

- Very dependent on weather. If rains come and persist, it could be a very difficult year!
 - Need to get better reporting system.
 - Need to define how to control, methods, programs, etc.
- Regions which need better reporting include:
 - Sahara
 - Western Algeria
 - Northern Chad

This may be difficult to remedy due to remoteness, civil strife, etc.

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Monday, February 6

CHAD --- Fort Fuller and Greg Garbinsky

Background

Responding to the assessments of locust experts after the 1967 campaign and to recommendations made at the AID conference held at Harpers Ferry, West Virginia, in January 1968, USAID/Chad on January 29, 1968 submitted to AID/W a proposal for an emergency locust control program in Chad. The proposal included USAID/Chad's strategy for the program as well as a request for \$970,00 to fund technical assistance, aerial services, pesticide, support costs, and satellite imagery; thus a vertically integrated program which ensured the availability of all the required inputs for its success. The proposed program was part of an international donors effort to address the expected locust infestation.

The proposal was finally approved on July 7, 1968 after the U.S. Ambassador officially declared a disaster on July 6. Funding situation for the aerial services and inventory transportation of pesticides was received on July 8. Pesticides, technical assistance and satellite imagery were to be provided in-kind directly from AID/W. Delivery of 30,000 liters of pesticides to N'Djamena started July 26 and was completed August 3. The satellite imagery was delivered regularly over the season. The technical assistance in entomology was not provided.

Primary Objectives

1. To assist the CPS in the survey, identification, and treatment of areas infested with desert locusts that could not be effectively reached by CPS ground control teams or village brigades;
2. To plan and implement, in conjunction with the CPS and the Donor Coordination Technical Committee, the locust control program in the Qaddai, Biltine, and B.E.T. Prefectures;
3. To supplement, but not duplicate or replace, the CPS whenever necessary;
4. To provide technical assistance and logistical support to the CPS and other donor organizations, wherever feasible.

Implementation

- two Aycos Turbo Thrush fixed-wing aircraft with full spray gear, on loan from USAID-Morocco;
- Alouette II helicopter with full spray gear, to assist with aerial survey/control in eastern Chad;

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- requesting the assistance of a French-speaking agricultural specialist from USDA-OIGD to provide technical assistance and guidance.

1. Turbo Thrush Operation

- Turbo Thrushes were delayed in arrival, due end of July
- first plane arrived on August 19
- second plane arrived August 23
- effective time was lost due to these delays
- fully operational by August 26

During the period of operational capability from August 25 to September 10, no major infestations were identified, warranting the use of this high capacity spraying equipment. Possible reasons include:

- a) Unusually heavy rainfall far exceeding the norms for the region was prevalent throughout Chad and most of Sahel.

e.g. Abeche: July -- 14 days rain, 147.3 mm
August -- 21 days rain, 288.5 mm

As compared to 1967 total of 116.8 mm and a 30 year average of 409.6 mm.

Egg pods and/or larval bands were probably inundated and drowned, covered too deeply by soil and sand due to heavy soil erosion, or were washed to the surface and dried out.

- b) Efforts of village brigades and traditional control measures had more impact on reducing larval bands than was recognized:

- Sous-Préfet and extension agent in the Guereda province both cited the significant level of effort of 200 village brigades using backpack sprayers in June and July 1968.

- Traditional method of herding larval bands into deep trenches and then burying them, killing tens or thousands in a matter of minutes.

- c) Lack of adequate information

- Since coordination relied heavily on CFS radio messages and sightings, it is possible that remote areas having large locust infestations may not have been located.

- Because of rains, most CFS vehicles were limited to surveying and treating only along major roads.

Much of the reporting of locusts was not quantified or verified. Many sightings did not give adequate indicators of extent of infestation. GPS reports often relied on villagers' info or second and third-hand sources.

The locusts may have fledged and moved to Sudan or other areas. However, extensive helicopter survey of the area did not find but a few swarms during September and October.

2. Helicopter Operation

- Helicopter was used for survey of the 16th and 17th parallel on September 18, since no donor or GPS team had conducted prior surveys in the area.
- Results indicated there were no locust infestations and very few isolated swarms were passing through the area in west and northwest directions.
- Helicopter surveyed intensively the area between 14°00' and 16°00' latitude and between 19°00' longitude and the Chad-Sudan border.
- PRIFAS locust experts visiting in the week of October 9th, determined that current vegetation and soil humidity was not conducive to locust oviposition in eastern and central Chad.
- Helicopter base camp moved to a base near Ghereda (14°30'N-22°10'E) to monitor reports of desert locust swarms coming in from Sudan.
- After discussions with the GPS Director and the Technical Committee it was determined that there was no further need for the services of the Alouette II helicopter in Chad. Director agreed to provide the helicopter to any other Sahelian country that may have a need in their locust control campaign this year.
- On October 24 USAID/Chad contacted the Desert Locust Task Force in Washington to ascertain which USAID mission might have the greatest need for the services of a survey/spray helicopter.
- The helicopter was dispatched to Mauritania, where need was greatest, leaving Chad on October 31 and arriving in Mauritania on November 8.

Lessons Learned --

1. Need funds up-front
2. Programs should be realistically integrated
3. Establish a procedure enabling the rapid availability of resources.
4. Need to better consider alternatives
5. Better allocation of existing resources
6. Need at least two entomologists!

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AFRICA LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1989

Tuesday, February 7

MALI -- Mamadou Fofana, Project Manager, GAG, USAID/Damako, Mali

1. INTRODUCTION

- Desert locust infestations were huge during the 1988-89 campaign due to:
 - abundant and well-distributed rainfall all over the country;
 - subsequent good growth of natural vegetation and cultivated crops.
- Intense control activities were deployed by the Mali Crop Protection Service (CPS) starting in April when first swarms were noted.
 - campaign was successful, with only minimal crop losses.

2. CAMPAIGN OPERATIONS

- Campaign Preparation
 - Training sessions were held and 45 control brigades installed in appropriate villages
 - Control plan was developed in consideration of the locust situation in the Maghreb countries.
 - Establishment of Coordination and Organization Committees
 - Donor committee met monthly to review the resource and control activities situation
 - Technical committee formed with responsibility for the technical organization of the campaign, the identification of needs, and the implementation of the activities
 - Evaluation and follow-up committee
- All political and administrative authorities, the army, the rural populations, and 45 village brigades were mobilized and trained.
- Infestations
 - Infestations started in May from four fronts.
 - swarms came early and density was high

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- throughout June, there was a general eastward movement.
 - egg laying and first instars were observed at this time
 - July, hatching was generalized and hopper bands were sighted throughout the Western sector of the country, the central delta, and the Gourma.
 - Late July and August, fledgling were observed.
 - Second generation reproduction was observed in September and October, with serious infestations until November.
 - Some residual populations reported in many places in December and January.
- Control Activities
- Surveying was made easy by adequate funding and by the use of the organized village brigades.
 - Control activities were primarily aimed at crop protection:
 - spraying around fields
 - spraying along Mauritania border, from which side the swarms originated.
 - surveying breeding grounds
 - treating instar bands
 - Ground spraying intensified with use of army and farmer brigades.
 - Donors participated by providing pesticides, aircraft flight time, fuel, spray equipment, funds, and technical assistance.
 - Total of 520,000 hectares were treated during the campaign;
 - 97,805 hectares by ground teams
 - 422,195 hectares by aerial means
- Crop Loss
- Some localized severe damage, but overall crop losses did not exceed two percent of the total production of an estimated 2.4 million metric tonnes.
 - Natural vegetation was seriously damaged in July and August, but abundant rainfall has contributed to good regrowth.

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-- Problem Areas

- U.S. government was only donor to react in time to CPS requests for pesticide to be pre-positioned in at-risk areas.
 - 50,000 liters of malathion in March
 - 100,000 liters of malathion, later, after short notice.
- Other donors were slow to react to requests, even after pledges were made.
- Poor road conditions hampered the supply of some CPS bases in pesticide and fuel for aircraft.
- Some pilots contracted by donors got paid whether they worked or not, so they were inclined not to.
- Lack of sufficient operating funds immobilized some vehicles for minor spare parts.
- Lack of expertise in:
 - spraying and pesticide drum neutralization and disposal was a strongly felt concern.
 - environmental impact assessment
 - crop loss estimation
- Lack of radios for communication

-- Success Areas

- Tremendous effort on part of Mali CPS in planning and coordination of activities
- Sensitivity and responsiveness of political and administrative authorities
- Regular meetings at different levels helped solve a lot of problems
- Good treatment methods were clearly explained to all people involved
- The establishment and training of village/farmer brigades was very successful, contributing to the timeliness and effectiveness of control efforts.

3. NEXT CAMPAIGN PROSPECTS

- Infestations will likely be the same size or greater, assuming:

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- same level of rainfall
- winds blow early and trap the locusts in their northward movement in October
- Grant signed for a 3-year project with a funding level of \$1,055,000.
- about \$750,000 spent or earmarked for aircraft operation, technical assistance, fuel, logistical support, pesticide handling and training, locust unit operation, etc.

4. LESSONS LEARNED

- Each donor should have an integrated program
- More intensification of ground treatment
- Mission not to support Mali fleet (not cost-effective)

5. MISSION STRATEGY

(see cable)

AFRICA LOCUST CONTROL WORKSHOP
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Monday, February 6

MAURITANIA --- Bill Thomas, Locust/Grasshopper Program Coordinator,
USAID/Nouakchott, Mauritania

1. SUMMARY ---

- Main impact of locust plague was felt in the agricultural and pastoral regions of the south.
- Mauritania was a major reproductive zone for the insect because of:
 - plentiful rainfall
 - an influx of breeding swarms
- Campaign taxed the resources of both Mauritania Crop Protection Service (CPS) and donor treatment operations
- Impact of control efforts on the locust population at large remain unknown
- A good percentage of food crops were protected

2. NORTHERN MAURITANIA ---

- Heavy rainfall in Northern Mauritania & Western Sahara during the late fall of 1987 gave rise to environmental conditions that were favorable for locust breeding and survival. Conditions remained favorable in the Tiris Zemmur region into March 1988.
- CPS survey teams and roving nomads reported adult swarms and larval bands moving through northern Mauritania in a northwesterly direction.
- Limited control operation initiated with assistance of one FAO spray plane, CPS and OCLALAV ground treatment teams.
- Majority of locusts moving through and breeding in the area probably escaped into Western Sahara, Morocco, and Algeria due to:
 - vastness of region
 - logistical difficulties
- continued rain into early March favoring locust breeding and movement.

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-- Control operations were closed by April because of dry conditions and few locusts and resources moved back to southern regions.

3. PREPARATIONS FOR THE SUMMER, 1960

-- Severity and extent of the upcoming locust invasions were unknown.

-- Donor response was limited due to present calm and lack of locust sightings.

-- OAR/M offered technical advice to CPS in regard to:

-- Survey and treatment team preparation;

-- Logistical preparations;

-- Pesticide use guidance.

4. SURVEY TEAM ACTIVITY

-- CPS survey teams reported both swarms of adult locusts and larval bands in June, in the eastern and central regions, moving in a southeasterly direction.

-- With assistance from OAR/M, CPS began pre-positioning pesticides in the interior regions, depleting existing stocks in Nouakchott.

-- Coordinating Committee meetings continued and donors pledged to rapidly replace depleted stocks of pesticide.

-- U.S. resource assistance to CPS included fuel and spare parts for survey and treatment vehicles, and increased assistance in pesticide pre-positioning activities.

-- Dieldrin controversy emerged as a critical issue:

-- Over 280 barrels were found stored in the eastern town of Adoun, left over from OCLALAV activities of the early 1960s

-- France, Morocco, and Algeria extolled the "virtues" of this chemical.

-- OAR/M informed that U.S. funds were not to be used in any connection with the application of dieldrin.

-- CPS responded that they had no intention to use the chemical.

-- French fueled controversy early in the campaign by donation of lindane to the locust control efforts.

-- U.S. reminded the CPS that lindane fell into the same category as dieldrin.

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- French responded with criticism of U.S. sabotaging the only really effective tools in the locust fight.
- Ironically, CPS and French aerial operations stopped using the chemical because of its corrosive effects on application equipment, and began using the U.S. approved Fenitrothion.

5. GROUND TREATMENT OPERATIONS START

- Increasing numbers of locust larval bands were reported by survey teams and nomads in the southeastern regions as summer progressed.
- Adult swarms were moving west out of Mali into the southeastern regions of Mauritania in early August.
- Limited resources forced control efforts to be directed at locusts, often neglecting threat posed by grasshoppers, birds, and other pests.
- CPS estimated that farmers treated 51,000 hectares with powdered pesticide during the campaign, primarily treating larval bands in cropping areas.

6. AERIAL CONTROL OPERATIONS BEGIN

- By August, CPS ground treatment operations were overwhelmed by the vastness of infested regions and the rapidly growing numbers of locusts.
- CPS requested Donors supply:
 - aircraft to augment continuing ground operations, in addition to...
 - fuel, pesticides, and control operation supplies.
- While pledging and delivering needed supplies, donors recommended to CPS that efforts be concentrated on crop protection rather than on locust eradication.
- Rainfall continued to be abnormally high, with larval bands and adult swarms continuing to expand.
- U.S. supplied 100,000 liters of pesticide, used by CPS in:
 - continued ground treatment operations;
 - donor aerial operations.
- Armed forces were mobilized to assist in control efforts and an international appeal for assistance was issued.

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-- Aerial operations by FAO, Canada, France, suffered due to inadequate CPS ground survey.

-- CPS argued that survey vehicles were either broken down or without fuel despite generous U.S. donations of fuel and spare parts specifically for survey operations.

7. U.S. FUNDED AERIAL OPERATIONS

-- USAID aerial operations technical assistance team arrived in mid-October, finding massive numbers of pink adults consuming all vegetation in area northeast of Nouakchott.

-- TAT determined that real threat lay in the agricultural regions south of Nouakchott because of recent rainfall and passing swarms.

-- Recommended setting up an OFDA-funded aerial spray operation in the southwest, oriented toward crop protection, utilizing four aircraft.

-- Cooperative survey program with the CPS, Peace Corps volunteers, and military units.

-- with urging, military assisted by supplying five four-wheel-drive vehicles, drivers, and a sergeant to oversee operations.

-- a Peace Corp volunteer rode with each vehicle.

-- Local currency f(PL-480) funds were released for use in the U.S. program, to purchase items on the Mauritanian market. Dollar funds were used to procure off-shore materials.

-- Control aircraft arrived during first week in November, with operations commencing November 10.

-- logistics of supply materials was a constant problem

-- U.S. funded control operations continued from early November until mid-December, 1980.

-- Total of 156,150 hectares treated.

-- Total of 19,650 liters of pesticide used.

-- Primary goal was crop protection, but swarms moving north out of Senegal were also treated.

8. NORTHERN MAURITANIA

-- By late January, most of the area Northwest of Birmogries and around Zourate was dry, and no longer considered an important breeding area.

9. CONCLUSIONS

-- CPS operational and planning resources proved marginal.

- Donor assistance played the major part in locust control operations and crop protection.
- The CPS estimates that combined control activities of donor and CPS operations treated nearly 900,000 hectares during the 1988 season.
- High points of campaign included:
 - the assistance of the Mauritanian military in both treatment and survey efforts,
 - the involvement of Peace Corps volunteers in survey operations.

10. PREDICTIONS FOR 1989

- Highly weather dependent.
- Donors will likely be expected to carry the major portion of the effort.
- Prospects for improved regional coordination appear bright in light of the international task force concept.

AFRICA LOCUST CONTROL WORKSHOP
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Monday, February 6

MOROCCO -- Robert Hellyer, DE/AD/Morocco

I. BACKGROUND

-- An in-depth background on desert locust control history and activity in Morocco was provided in the country report and a "Technical Analysis", Annex B, prepared by Dr. Hellyer. The following synopsis of Dr. Hellyer's oral presentation has been prepared for participants.

A. 1987 Campaign (October 1987 - January 1988)

- Desert locusts entered Morocco in late 1987 for the first time in twenty years.
- Massive swarms of locusts moved northeast across the Sahara on a broad front, moving into eastern Morocco where they were first sighted in late October. Soon after, additional swarms began arriving from northern Mauritania and the Western Sahara.
- November 3, 1987, Government of Morocco (GOM) requests USAID assistance.
- Morocco acted very much alone in the region in developing a strategy against the locusts, obtaining very little information or guidance from other countries to the south, from which the locusts originated.
- OFDA assisted in providing:
 - Two Turbo-Prop aircraft (moved from Senegal) and 40,000 liters of malathion insecticide;
 - Logistical ground support team of 3 persons;
 - 3 American entomologists;
 - G/A communications, radios, and other logistical supplies;
 - Total AID assistance of approximately \$650,000.
 - Total of 200,000 hectares was treated.

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B. Spring 1988 Campaign (March - June, 1988)

- Entomologists predicted the locust threat would repeat itself during October of 1988, so a long-term bilateral project was initiated to prepare a locust control strategy that would be in place by October 1988.
- Morocco hit by unexpected locust attack on potential plague properties in March 1988, necessitating a waiver allowing emergency procurement of insect pesticides and materials.
- Locust invasion of March - June was approximately five times more severe than the Fall 1987 invasion, affecting all High Plains countries.
- USAID/OFDA procured 100,000 liters of malathion, 163,200 liters of carbaryl, and continued utilizing the two Turbo Thrush aircraft already in country.
- A total of 2.5 million hectares were treated.

C. Summer 1988 (June - October, 1988)

- Preparations for the Fall campaign begun in late May.
- Pre-positioning of 400,000 liters of malathion, equipping of Moroccan helicopters with spray equipment.
- Other technical assistance (30.8 person months) pertaining to spray operations, safety, logistics, and management.
- Released two Turbo Thrush aircraft to Chad for locust treatment during summer months.

D. Fall 1988 Campaign (October 1988 to February 1989)

- First locust swarms migrating northward were sighted in the extreme southern regions of Morocco in late September and early October.
- Treatment began on October 10, 1988. Daily treatment increased from 5-10,000 hectares per day in early October to 30-40,000 hectares per day in late October.
- Locust invasion soon outstripped the 601's 30-40,000 hectares per day capacity.
- USAID responded by providing two DC-7 aircraft on November 10, boosting daily treatment capacity to 65,000 hectares per day, still short of the desired 100,000 hectares per day rate, considered necessary.

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- On November 15, Morocco treated 61,359 hectares which represented the largest single daily treatment. Treatment averaged 25,000 to 30,000 hectares per day in latter part of November.
- Other smaller aircraft have and are being utilized.
- Average daily treatment rate in January is around 10,000 hectares per day.
- From the beginning of the fall 1969 campaign to present, approximately 2.0 million hectares have been treated. USAID financed aircraft have treated roughly one-fourth of this area.
- A total of approximately 4.6 million hectares have been treated in Morocco between October 1967 and February 1969.

II. SPRING 1969 CAMPAIGN (Proposed)

- Experts are predicting that locusts which have escaped from Senegal and southern Mauritania may find adequate breeding areas in the southern Sahara or Morocco, which could result in a massive re-infestation of southern Morocco during the March - June, 1969 period.
- USAID is preparing an amendment to the bilateral plan to add \$10 million to the locust control program. The project will:
 1. Enhance Omani capacity to control desert locust through aerial spraying or insecticides;
 2. Improve strategic planning and tactics of control operations, including preparation for appropriate responses north of the Atlas mountains if necessary;
 3. Improve efficiency of control operations, including ground surveillance, ground to air communication, and treatment strategies; and
 4. Improve OMI capacity for the management and monitoring of environmental, safety and health aspects of control operations.

III. ORGANIZATIONAL STRUCTURE

- AID will work within the institutional framework developed by the OMI to implement locust control operations, as follows:

the campaign. Desert locust control programs are conducted through this office.

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2. The General Commandant of the Royal Gendarmerie coordinates the locust control operations.
3. Other departments include:
 - Ministry of Agriculture and Agrarian Reform, (HARA)
 - Ministry of Information
 - The Royal Air Force and Army
 - The Ministry of Transport
 - The Ministry of Public Health
4. They are represented within a Central Command Post (PCC) and in Regional Command Posts (PCs)
 - PCs are supervised by the governors of the provinces in which they are located
5. HARA divisions provide technical activities (survey, selection of treatment techniques, biological studies, etc.)
6. Royal Army and Air Force provide various aircraft for swarm identification and treatment, and provide for aircraft maintenance.
7. Over 3000 people are currently assigned to the locust program.

IV. STRATEGY

1. Decentralized Operation with three line defense strategy:
 - 12 command posts
 - 39 subcommand posts
 - 121 operational units
2. Treatment of swarms as far away from agriculture zones as possible
3. Judicious management of means, in order to reduce cost and maximize efficacy

V. PROBLEMS/DIFFICULTIES

1. Pesticides
 - DVP Use
 - Drum disposal

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-- Carbaryl

2. Material

-- Helicopter spray systems didn't function properly

VI. International Conference on the Locust Peril, Fes, Morocco, October 1968

-- King Hassan II hosted an international conference on October 25-29, 1968.

-- Thirty-two countries, the OMDP, and the EEC were represented.

-- OFDA Director Julius Taft, USAID Director Charles Johnson, Agricultural Officer Robert Hellyer, and Entomologist George Gavin attended.

-- Recommendation included:

1. increased locust control capacity at the national CPS level;
2. the creation of a regional task force to reduce massive reproduction in recession areas.

AFRICA LOCUST CONTROL WORKSHOP
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FEBRUARY 6-9, 1989

Monday, February 6

NIGER -- Charles Kelly, Disaster Relief Coordinator, USAID/Niger

1988 Campaign

- Locusts crossed northern Niger from the east in late 1907.
- During May and June 1988, locust problems spread across central and northern Niger, due to:
 - maturing locusts
 - good rains
 - large scale egg laying and heavy hatching
- Despite intensive ground and aerial treatment, immature adults began to appear in early September, moving away from crop zones into the Air Mountains.
- 1988 program was the single largest locust control operation in Niger's history
 - Over 900,000 hectares treated, three times average operations, and 50 percent greater than largest previous year.
 - 65 percent of control work was done by aircraft.
 - Control operations ranged from village brigades to seven aircraft and two helicopters.
- Major weaknesses of 1988 program:
 - insufficient and inadequate planning;
 - poor communications;
 - inadequate surveying; and
 - lack of organization structures and procedures.
- attributed to lack of experience on part of the CPS and to general underestimation of the magnitude of the locust problem and requirements for effective control efforts.

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1989 Program (proposed), excerpted from Statement of Work

-- Primary Focus

- Improved planning and operations management,
- Improved surveillance and assessment,
- Improved communications and information use, and
- Improved aerial application of pesticides.

--- Objective

- Concentrating on the four focus areas, three operational levels of activity and funding have been proposed:
 - Initial level will involve inputs of approximately \$400,000.
 - Second level will be for operations at the same level as 1988 (\$1.5 million).
 - Third level will be for a massive problem, should it develop, involving significant external material and technical assistance such as occurred in Senegal during the Fall 1988 program.
- Each operational level must consider the real financial parameters that exist and assessment of needs developed through survey and monitoring.

--- Identified Issues

1. Technical assistance (role, problems, strengths)
2. Training cadre during operations (methods, skills, training)
3. Communications (equipment and procedures)
4. Surveillance (systems and procedures)
5. Information management
6. Operations planning and management
7. Aerial operations management
8. Cost/benefit issues (treat/no treat, choice of weapons)
9. Pesticides (applications, testing, choice of weapons and means of attack)
10. Donor coordination and role of FAO

AFRICA LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1969

Wednesday, February 8

SENEGAL ---

I. Summary of 1968 Campaign and Operations

- A. International and local experts did not expect desert locusts to pose a serious problem for Senegal in 1968. A combination of an unusual intertropical convergence zone and uncontrolled locust breeding elsewhere led to the sudden, massive invasion of Senegal by locusts in late September. The area and intensity of the late 1968 infestation thus might have been predicted.

The initial response of the UNEP, in October 1968, to Senegalese requests for assistance was to support two small plane operations, the first out of Dakar and the second out of St. Louis. It became obvious in early November, however, that these operations, and indeed all other attempts to control the locusts, would not be enough to handle Senegal's infestation. The OE mission to Senegal then recommended blanket aerial treatment by the category "a" aircraft.

The large plane operation of one *DC-7B* and two *DC-7C*s began only five days after the formal request was made to Washington, showing an impressive capability on the part of ODA and the two coalition contractors that supplied the aircraft and crews. By the same time, USAID continued to support the operation of three small planes in St. Louis.

In total, the large plane operations applied approximately 460,000 liters of insecticide to 790,000 hectares in Senegal, and 44,000 liters to 69,000 hectares in the Gambia. The first small plane operation out of Dakar treated 21,000 hectares near Dakar. The second small plane operation applied approximately 69,000 liters to 124,000 hectares near St. Louis in northern Senegal.

Locust control operations in Senegal undoubtedly prevented the formation of an immense swarm of mature locusts that could have devastated much of Senegal's agriculture and created future havoc in neighboring countries. We would all be satisfied with this result, except for the unexpected missile attack on the two *DC-7C*s and the tragic deaths of five American soldiers for the *DC-7B* operation.

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2. Problem areas and barriers:

- A. Absence of data:
 - 1) Survey data describing expected, actual locust infestation
 - 2) Data to evaluate locust control programs: actual and expected crop damage, bug kill ratios.
- B. Transportation of insecticide to Senegal:
 - 1) Air freight (especially expensive in case of freight).
 - 2) Hard to get 7/7s for cargo planes.
- C. Logistics within Senegal:
 - 1) Confusion about fuel at airport
 - a) Customs and taxes versus handling, clearing, forwarding charges.
- D. Opposition to use of large planes (contributed to delay).
- E. Difficulty of planning ahead for locusts. We did in 1987 and the bugs stayed away. We have no action plan for next invasion. Supply-side planning. But missions need to have something in addition to their standing O/B to use for locusts. Can locusts be predicted?

3. Highlights of what worked well:

- A. ODA contracting with ICG and SAF, and their quick mobilization to get items on short notice.
- B. Effectiveness of cargo planes operations. Kill rates high with no adverse environmental effects.
- C. Our FA team, which mobilized quickly, split into two teams, worked effectively despite attrition and long hours.
- D. US Canadian cooperation on insecticide teams.
- E. Support from embassy, especially Amb. Berger.
- F. ODA Mission mobilization in support of locust activities, especially CBR and motorpools.
- G. US Army food transport in the north.
- H. US support in SF.
- I. Cooperation with Senegals (CGP and MSAD). Small planes team to make us. Critical team.
- J. Cooperation with Gambia (CGP, MSAD). Our air ops there, claim valid attempts to locate insecticide for us when we ran out.
- K. Publicity of cargo planes ops so that Senegalese villagers covered self and others were prepared for spraying.
- L. Better coordination. Divide responsibility for different kinds of assistance.

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4. Preliminary operational plan for 1969

A. Plans for next year's locusts

- 1) FFP's recommendations for locust control
 - a) Improving capacity of staff to do survey, analysis, and reporting of locust infestations.
 - b) Making commandment local technicians to operate more efficiently.
 - c) Training and equipping farmers so that they can deal with early infestation on the ground, which should reduce the need for aerial operations.
- 2) Can't really say much more than that because we don't know
 - a) GOS plans.
 - b) Size or timing of next infestation.
 - c) Response or plans of other donors.
- 3) demands driven versus supply-side planning for locusts (and other disasters that are difficult to predict?) How does it fit in?

5. Misc. issues

- A. Carbaryl. There is a general impression that carbaryl provided to Mali for last year's operations was bad, alternative explanation is that it was applied incorrectly, as a contact pesticide, when it must be ingested to be effective. Improvement of application via the cause of low insect mortality, not poor quality product.
- B. Grasshopper operations. In case of Zambia, this worked well, and large planes were able to treat 60,000 hectares. In case of Senegal, still needs to be worked out in coordinating locally centered programs between the two countries.
- C. Long term control program instead of one operated each year. Working groups and local specialists agree that desert locusts will probably be a chronic rather than episodic problem in the next few years in Senegal. USAID therefore suggests that, in the course of planning future assistance strategies to combat locusts, all of explore possibility of achieving locally centered program rather than treating it as a yearly emergency. Keep in mind that it costs roughly twice as much to air freight insecticide as to send it by sea.

Handling a possible locust control program must be flexible enough to deal with the many contingencies that can occur during a locust program. Another reason for flexibility is that planning a budget for such a long term program will be difficult to do with any precision because contributions of the host country and other donors are so hard to predict.

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SUDAN -- John Mullenax, USAID, Agriculture Officer, Khartoum, Sudan

1. STRUCTURES AND ORGANIZATIONS FOR LOCUST CONTROL IN SUDAN

- The Plant Protection Department (PPD)
 - Well staffed locust control unit with four senior technicians, 21 mid-level technicians
- The Locust Steering Committee
 - Composed of donors, PPD/HARK personnel, Ministry of Finance, representatives from various national committees and from the private sector and from DICOEA.
 - Coordinates donor and national resources and efforts in organizing the locust control campaign.
- Desert Locust Control Organization for East Africa (DLCO or DICOEA)
 - Regional organization, largely supported by Overseas Development Administration (ODA) of the U.K.
 - Provides entomological expertise, pesticides, and aircraft for surveillance and treatment
- The Medium Term Locust Project
 - Multi-donor project
 - Assists PPD in preparing for locust infestation and improving pesticide safety practices
- National Pesticide Committee
 - Reviews and provides guidance on the issues related to pesticide use in Sudan
- National Locust Committee
 - national committee organized to generate support for the locust control effort
- Institute for Environmental Safety
 - GOS organization related to the University of Khartoum that monitors environmental issues
- The Private Sector
 - Extensive private sector involvement due to large areas of irrigated cotton

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- Several companies specializing in aerial application services
- Most major pesticides manufacturers have active local representation

II. REVIEW OF LOCUST CONTROL IN 1968

A. Summer Campaign

- Locust build-up began with the arrival of mature swarms in Western Sudan in late May and early June
- Above average rainfall contributed to rapid multiplication of swarms:
 - 400,000 hectares infested by mid July
 - Control measures began in late July using planes provided by DICO
 - Summer infestation continued in the west until November
- Escapes from the west to areas along the Nile in the northern provinces have maintained populations in that area until now

B. Winter Campaign (Red Sea)

- Distinction between winter and summer campaigns is arbitrary, since different ecological settings permit an almost permanent population presence somewhere in the country
- Infestations along the Nile and Red Sea are the result of swarms coming from the west and the end of the summer campaign
- Red Sea area is traditional breeding ground, with generally favorable conditions for population increases
- Two level contingency plan prepared in November
 - First level, covering 500,000 hectares and focusing primarily on the crop production areas in the Red Sea area
 - Second level, designed to cover an additional 1,500,000 hectares of breeding grounds in the event that conditions are favorable to breeding
- To date, combination of dryness and strong winds from the north has limited the build up in the Red Sea area, with populations contained
- Total infestation to date has been 266,363 hectares and total area treated is 110,451 hectares
 - Most swarms were controlled using ground spraying

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- Aerial spraying provided by PPD and DICO

-- Current Outlook

- Surveys in mid January indicate area to be free of major build-up
- Many populations found in area were highly parasitized
- Major upsurge appears unlikely
- Existing planes, equipment, and other resources adequate
- No major control efforts are predicted

III. INPUTS BY USAID/GEPA

- \$740,000 + local currency support
- Technical support, funds for aircraft surveillance, etc.

IV. PROBLEMS ENCOUNTERED

A. Winter Campaign

- Communications & coordination of aircraft and ground crews
- Late placement of pesticide and supplies
- Spraying too late in the day
- Control over aircraft personnel
- Spraying flying swarms instead of roosting swarms
- Overuse of pesticides
- Poor monitoring of hills
- Pesticide handler safety
- Heterogeneous pesticide formulations
- Poor surveying

B. Winter Campaign

- Most notable problem was the difficulty of obtaining timely accurate information

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- Reporting is not detailed nor accurate enough upon which to base decisions but could be improved substantially with info on swarm density and natural factors such as parasites and weather conditions

V. MEDICAL VERT LOCUST PROJECT

- Based on the EEC commitment, FAO/Rome has authorized FAO to proceed with an agreement with the GOS, but other donor assistance must come onstream quickly.
- It has been proposed that the National Coordinator will assume role of chief of party
- Major problem faced by USAID/Sudan in this respect is the Brooks Amendment

VI. OPERATIONS PLANNING FOR 1989

- Four man committee of IFD staff named to develop operations plan for summer 1989 campaign
- Equipment and staff mobilized for the winter campaign can be shifted to the west for the summer
- Base station radios are scheduled for installation in the west
- At least 100,000 liters of pesticide will be remaining from current stocks

MISCELLANEOUS OBSERVATIONS AND COMMENTARY -- Ron Lilly

- Well organized, educated OPS
- Very well run steering committee. Doesn't play one donor country against the other
- Communications -- radios limited, accountability is lacking
- Prepared a data gathering checklist which is used by survey people to record information and transmit it to base in clear, concise, and standardized format
- Transportation is limited
 - Roads are a major problem. Few paved roads. Many areas are inaccessible by ground
 - Aircraft use is very inefficient -- utilizing aircraft to search for hopper bands is very wasteful and doesn't really locate targets.
- The need for training can not be overly stressed!!

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-- 3,694,000 hectares treated in 1988

Other information detailing anticipated expenditures and other material pertinent to the Mission are included in the Sudan Account Control Report, in their entirety but are not summarized herein.

During the oral presentations, Ron Libby discussed communications difficulties and a communications plan which he developed to correct the problems. This plan included detailed information on radio procurement, installation, and use and also examples of various reporting and inventory forms which should help standardize reporting and tracking, thus improving communications. This material was provided to participants as a handout and is not reproduced here.

TUNISIA

(REPORT WILL BE ADDED LATER)

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Tuesday, February 7

STATUS OF STRATEGIC CONTROL PLANS AND THE ACTION FORCE --- Bob Huesmann and
Carl Castleton

(Material to be included at later time)

AGENCY STRATEGY FOR FUNDING LOCUST CONTROL --- Bob Huesmann

(Material to be included at later time)

FAO'S ROLE IN REGIONAL OPERATIONS: 1988-1989 --- Dr. E. Shar, FAO, Rome

(Additional material to be included at later time)

- Two or three breeding generations can occur in the Sahel
 - Must rely on the control of bands
 - Aircraft is perhaps not more than around 20 percent efficient in control of locusts
 - Aircraft is not truly effective without adequate ground support for survey and treatment
 - Ground units must be installed and operational before aircraft can be efficiently utilized
 - Difficult to pinpoint treatment areas
 - There were much more aircraft than what was truly needed or exploitable
- STUDY OF THE REORGANIZATION OF OCLALAV
- Budget of \$270,000

Tuesday, February 7

RESULTS/BRIEFING ON THE LOCUST/GRASSHOPPER RESEARCH TASK FORCE

Meeting held in Paris, France January 10-11, 1989

Under the Aegis of SPAAR

Abdul Wahab, Chief, AFR/TA/ANR/NR

SPAAR ORGANIZATIONAL MEETING

- SPAAR is the special program for African agricultural research chaired by the World Bank, the United States, and Germany, held in Paris, France, 10-11 January, 1989.
- Participants included representatives from:

United States	Netherlands	Japan	Canada	World Bank
United Kingdom	Germany	Norway	Denmark	FAO/UNDP
- Research institutions included ICIPE and IITA among others.

PURPOSE OF SPAAR MEETING

- Initiate a process whereby donors would be sensitized to the dire need for supporting basic research aimed at developing biological control measures for the desert.
- Role of SPAAR is to provide donors with opportunity to communicate with each other and with representatives of African agricultural research organizations and government institutions to achieve better coordination of resources.
- SPAAR facilitates member donors to have a comparative overview of the various research works underway.

GRASSHOPPER / LOCUST RESEARCH EFFORTS TO DATE

- Efforts to date have been aimed at operational aspects of control, i.e.:
 - Pesticide efficacy trials
 - Pesticide application methods
 - Physics of aerial as well as ground spraying of pesticides, i.e., micronair - ULV - knapsack, etc.

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- Relationships between climate and population dynamics -- PRIFAS work on biological modeling
- Survey techniques, etc.
- Despite all of the chemical control efforts, the problem of the desert locust has increased ten fold.
- Over the long haul, research on the behavior, biology and biological control appears to offer the only solution:
 - Political dimensions -- use of chemicals cannot continue for ever
 - Environmental effects of pesticide use
 - Effects of chemicals on non-target organisms
 - Risk to personnel applying and working with pesticide materials
- Currently, funding for this type of basic research is negligible.
- Need to develop accurate and effective means of assessing crop losses

WHO IS DOING WHAT (in the way of research)

--- FAO

- Concerned about the relative effectiveness of chemicals, their cost, and their effects on the environment
- Looking ahead to alternatives to chemicals, FAO plans to conduct pathogenic pesticide trials in Sudan and Morocco, using *Nosema Locustae*.
- Environmental assessment
- Population dynamics need further study -- during a campaign, one is more interested in killing the critters rather than estimating their numbers

-- ICIPE PROPOSAL

- Study the locust/grasshopper ecology, in terms of carbon cycling and organic matter transformation
 - work in this area was phased out in 1973 when it was thought that locusts had been brought under control.
- Proposal, based on ICIPE's comparative advantage has a temporal dimension of around ten years, and would cost about \$50,000,000 to implement.

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- Principle components of ICIPE proposal

- identification of pathogens including development of pheromones/karymones -
- concentrate on the solitary phase to understand factors that lead to swarming and recession phases
- will require that physiological studies be conducted in the field to understand the physiology of the locust and the interaction with plants
- theory based on field evidence that there is synchronization between plant aromatics and sexual development of the locust, making locusts into gregarious swarms or going from gregarious to recession phase.
- ICIPE believes that given the resources, it will in three years be able to characterize/synthesize a number of analogs of pheromones and other hormones that appear to be implicated.
- training in basic research, rather than operational research, is another area in which ICIPE has comparative advantage, including advanced (MS, PhD) degree programs.
- Research management, especially in area of post management research network
- Technical dissemination through workshops for national and regional institutions
- ICIPE plans to work closely and cooperate with other research organizations through SPAAR

-- UNDP

- wants to award research sub-grants totalling \$5,000,000 (if donors make these funds available) to individuals/institutions to be made on a competitive basis through submission of research proposals in the area of locust/plant interactions

(this raises the question of "why need two institutions under the UN system, FAO and UNDP, doing much the same thing")

-- PRIFAS

- concentrating on operational locust research:
 - adaptation work
 - weather forecasting and modeling using agro met information

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- systems research
 - taxonomy -- have identified around 300 species of grasshoppers and locusts in Sahel
 - solitary stage much more studied, gregarious stage little studied
 - operational models developed for Senegalese locusts
 - vegetative index (NOAD)
 - Greenness maps, French stated that this technique is "blind when plant density is sparse".
 - PRIFAS articulated for coupling between the modelling of PRIFAS with the biochemical work that ICIPE proposes to do.
- GTZ (Germany)
- Established task force to look at ecological aspects with aim being to minimize environmental damage.
 - Research on low persistence chemicals over short haul and supporting ecologically sound control measures for long haul. This includes:
 - ecological/physiological basis for reproduction
 - population dynamics
 - effect of pesticide on metabolism
 - hormonal basis for reproduction
 - chemical nature of the pheromones in solitary & gregarious types
 - improved monitoring of surveillance areas
 - Search for pesticides and micro-organisms, fungi, bacteria, and virus
 - GTZ committed to \$17,000,000.00 for research and development projects, over a 7 to 10 year period
- Belgium
- To date actions have been confined to short term "punctual" activities, i.e. chemical supplies
 - In process of establishing academic/scientific group to obtain info and network with on-going locust work world wide.
- Denmark

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- Committed to supporting FAO coordinated program

-- IDRC

- For last 6 years has funded a research project being carried out at Najpur University, India, to identify indigenous parasites that are endemic to locust population and to develop in-vitro techniques for isolation
- Result: Nosema locustae spores isolated, production of spores now being done, and work now in progress to test specificity of N. locustae against desert locust, grasshopper, silkworms, honey bees.
- Evidence presently available that Nosema locustae spores are not harmful to honey bees.

-- Netherlands

- Chemical research mainly on formulation and efficacy of pesticides

-- United Kingdom

- environmental monitoring concentrating on reviewing all that's been done

-- IITA

- Cited their successful biological control research and development work on E. lopesi as a biological control against cassava mealy bug
- Short term (3 years) project involving potential locust pathogens:
 - nematodes which need living hosts for survival
 - viruses
 - protozoa
 - bacteria
 - fungi
- All these organisms debilitate but do not kill rapidly
- Proposal has five major thrusts:
 - 1) Surveys for new pathogens
 - 2) Development of a biopesticide

- 3) Field tests of biopesticides
- 4) Ecological studies
- 5) Production technology
- LOP cost \$6.0 million

-- United States of America (presentation by Carl Castleton)

-Four Main Lines of Research to be funded by USAID/AFR:

1. Biological control research

-- insect pathogens (*Nosema*, possibly *Entomopox* viruses)

-- insect hormones, pheromones, analogs

Politically sensitive area. Host countries fear of being subjects of "biological research"

2. Neem kernel extract as an anti-feeding agent

3. Crop Loss Assessment

4. Pesticide testing

-- very difficult to implement. FAO to play larger role in coordinating future trials.

OTHER RESEARCH QUESTIONS

- 1. What is the real economic impact of desert locust today?
- 2. If we don't know, is it because we do not have a method to determine this?
- 3. Or, perhaps the impact is not significant?

CONCLUSIONS

- World Bank to take lead in convening a follow-up meeting in one of the affected countries by June, 1989 to bring scientists together to review ICIPE and IITA proposals and seek donors pledge for initiating research programs under the SPAAR umbrella.
- Remember, that if locusts are not present such efforts will be severely constrained.
- We must move rapidly to initiate such a research program while the locusts are around!

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- There is a real need for research and participants are urged to identify research needs and proposals when developing Statements of Work and work plans. Must be of high academic quality and must be relevant to the needs of field personnel.

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AFRICA LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
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Wednesday, February 8
Survey Requirements (0800-0900)

Bob Hussmann called a meeting of a special group at the start of the day to discuss survey requirements that are needed between now and June. The following survey criteria were proposed by the group:

1. Shannon Wilson described the importance of continuing periodic and continuous surveys until June (or when the rains come) in the Senegal and Niger River drainages. Surveys should continue on the basis of twice monthly. The importance of these areas was emphasized, because greenness will remain for the longest period of time in the riparian zones.
2. Rafik Skaf recommended that some national teams be deployed in the field to track the development of locusts in the sub-Saharan region this spring. He said that it would cost \$5000 per month to support one national team with a Land Rover, medium pickup, per diem, petrol, etc.
3. George Cayin indicated that we would need to carefully watch Red Sea coast area early enough this year to obtain some advance warning of the potential for widespread breeding and dispersal elsewhere. The Red Sea area is a critical one and emphasis should be placed on effectively monitoring locust activity here. Sudan should continue to keep teams in place in this area for surveillance and surveying purposes.
4. Excluding the Red Sea area, one recommendation was made to field at least two teams per country for survey purposes across the Sahel. But the number of teams used should be determined by terrain, remoteness, availability of other people in the area, etc.
5. Survey results communications process: survey team results should be sent to OCLALAV for distribution (FAO, USAID, others) on a regular basis.
6. Morocco and Algeria survey requirements: there is an active control program in this area and there should be a minimum of breeding activity or movement. There are enough people working in Morocco to keep track of the locust activity. It is important, however, to encourage Morocco and Algeria to continue active survey programs during upcoming months so that there will not be surprises later due to escapes that go undetected. Bob Hellyer stated that there is a joint Morocco/Algeria/darstana team in place now to carry out survey activities in the region. But Bob indicated that Morocco has a need for assistance in implementing a standardized form of training to help improve national teams in their conduct of accurate and effective surveys.
7. With regard to surveying, Jerry Roffey indicated that it is more an art than a science. It takes experience to do it well. There are many references available to augment the efforts of the people who will be doing the surveying. Carl Castleton added that a process needs to be provided to ensure the timely management and communication of survey information.

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8. Bob Hellyer recommended that FAO and the Desert Locust Task Force develop a comprehensive approach to survey methodology and reporting that would include training, reference material, forms, and reporting procedures.

ACTION ITEM: RAFIK SKAF AND ABDUL WAHAB WILL DRAFT AN ACTION PLAN ON SURVEY REQUIREMENTS AND PRESENT THE PLAN TO REPRESENTATIVES FROM THE SAHEL FOR THEIR REVIEW.

Wednesday, February 8

Situation Report Format

During the discussion of issues, participants identified the need to agree on an acceptable, somewhat standardized, format for Situation Report. The following format was "brainstormed" by the participants.

1. Summary
2. Locust Situation (entomological)
 - Source
 - Where, extent, magnitude, stage
 - Forecast (locust, weather, other pertinent factors)
 - Crop Situation
3. Control Activities
 - Ground Treatment
 - Aerial Treatment

For both types of treatment, be specific on number of hectares to be treated, type of pesticide or other treatment, application method, applied by whom (USG, CPS, others)

4. Status of Resource/Inputs
 - Arrival of commodities (what, what, where, when, how, and by whom)
 - Stocks, Prepositioning, number of aircraft, vehicles, spray equipment, pesticides, internal shipments
 - Technical Assistants (arrivals / departures)
 - Pledges (new, old, keep updated and current)
5. Other (Issues)
 - problems (logistics, pesticides, etc.)
 - comments, observations, recommendations
 - lessons learned
 - training (needs and accomplishments)

[If any "other" issue(s) is especially important, make it a separate title, i.e. "Training" is a course took place, say on pesticide drum disposal, etc.]

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AFRICA LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1989

Wednesday, February 8

PRIORITIZING ISSUES

The participants listed 25 issues that are related to the locust control campaign in Africa. Through a voting process the participants then ranked the issues in the following order of importance:

<u>Issues</u>	<u>Votes</u>
1. Cost/Benefit (treat / no treat, alternatives, etc.)	17
2. Survey techniques (also, credibility and accuracy)	15
3. Communications	14
4. Surveillance (systems and procedures)	14
5. Training activities	12
6. Pesticides: Selection, waivers, applic'n, disposal, medical & safety	11
7. Donor Coordination and FAO Role	10
8. Operations Planning and Management	9
9. Mission Logistics and Support for Emergency Operations	9
10. Technical Assistance (TDY) Performance Feedback	9
11. Environmental Concerns	9
12. Control technologies	7
13. Greenness maps	6
14. Political accords needed to access "action force" treatment areas	6
15. Use of USAID funded health and safety commodities	6
16. Reporting practices	5
17. How to Accomplish Regional Operations?	4
18. Funding and Roles	3
19. Information Management	2
20. Sahel Communications and FAO radios (sub-group meeting)	2
21. Spray Equipment and techniques	1
22. Donor's Ability to React Quickly	1
23. Locust problem in Tunisia	1
24. Aerial Operations Management	0
25. Who should be on distribution list for locust Operations Guidebook	0

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Wednesday, February 3

ISSUES - DISCUSSION AND CONSENSUS

During the course of the workshop, several issues were identified for discussion during this segment of the workshop. These issues were prioritized by simple vote, the results of which are displayed on the page entitled "Prioritizing Issues".

The following issues, having received the most "votes", were discussed more fully. The key points raised in discussion are summarized below for each issue.

#1 COST / BENEFIT (Treat / no treat, alternatives, etc.)

- List of Research Needs
- Define parameters
- Identify and quantify alternative strategies
- Cost Effectiveness of chemical application
- Trade-off
 - Creating Institutions versus Cost of Operation
- Survey / Control

#2 SURVEY TECHNIQUES

- How to get system working?
- Problem is motivation or lack thereof
- Lack of money \$\$
- Money \$\$ without strings attached
- Timely technical assistance
- Training: Formal and On-Job-Training
- Peace Corps volunteers, long term Technical Advisors
- Ensure proper management and supervision
- What to do with isolation during the rainy season
- Availability of and ability to apply advanced technologies

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- Assess the survey management systems
- Generalized scope of work for Survey
- Management Assessment of Survey (Bob, George, Carl, Shannon, Bill)
- Missions will give a preliminary assessment of the Survey in the Situation Report they prepare
- Desert Locust Task Force (DLTF) will send out a format for Situation Reports
 - One proposal has been drafted and circulated for comment at this workshop

#5 TRAINING ACTIVITIES

- USAID to provide training resources
- Missions to provide participants and per diem
- Train National units on proper survey techniques
- It's a good idea to train farmers and local brigades
- Exchange visits between countries
- Pesticide application training
 - Mali is particularly interested
 - Check to verify status of training program

#6 PESTICIDES: Selection, waivers, application, disposal, safety, and medical, etc.

- DLTF will accumulate and distribute emergency information packets
- Mission send copies of translations to DLTF

#7 DONOR COORDINATION AND FAO ROLE

- DLTF has role in AID
- Need to define role/relationship with FAO in global setting
- There has been significant improvement in last six months to one year
- Some confusion as to who is coordinating the role of Japan
 - Japan has had an annual agreement since 1980 regarding pesticides

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- Mauritania does not understand FAO coordination role with donors in their country
- FAO are field coordinators in some countries and roles differ
- Rome FAO
 - formal meetings
 - ad hoc meetings to resolve critical issues
- In general, have a good sense of donor collaboration
- Areas to improve
 - bilateral donor level
 - more leadership should be taken at national level
 - need a way to communicate our activities to PRIFAS and DLCO

#9 MISSION LOGISTICS AND SUPPORT FOR EMERGENCY OPERATIONS

- Are locusts and grasshoppers an emergency or long term development problem?
- handle each situation differently
- OFDA versus long term development
- Mission structure for emergencies
- Mission funds for general operating expenses have been used for funding programs but these projects, but mission funds are limited
- Big problem trying to get money \$\$ to finance operations
- Harsh AID development channels are slow
- Local currency fund should be looked into
- a lot of hidden issues come during an emergency making it difficult to project and predict funding needs

#11 ENVIRONMENTAL CONCERNS

- Possible effects on vertebrates
 - Direct toxic effects
 - Indirect effects, eating insects or developing a scarcity of food

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#12 CONTROL TECHNOLOGY

- Poison bait is an old proven technique that should be revived to avoid wastefully applying pesticides. Effective and relatively safe.
- low cost
- 4 dollars / hectare (\$4.00/Ha)
- bait uses minimum amount of pesticide / hectare
- bran and other substrate are readily available
- need to look at older abandoned techniques to reduce environmental effects of dusting

#13 GREENNESS MAPS

- Three issues:
 1. How useful are they
 2. Are they available fast enough
 3. Cost? Where is the funding coming from
- Chad (Curt Fuller) answers:
 1. very useful for locust and other programs
 - helped pinpoint areas to survey
 - found a good correlation between greenness and locusts
 2. Yes, Telex messages helped to identify new maps and where crews should go for survey
 3. Look at existing budget and see what funds are available
- Niger (Charles Kelly)
 1. used by CPS for ground truthing
 2. had problems
 - competition for limited time
 - need to reduce to a page size
 - distribution needs to be through CPS rather than AID

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3. host government wants them, Mission will finance them

-- Haiti

1. Intensively used for surveys
2. Receive four days after shipping
3. Mission will pay

-- Sudan

1. may continue
2. useful
3. Getting them CE

-- Mauritania

1. 1987-88 were used by CPS for survey
2. Arrive too late, 8-12 weeks
 - support sending by fax, telex not useful
3. in budget for this year

-- Tunisia

- up to 3 weeks delay
- planning to test fax
- need confirmation of needs by 3/1

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February 9, 1989
Training Issue

Carl Castleton made the following comments in relation to the training issue:

1. Training is not a panacea, since difficulties may arise from implementation or management problems.
2. Training takes a long time to develop and complete.
3. Analysts will do determine whether your problems can be solved by training.
4. There may be difficulties as to physical logistics, so "train the trainer" packages should be put together to optimize effectiveness of the training.
5. Training materials must be adapted for local conditions and ethnic populations.

Greg Carbinsky reported on the schedule for workshops that will be held in Africa:

1. April 16, 1989--a 6-8 day workshop in Niger on the safe and effective use of pesticides (OLV equipment, pesticide user's guide, aerial operations guide, etc.). The target audience consists of Directors, field operations personnel, and Crop Protection Service personnel.
2. April 23, 1989--a 4-day workshop on the development and use of crop protection training materials. The target audience consists of the Crop Protection training officers. Recent training materials will be available to review, participants will be able to practice presentations on their own work, and they will be able to improve audio/visual skills.
3. August, 1989--a workshop will be held on the "Identification of Sahelian Grasshoppers" with special emphasis on grasshopper nymph identification for early season control programs. The sessions will pay air fare and per diem for participants. There should be one person nominated per country. There will be English translations.
4. April, 1990--there will be a 5-day "Crop Loss Assessment workshop in the The Gambia.

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February 9, 1965
Technical Assistance Issue

Bob Hatch described the manner in which technical assistance specialists are acquired for temporary locust control assignments in Africa through the Forest Service's Insecter Assistance Support Program and other mechanisms. These specialists are provided to the Mission to help them accomplish their locust control programs. In order for these types of technical assistance programs to be most effective, it is important that the sending agencies and the TDY individuals receive constructive feedback on personal performance and how well the objectives of the assignment were met. A one page "Individual Performance Rating" form was developed and then distributed to the participants as an example of one way to provide technical feedback. One way to ensure that the objectives of the technical assistance assignment will be met is to always provide comprehensive briefings before people depart from the United States and again when they arrive at the Mission. There needs to be a common expectation on both sides as to the job to be done. People should not assume that the TDY personnel always will know how to operate effectively in the African environment. Details of the job, country information, Mission operations, security, address and mail procedures, trip report protocols, over-time authorization requirements, and other expected TDY projects all need to be carefully covered in briefings. Several Mission representatives stressed the importance of trying to acquire some basic language training for people who will be coming out on TDY assignments. John Bellamy stated that the Mission could be able to find up interpreters to help facilitate some types of TDY assignments. A drawback or interpretation that was mentioned was the fact that they might not be conversant in technical terminology. Ted Hallyer, Bill Thomas, and Charles Kelly indicated that they would provide some guidelines to the Insecter locust task force to better prepare individuals for TDY assignments.

People also can be better briefed and prepared for TDY assignments, if the Mission can provide more lead time in requesting technical assistance personnel. There have been instances where requests have come in for personnel on Friday to have people in Africa by the following Monday or Wednesday. It is recognized that emergency mobilization may be required occasionally, but the TDY assignment will also better organized when more advance notice can be provided.

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Thursday, February 9

EVALUATION OF SURVEY PROCESSES - Shannon Wilson

- I. Technical Validation of Survey Results
 - A. Check survey staff for knowledge of biology (life cycle, locust behavior, tolerance, etc.)
 - B. Determine staff knowledge of preferred habitats, preferred host plants, condition of nester and egg laying sites
 - C. Timeliness of Surveys
- II. Appropriate Survey Design
 - A. Stop sites are grid overlaid
 - B. Stop sites are correlated with areas that should be excluded and prioritized
- III. Resource Base
 - A. Estimates available physical resources versus work to be performed
 - B. How much of the program budget is funded from external sources -- how much is funded from self-sustaining sources
- IV. Management Issues
 - A. Due dates on reports are met
 - B. Accuracy of reports
 - C. Supervision and Technical backstepping
 - D. Quality control (radio reports, forms, records, mileage checks, and equipment failures (flat tires, etc.))
 - E. Planning process -- develops resource needs for size of area to be surveyed
 - F. Determines whether survey staff have status within the Ministry of Agriculture
 - do survey staff receive per diem, etc.
 - does field staff get pay on time
 - does the field staff receive modest advances prior to travel
 - G. Are survey results used for control purposes and plan

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APPENDIX

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AFRICAN LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1989

List of Participants

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AFRICA LOCUST CONTROL WORKSHOP
DAKAR, SENEGAL
FEBRUARY 6-9, 1989

Summary of Participants' Evaluation of Workshop

OVERALL, ON A SCALE OF 1 TO 5 (1 being low and 5 being high): (Please circle)

1. How well did this workshop meet your expectations? 1 2 3 **4** 5

Comments: Excellent workshop; too much rambling; a good workshop -- I'd attend again; learned a lot; great exchange; very good, but could have been longer

2. How would you rate: (Please circle)

- a. Facilities: 1 2 3 **4** 5
 1) Food 1 2 3 **4** 5
 2) Lodging 1 2 3 **4** 5
 3) Meeting Rooms 1 2 3 **4** 5
 b. Assistance and support from Dakar Mission: 1 2 3 **4** **5**
 c. Assistance and support from Facilitation Team: 1 2 3 **4** 5

Comments on 2 a-b-c: Mission Director's participation and support appreciated; somewhat isolated; should have been more on facilitation team; meeting rooms better than many in U.S.

- d. Meeting processes: (Please circle)

- 1) Overall agenda 1 2 3 **4** 5
 2) Facilitators 1 2 3 **4** 5
 3) Presentations 1 2 3 **4** 5

Comments: Facilitators had little opportunity to do their job; closure on issues seldom reached; too many changes in agenda; some country reports were too long; basically good; stick to time limit; facilitators turned things around quickly

3. What was the most valuable part of this workshop for you?

Exchanges after presentations; exchanging valuable information; exposure to operations of other Missions; decisions made to improve communications; getting to know OFDA staff better; session on survey; frankness; presentations and the Guidebook

4. What suggestions would you like to make for future workshops?

Similar format, less open-ended discussions, more time; set up time for country locust officers to meet one on one with DLTF; speakers present outlines of papers in advance, keep to time schedule; hold in early December; schedule another workshop next fall; schedule field visit; make more interactive; consider having more bilateral donor representation; have them in Africa

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5. Finally, I'd like to add:

Well done; excellent forum for colleagues to devise strategies for enhancing future campaigns; OFDA is doing a fine job; Dakar was great; excellent initiative of OFDA to design and organize workshop; good job; publications from last meeting (Harpers Ferry) excellent; Good Show!