

## **Chapter 4**

# **Policy Options for Congress and the Executive Branch**

## CONTENTS

	Page
<b>WHERE WE STAND TODAY</b>	87
Oversight, Not Micromanagement, Is the Goal ... ..	87
Recommendations From Other Studies .....	88
<b>POLICY OPTIONS</b> .....	89
Revising USAID's Strategy ..	89
Implementing Integrated Pest Management .....	92
Using Pesticides Judiciously ... ..	95
U.S. Coordination and Support for African, U.N., and Regional Organizations .....	97
Funding Implications .....	104

### Boxes

4-A Potential Congressional oversight Questions and Congressional Policy Options: Revising USAID's Strategy .....	90
4-B Potential Congressional Oversight Questions and Congressional Policy Options: Implementing Integrated Pest Management .....	93
4-C Potential Congressional Oversight Questions and Congressional Policy Options: Using Pesticides Judiciously .....	96
4-D Potential Congressional Oversight Questions and Congressional Policy Options: Coordination and Support for African, U.N., and Regional Organizations .....	98
4-E Integrating Farmers' and Scientists' Knowledge for Variegated Grasshopper Control .....	103

# Policy Options for Congress and the Executive Branch

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### WHERE WE STAND TODAY

#### Oversight, Not Micromanagement, Is the Goal

OTA's work suggests that no major new U.S. authorizing legislation is needed to improve locust and grasshopper control at this time. Supportive elements could be added to the Foreign Assistance Act or the Farm Bill, however. These laws set out key dimensions of U.S. foreign aid and agricultural policy. Thus, this legislation could appropriately include statements regarding U.S. adherence to economically, institutionally, and environmentally sustainable pest management as one element of successful agricultural and international development.

A great deal of uncertainty exists regarding the nature of grasshopper and locust problems, the costs, benefits, and impacts of control, and the desirability of various future approaches. OTA cannot confidently suggest specific areas in which funding might be adjusted with numerical benchmarks given this high degree of uncertainty. The international control efforts of 1986 and 1989 did little to resolve important questions. Instead, the U.S. Agency for International Development (USAID) seems unable to:

- find long-term solutions to problems such as grasshopper and locust upsurges that have episodic and chronic dimensions;
- take advantage of recession periods to put into place preventive programs; or
- research alternative controls effectively.

In these circumstances, congressional action might best be directed toward helping U.S. officials decrease the uncertainty surrounding locust and grasshopper programs by requesting that USAID carefully review what is known and not known, assign priorities for gathering information, and improve strategies to deal with future pest problems. Congress' oversight role is key and this can be done by the relevant authorizing and ap-

propriations committees. Boxes A through D set out possible oversight questions and options to help Congress play that role.

Congress' micromanagement of USAID is not the goal. USAID's failure to answer these strategic questions, however, has left a policy vacuum. If USAID is unable to fill the vacuum, Congress has little choice but to become more involved if U.S. programs are to be effective.

Danger exists that the United States will respond to the next pest upsurges in the same costly way as before, with strategies based on questionable premises. Public support of disaster assistance increases this probability. Danger also exists that special interest groups will exert undue policy influence and that decisions will be ill-informed. For example, tied aid requirements for the use of American-made commodities mean that U.S. pesticide manufacturers have a vested interest in maintaining a control strategy based almost exclusively on insecticide use. They can be expected to over-stress benefits, overlook difficulties of following safer practices in Africa, and minimize the hazards of insecticide use. On the other hand, environmental groups have legal power to sue USAID if environmental laws and regulations are not met. They can be expected to emphasize the hazards of insecticide use, to over-stress the potential of alternative controls, and to favor natural resource protection over economic development.

USAID responds to all of these pressures. At the same time, USAID has the political and economic power to influence, if not determine, the shape of grasshopper and locust management worldwide. U.S. financial contributions to control are sizable and USAID has placed effective conditions on the use of these funds. The United States is perceived by many to have the technical resources for pest management generally.

On the whole, USAID has assumed a reactive, rather than a proactive, posture toward Congress as well as other pressure groups. So far, USAID's grasshopper and locust work has escaped the kind of scrutiny that it deserves. Generally, Congress'

reporting requirements have been counterproductive, deflecting attention from more fundamental issues and glaring missteps:

Nena Vreeland of CDIE [USAID's Center for Development Information and Evaluation] found out from interviews that [USAID] field professionals spend about 6 percent of their time on reporting requirements to Congress and another 20 percent on reporting to [USAID]/Washington. As one [USAID] staff member pointed out, "Development is something that [USAID] does on a Thursday afternoon." (98)

Thus, OTA does not intend that the improved oversight discussed here be done on a haphazard basis by Congress nor be used by USAID to generate stacks of irrelevant and unread paper. Instead, Congress and USAID need to engage in a thoughtful dialogue with effective follow-through. Perhaps it is time to involve additional outsiders in this process and to mediate the process deliberately. In this chapter, OTA highlights recommendations from several other recent studies related to pest management in development, then turns to policy changes within USAID and options for Congress.

#### Recommendations From Other Studies

OTA's study complements three recent reports (22, 95, 99). The options considered here are generally consistent with recommendations in one or more of the reports (app. F). Each report fulfilled congressional requirements; each was contracted externally but conducted with the assistance of USAID staff.

USAID contracted *Opportunities to Assist Developing Countries in the Proper Use of Agricultural and Industrial Chemicals* (22) to comply with a 1987 Foreign Assistance Act amendment by Rep. David Obey's Appropriations Subcommittee on Foreign Operations, Export Financing, and Trade. It was prepared by the Committee on Health and the Environment (which included representatives of environmental groups, industry, labor organizations, and universities) with help from the Conservation Foundation. Its scope included chemical use for industry as well as agriculture and industry; that distinguished it from the following two reports.

A Programmatic Environmental Assessment for African and Asian locust and grasshopper control programs (95) was prepared by TAMS Consultants and the Consortium for International Crop Protection. This fulfilled USAID's statutory requirement to assess the environmental impact of overseas operations and the Agency's internal environmental regulations. On the whole, this is considered a comprehensive and balanced presentation, and OTA's analysis relies heavily on it. Also, this report has had a significant impact on USAID: a task force has met regularly since mid-1989 to consider ways of implementing the report's recommendations.

The third study, a mid-term evaluation of USAID's Africa Emergency Locust/Grasshopper Assistance (AELGA) project, was conducted by Tropical Research and Development (99). This, unlike the others, was not a complete independent external review because an USAID entomologist served on the three-person analytical team. It assesses the progress of a number of USAID projects through mid-1989 with the emphasis on locust and grasshopper control programs in five Sahelian countries.

The recommendations from these three studies have some similarities and differences:

- **Integrated Pest Management (ITM):** The Conservation Foundation report and the Programmatic Environmental Assessment emphasize that USAID should increase use of 1PM, with the goal of making 1PM its primary pest management approach as well as its stated policy. But the AELGA evaluation omits 1PM from its major recommendations, confining the 1PM discussion to an annex on research.
- **Improved Use of Pesticides:** All three reports recommend improved use of pesticides as consistent with an 1PM approach, and they also stress the need for monitoring health and environmental effects of insecticide use and improved environmental protection. For example, the Programmatic Environmental Assessment recommends prohibiting insecticide

application in environmentally sensitive areas (such as near bodies of water or in areas containing endangered species), minimizing the area sprayed, and using economic thresholds for deciding if and when to spray.

- **Cumulative Impacts of Control:** The Programmatic Environmental Assessment and the AELGA evaluation address the problem of cumulative impacts of pesticides used in health and agricultural programs.
- **Training:** All emphasize providing training and technical assistance to various groups, such as crop protection personnel, USAID staff, and African farmers, on various topics, e.g., safe and sound pesticide use, storage, and disposal.
- **Control Alternatives:** All endorse increased research on alternative technologies. The Programmatic Environmental Assessment and the AELGA evaluation advocate field-based economic research as well. The Conservation Foundation stresses linking research with the perspectives of project beneficiaries. The Programmatic Environmental Assessment recommends field testing *Nosema* and other biological agents such as neem extracts.
- **The Role of Different Groups:** The AELGA evaluation and Conservation Foundation report give more attention to institutional factors and USAID management than the Programmatic Environmental Assessment, although all advise involving international, regional, national, and local organizations and coordinating efforts.

In addition to these reports, USAID has its own reservoir of newly acquired data. Some preliminary work has been done by USAID's Office of Foreign Disaster Assistance (OFDA) internally to tap lessons learned, mission cable traffic contains similar lesson. The minutes of USAID meetings in Harper's Ferry, WV, and Dakar, Senegal provide some insights from the field. Also, USAID mission staff have access to information from African government agencies that could be compiled and analyzed. OTA finds that the

three reports described here, along with these other sources of information, can form the basis for initiatives in several important areas.

## POLICY OPTIONS

### Revising USAID's Strategy

*Finding: USAID's strategy would require significant changes if the United States wants to play a leadership role in developing sustainable pest management strategies for Africa: giving higher priority to IPM; building inhouse scientific capacity to improve its ability to use pesticides judiciously; improving internal, interagency, and international coordination as well as improving support for various other organizations involved in pest management.*

The changes needed to improve USAID's approach to pest management are substantial enough to require a shift in the way the agency views the goals of pest management and the ways in which those goals are implemented (box 4-A). For example, USAID saw its strength in conducting aerial spraying in the recent emergency effort (44). The United States contribution might instead focus more substantially on using American scientific expertise and other resources to develop alternative control methods (including safer insecticides and improved cost/benefit methods), to improve forecasts, and to improve environmental monitoring of insecticide use. Generally, the U.S. strategy should lay out a long-term, multipest approach (where possible) to pest management, one that would support preparedness and prevention while minimizing pesticide use and increasing environmental and health safeguards. Also, this plan should carefully define complementary uses of disaster and development assistance. Congress could provide USAID with overall direction, set time limits during which this strategy should be developed, implemented, and then evaluated, and provide adequate funding for the initiative.

USAID currently has enough information to revise the Africa Bureau's 1987 *Locust/Grasshopper Strategy Paper* (113). Revisions should reflect the full geographic and institutional scope of the problem as well as its episodic and chronic dimensions. For example, relevant regional bureaus, the Bureau for Science and Technology, and OFDA should participate in setting priorities for U.S. programs during upsurges and recessions. Later,

### **Box 4-A—Potential Congressional Oversight Questions and Congressional Policy Options: Revising USAID's Strategy**

#### **Accountability for the Past:**

- How did USAID select widespread pesticide spraying for its campaigns against locusts and grasshoppers? What field-based, economic evidence justified this involvement?
- What amounts and percentages of total USAID funding to Northwest and sub-Saharan Africa from 1984 through 1990 were for pest management of all pests, compared with that for grasshoppers and locusts? How does this compare to estimates of crop losses from different groups of pests?

#### **Preparing for the Future:**

- How are USAID's plans being revised based on recent locust/grasshopper campaigns in Africa? What will be done differently the next time?
- What alternatives to spraying might effectively increase African food security during locust and grasshopper upsurges, e.g., cutting other agricultural losses, providing food aid or supplies for replanting? How does spraying compare to these other tactics in terms of: 1) effects on farmers and 2) costs and benefits at the national level?
- What are the benefits and costs of implementing a preventive approach during locust and grasshopper recessions? How do these compare to widespread spraying?
- What management changes would help to integrate pest prevention, research, and control within USAID and other Executive Branch agencies?
- What progress has been made to implement the high priority recommendations of USAID's Programmatic Environmental Assessment? What measurable indicators, milestones, time-frames, and estimated costs have been developed for these?

#### **Congressional Options:**

**Option 1:** Congress could direct USAID to revise its *Locust/Grasshopper Strategy Paper for Africa* that would: apply IPM during recessions and upsurges; integrate research, development, and prevention with disaster assistance; address the context in which migratory pests occur; and assign priorities among activities during recessions and upsurges.

**Option 2:** Congress could review USAID's pest management planning to ensure that earlier problems are not repeated. Congress could request short (1 page) progress reports with quantitative data and anticipated modifications, such as a breakdown of AELGA's specific activities and costs for fiscal years 1990 and 1991.

**Option 3:** Congress could invite USAID to discuss differences between its actual priorities and those recommended by its Programmatic Environmental Assessment. USAID could be asked to list objectives, milestones, timeframes, and funding of activities to implement the assessment's recommendations.

**Option 4:** Congress could ask USAID's Center for Development Information and Evaluation to do a program assessment of USAID's disaster work.

USAID should revise the 1989 *Locust/Grasshopper Management Operations Guidebook* to conform with its updated strategy. The revised locust and grasshopper strategy paper might be incorporated in, or later appended to, a USAID policy document on pest management.

A number of the Programmatic Environmental Assessment's recommendations directly relate to strategic considerations and policy changes. Many of these should be incorporated into the revised USAID Strategy Paper and the updated Operations Guidebook because this is the most comprehensive analysis available on many of these issues. USAID seems to be moving to implement many of these recommendations. However, certain differences are apparent between the two sets of priorities. For example, USAID is giving higher priority to pesticide disposal and less to surveys of environmentally critical habitats.

#### *The AELGA Project*

The major USAID funding of locust and grasshopper programs currently is through the 3-year AELGA project slated to end September 30, 1990. While the AELGA project's goals encompassed emergency and long-term development, the individual components had not been carefully thought through and many specific activities suffered from poor planning. Project assumptions were not identified; constraints were not dealt with in advance; measurable objectives and realistic milestones to measure progress were not set; feasible management systems were not put in place before funding began, etc. As a result, often emergency and long-term elements did not reinforce each other in practice. Even more important, the list of things that were not done during the recent control campaigns—for example, not measuring insect kill-rates nor monitoring health and environmental impacts of spray programs—reflects the absence of budgeting time, personnel, and resources for these activities during the project planning and contracting processes. These problems should be avoided in the next phase.

#### *A Role for Task Forces*

OFDA forms task forces in response to specific disasters with the goal of improving inter-

agency coordination. When a given disaster is perceived to have run its course, OFDA disbands its task force and other groups within USAID are expected to carry on. OTA found that the OFDA Desert Locust Task Force, with its weekly meetings and annual evaluation and planning conferences, was generally effective in coordinating the U.S. emergency response. For the locust problem, however, the task force's position in OFDA and its narrow mandate to coordinate the emergency response had serious negative consequences. OFDA disbanded the Desert Locust Task Force in June, 1989, and the people who built up knowledge during this effort moved on to new responsibilities within USAID and other U.S. agencies. The data collected during the task force's life was put into storage.

A similarly organized USAID task force with a broader mandate to examine long-term pest management might initially formulate an improved USAID strategy and plan and oversee its implementation. The broader mandate would imply a wider membership on the Pest Management Task Force and greater responsibilities for evaluation. For example, persons with solid technical expertise and those representing research, in addition to control, should be included. So should representatives of private voluntary organizations working with local farmer groups. Data gathered during the course of an upsurge should be mined rather than stored. The Pest Management Task Force might also oversee implementation of recommendations from the Programmatic Environmental Assessment and coordinate the U.S. response to various worldwide plant protection initiatives.

Initially, this Pest Management Task Force could commission an independent, external group to examine the 1986 to 1989 locust and grasshopper control programs in Africa to determine whether and/or how much these efforts contributed to stopping the plague and where costs might be cut. Attention should be given to identifying clearly where and when chemical control programs are mounted most effectively and how they could be minimized. Also, the group could provide recommendations for future U.S. programs. While this group should collaborate with U.S. agencies, it should be organized by an outside group, such as the National Research

Council, with official responsibility in the hands of those outside the U.S. Government's locust and grasshopper control operations.

At the same time, USAID could conduct its own evaluations of disaster assistance and pest management. For example, USAID's Center for Development Information and Evaluation (CDIE), which conducts evaluations of programs both inside and outside of USAID, might examine USAID's disaster work, especially that of OFDA. In the process, CDIE might identify broad lessons learned about natural disasters, hazard mitigation, the role of disaster planning, etc., as they relate to insect outbreaks. In this context, the Federal Emergency Management Administration's experience with domestic natural hazard research and planning may be relevant.

#### Implementing Integrated Pest Management

*Finding: Mom fully using IPM will require a substantial investment in research, training of Africans, and improved technical capacity among USAID staff. Since IPM is a multipronged systems approach, it will require renewed efforts at coordination and drawing together information from a variety of sources: U.S. universities, government agencies, and other donors.*

The United States has important capabilities to contribute to improved pest management via IPM. Certain U.S. organizations and individuals have substantial experience in using this systems approach. Likewise, USAID has staff who are knowledgeable about institution-building and regulation of pesticides and the U.S. scientific community has resources far beyond most developing countries. However, policy changes are needed if these capabilities are to be exploited for improved IPM (box 4-B).

The term "integrated pest management," derived from the earlier term "integrated Pest control," was introduced by the U.S. Council on Environmental Quality in 1972. The Council promoted IPM as an environmentally sound alternative to the misuse of pesticides in large-scale temperate agriculture. Use of the term soon

spread to those working with small-scale agriculture in the tropics (8).

Developing countries usually modelled their pest management programs after those of colonial powers. So, national crop protection services, like their donor counterparts, are oriented primarily towards chemical control of pests. This orientation, however, is questionable when most of the national crop protection services' clients lack the resources to adopt this control and some of their existing agricultural practices might be better adapted to IPM.

It seems that USAID policy regarding IPM was not well understood nor fully implemented by those who led the recent emergency grasshopper and locust campaigns. USAID stopped funding several regional longer term IPM efforts in Africa. Termination of funding seems justified for these specific projects but no alternatives were developed and funded. The agency has supported imaginative and effective pest control approaches, such as an IPM program in Honduras, however. A new USAID policy statement on IPM, the Pest Management Sector Review, was planned (2\*) for Spring 1990 but has been delayed until at least 1991. This could clarify the Agency's position, but a corresponding reallocation of resources is required. To date, emergency control operations have received far more resources than the various elements of prevention, such as IPM.

#### Research

Shifting from the current emergency focus to a preparedness and prevention approach will require that USAID tackle several types of research. Developing improved control programs requires a long-term, stable research program with sizable resources. The United States has a comparative advantage in conducting research of this type and Congress could encourage the U.S. Department of Agriculture (USDA), Environmental Protection Agency (EPA), Department of Energy (DOE), and the National Science Foundation (NSF), as well as USAID to support it. USAID could explore "twinning" programs between U.S. universities (land-grant and nonland grant col-

**Box 4-B—Potential Congressional Oversight Questions and Congressional Policy Options:  
Implementing Integrated Pest Management**

**Accountability for the Past:**

- Given that USAID's departure from its stated policy of IPM in the recent locust/grasshopper campaign was not fully justified, how might the agency have responded differently? Draw up several scenarios, including one without any pesticide use on the part of the U.S. Government.

**Preparing for the Future:**

- What research is USAID funding or planning in relation to alternative locust and grasshopper control methods, including projects on biological control, crop loss and economic injury levels, insect and weather forecasts, pesticide tests, etc.?
- How is USAID implementing IPM generally and in regard to locusts and grasshoppers specifically? How might USAID rely more on IPM during the next upsurge? What management changes might be necessary for this to occur?
- How does USAID set research priorities for programs related to Africa? What percentage of all USAID agricultural research funding directly relates to IPM? How do USAID's various bureaus coordinate research funding among themselves and with other donors?
- What efforts is USAID making to increase its technical capacity, generally, and in pest management, specifically? What staff hiring and training programs are underway at the missions and in Washington? What are their results?
- How, and at what costs, does USAID support agricultural extension and training in Africa; to what degree is IPM included in these programs? To what degree is IPM included in USAID-funded training of Africans in U.S. universities?
- What are USAID's plans regarding establishing policies and/or regulations for development and use of biological control agents and/or genetically engineered organisms in USAID-funded programs?

**Congressional Options:**

**Option 1:** *Congress could ask that USAID complete its delayed Pest Management Sector Review by an agreed on deadline.*

**Option 2:** *Congress could establish a Pest Management Task Force to determine and implement a revised USAID strategy. Also, this Task Force could: 1) commission an independent evaluation, perhaps by the National Research Council, of the recent locust and grasshopper campaigns and 2) form a standing Research Advisory Committee on grasshopper and locusts to backstop the U.S. Government's integrated pest management efforts.*

**Option 3:** *Congress could ask USAID to prepare a policy (e.g., a Strategy Statement, Policy Paper, Policy Determination, or other form, as appropriate) for using bioengineered organisms in U.S.-supported programs overseas.*

SOURCE: Office of Technology Assessment, 1990.

leges and universities) and developing country groups to conduct applied IPM research and to develop and implement training in Africa.

Providing pesticides, aircraft, and spraying equipment consumed an inordinately large part of U.S. resources in the recent campaign. Still, the part of U.S. contributions currently designated for development of biological control for locust and grasshopper problems may be unwarranted because of biological control's unproven potential. So, important questions remain, especially regarding future priorities of U.S. research.

USAID needs improved inhouse technical expertise and this is especially important if USAID supports IPM research programs. Deciding priorities among research projects and making specific funding decisions seems beyond the technical expertise currently within USAID. Without such expertise, USAID programs suffer in quality, become unduly influenced by political considerations, and lack continuity. While USAID has always relied on contracted expertise, many find current trends disturbing. USAID is known to have minimal technical capability in pest management (22). It seems that USAID has increasingly fewer career professionals with technical expertise and that the agency has problems retaining those it does have (132). Some experts contend that other donors, such as the Dutch, West Germans, and French, did a better job tapping their countries' technical expertise for grasshopper and locust problems.

Overall, U.S. Government agencies pay experienced scientists less than the private sector. In addition, USAID incentives reward those who plan—rather than carry out—programs. USAID field staff with general administrative experience and degrees in political science and economics are in a poor position to monitor the scientific merit of ongoing work related to scientific and technical issues (129). As a result, many layers of review by outside experts and other USAID staff in Washington are required, adding to the cost and time required to complete a given activity.

Research programs should take place in Africa as much as possible, include gender and family systems analysis, focus on the neediest farmers and herders, and tap indigenous knowledge as well as “frontier” technology. For example, efforts to im-

plement an IPM approach must include a sophisticated analysis of gender and family roles in agricultural production and the application of this analysis to proposed efforts. Women's agricultural roles display very different patterns in different African countries, and too often new technologies have increased their labor or decreased their share of the benefits.

Applying IPM to African realities will be challenging for American and European scientists. African scientists familiar with their environment, and able to speak the small farmers' language(s) may be better positioned to conduct this research than others. A small competitive grants program to support IPM-related research by Africans might encourage this type of work while bypassing the financial and management problems that were typical of the failed Permanent Interstate Committee for Drought Control in the Sahel (CILSS) IPM project (136).

The Pest Management Task Force discussed above might designate a standing Research Advisory Committee, comprised of experts in IPM, to assist USAID in deciding which research topics are most important to support. Members of the committee might assist USAID in designing realistic requests for proposals and selecting the researchers to carry them out. The committee, therefore, must be informed of: 1) the U.N. Food and Agriculture Organization (FAO) progress on research priorities regarding African grasshoppers and locusts, 2) African and European researchers' work on African insects, and 3) relevant research in Canada, Australia, and the United States regarding other types of grasshoppers and locusts. USAID could tap the modeling work of other Federal agencies and university scientists to improve forecasting. New or improved pest population and migration models are potentially very useful, especially for the African Migratory Locust, the Desert Locust, and Senegalese Grasshopper.

### *Training*

Generally, training is cost-effective, helps strengthen institutions, and increases programs' sustainability. A clear need exists for training farmers in currently available IPM methods, such as early identification of pests, safe pesticide use, and planting security crops. USAID should sup-

port such training for African extension agents, national crop protection services, and local farmers and herders. Moreover, USAID should review its current training programs to ensure that IPM is included.

### *Bioengineered Organisms*

Some bioengineered organisms are likely to have applications for pest management. The International Centre for Insect Physiology and Ecology (ICIPE) has already submitted a research proposal to USAID and other donors with plans to use such organisms. In the United States, a new and complex regulatory environment is developing related to the testing and use of bioengineered organisms involving EPA, USDA, the National Institutes of Health, the Food and Drug Administration (FDA), and several government advisory bodies on biotechnology (60). USAID should take the initiative to establish a policy framework for using such organisms overseas, while providing environmental and health safeguards. In the 1970s, USAID was forced by a lawsuit to develop appropriate guidelines for its development and use of pesticides. Today, USAID's policy response to the use of bioengineered organisms in pest management should not await a lawsuit. Setting up protective regulations for testing and using additional types of biological control agents overseas might alleviate African, as well as American, fears such as those that led the government of Mali to cancel USAID-funded *Nosema* trials after considerable funds had been expended (99).

### *Using Pesticides Judiciously*

*Finding: USAID needs to examine carefully its pesticide research, evaluations, and technical assistance and then incorporate results so that pesticides are used more selectively. Training in safe and effective pesticide use should be a key component of donor crop protection efforts. Donor coordination will be essential if U.S. policies are to have the greatest impact.*

Past locust and grasshopper control programs have left Africa with a legacy of unsolved problems. USAID's response to date seems woefully inadequate in light of its own conclusions regarding pesticide disposal and health problems.

In 1989, USAID spent only \$50,000 for one health workshop. Congress could play an important role in changing this situation (box 4-C).

Judicious insecticide use includes a spectrum of activities such as developing and selecting less harmful insecticides, applying them more effectively and efficiently, and storing and disposing surplus supplies safely—all with greater regard to protecting people, their food and water, and the environment. An essential dimension is better balancing the costs and benefits of control. Another is improved surveillance and forecasting to allow more accurate and precise pesticide application on small target areas. Research to improve understanding of the insects' biology, such as pinpointing conditions and reasons for swarming behavior, can strengthen the foundation for these improvements.

Controversy and confusion reign on such issues as the best insecticides to use, the threshold at which to mount control, and the most vulnerable habitats. For example, the list of insecticides "approved" by USAID constantly changes, along with the rationale for selection and accompanying restrictions. These are researchable topics, however, and USAID is well-placed to conduct this type of research and then incorporate it into agency strategic and program planning. Also, USAID's programs probably would be more cost-effective if decisionmakers were more explicit regarding trade-offs and their consequences regarding insecticide use. For example, sampling spraying's effectiveness and impacts might allow fewer hectares to be treated. This could lead to decreased pesticide use and related expenses, e.g., for respraying and clean-up.

### *Training*

Training in safe and effective pesticide selection and use is needed on all levels, from policymakers to individual farmers. Training and institutional development for African agricultural agencies (e.g., national crop protection services and agricultural extension services) should be a key component of donor crop protection strategies. Advantages might exist to making training part of broad-based efforts, e.g., USAID could develop training programs for all pesticide applicators, whether spraying for malaria,

### Box 4-C–Potential Congressional Oversight Questions and Congressional Policy Options: Using Pesticides Judiciously

#### Accountability for the Past:

- What has been the U.S. role in poor pesticide use (including site selection, storage, application, and disposal) in developing countries?
- What obligations—legal, ethical, and political—does the U.S. have to help correct such problems? How much might those efforts cost and how is USAID preparing, with other donors and African governments, to meet them?
- How is USAID addressing insecticide storage and disposal problems resulting from previous locust/grasshopper control efforts? What monitoring is underway for longer term health and environmental effects?
- Which U.S. procurement requirements increased costs, caused delays, or led to duplicate efforts in the recent campaigns? How much did these requirements add to U.S. costs?

#### Preparing for the Future:

- How will USAID use pesticides more selectively and efficiently the next time grasshopper and locust upsurges occur in Africa? How will USAID encourage other donors and Africans to do the same?
- What research is USAID supporting to develop safe and effective insecticides?
- What is the combined impact of pesticides used in agriculture and health programs on long term sustainable development? How is USAID addressing these concerns?

#### Congressional Options:

**Option 1:** Congress could ask USAID to specify how it will use pesticides more selectively and efficiently and ameliorate negative health and environmental impacts.

**Option 2:** Congress could direct USAID to document in its environmental assessments how pesticide selection and targeting comply with EPA and U.S. Fish and Wildlife Service regulations and the Convention on International Trade in Endangered Species (CITES) regarding protection of critical habitats and threatened and endangered species.

**Option 3:** Congress could waive tied aid and selected procurement requirements for pest management in Africa to improve the speed, effectiveness, and efficiency with which insecticides are used. However, a new USAID strategy for more careful and selective pesticide use should be in place before granting such a waiver.

SOURCE: Office of Technology Assessment, 1990.

grasshoppers, or other agricultural pests. This is likely to save money in the long-term and ensure a more integrated approach to pesticide use and documentation.

#### Preparedness

Preparedness can save time and expense in the long run. Information on insecticides in the

**Programmatic Environmental** Assessment (e.g., about which insecticides are more or less toxic to various habitats) and the Operations Guidebook is a good first step. **USAID** could take additional steps to alleviate **confusion** in the field regarding various insecticides and help its missions prepare for the next pest upsurges. Making one person in US~D/Washington responsible for maintaining up-to-date files on each insecticide used and providing clear information to missions would help missions be better prepared. Such a pesticide specialist could help **USAID** missions analyze technical information, apply what is known about the specific chemicals to their particular situation, and prepare or update country supplemental environmental assessments to fulfill Regulation 16.

**USAID** can implement its own staffs' suggestions to prepare for upsurges. For example, establishing more broadly-based rosters of highly qualified technical experts and experienced contractors who **conduct** aerial spraying (114) and maintaining up-to-date rosters could reduce delays in providing missions with assistance.

The **concerted** joint efforts of donors is likely to have greater impacts than single-handed U.S. efforts. For example, a need exists for a comprehensive evaluation of pesticide use in agriculture and disease control in developing countries. The U.N. agencies are the logical choice for this task because the U.N. World Health Organization is the major supporter of health-related spraying and **FAO**, for agricultural spraying. The U.N. Environment Programme would have an important role as well. The United States could contribute to this global effort in various ways. Either an external review panel or an interagency IPM task force could analyze pesticide use in all **USAID**-supported work. Donor coordination also is important in order to provide African countries with consistent advice on regulations for safe and effective use of pesticides.

In some areas, **USAID** cannot implement measures to improve pesticide use without congressional action. U.S. procurement requirements regarding U.S. **development** assistance sometimes add to program costs, increase administrative burdens on Africans, and result in the use of inappropriate technologies (128). **OFDA** funds have built-in waivers from certain of these require-

ments, but pest problems rarely fit within **OFDA**'s limit of providing assistance for 60 to 90 days. The recent campaign showed that prepositioning insecticides and equipment in Africa or Europe is cost-effective because it reduces air freight and enables a more timely response. Granting waivers to competitive bidding requirements for **non-OFDA** funds may help bring about a more efficient control program and help maintain such pre-positioned "pesticide banks" during upsurges. However, prepositioning insecticides might also facilitate even more widespread spraying. Pesticide banks would need careful maintenance to assure proper storage and this has not been done in the past.

### U.S. Coordination and Support for African, U.N., and Regional Organizations

The United States does not administer foreign aid directly. Virtually every program requires the approval of African government and then depends on the participation of government or regional organizations to carry out U.S.-funded work. **USAID**, like others, increasingly recognizes that strengthening African organizations is essential for U.S.-supported efforts to be sustainable.

Within this context, a variety of organizations receive donor support, ranging from the national crop protection services to **FAO** and the regional African research and control organizations. A more coordinated approach to supporting these groups, as well as to supporting work in **USAID** and among U.S. agencies and other donors is likely to stretch scarce resources (box 4-D). To its credit, **USAID** actively promoted coordinating committees in each African country and participated in **FAO** and World Bank-sponsored meetings during the recent campaigns.

### The Structure of U.S. Aid

Administrative responsibility for coordinating locust and grasshopper efforts within **USAID** shifted four times during the 4 years of the recent campaign (99). The lack of continuity in Washington caused changes in objectives, staff, programs, and funding restrictions. Also, changes in administrative responsibility, coupled with bureaucratic complexity, sometimes resulted in long delays in responding to requests from **USAID**

#### **Box 4-D—Potential Congressional Oversight Questions and Congressional Policy Options: Coordination and Support for African, U.N., and Regional Organizations**

##### **Accountability for the Past:**

- How does USAID support African national institutions in implementing sustainable pest management? How much 1986-89 funding went to national crop protection services in Africa? How much money went to U.S. firms and universities? What part of total U.S. assistance were these amounts?
- How have U.S. policy reform efforts affected African institutions and U.S. support for them? What impact did this have on locust and grasshopper control?
- On what basis has the disproportionate reduction of U.S. repayments of assessments to FAO v. other U.N. organizations been justified by the U.S. State Department? How does the State Department respond to FAO's contention that this hampered their locust and grasshopper programs?
- What benefits have been provided by USAID's "greenness maps" and at what cost? When will the capability to produce them be transferred to Africa? What will be the recurrent costs of such a program? How does this work relate to that of other groups doing similar work?

##### **Preparing for the Future:**

- How is USAID coordinating its grasshopper/locust efforts with FAO, other donors, and African countries regarding research, monitoring and surveillance, training, and insect control?
- What regional research and control organizations is USAID funding? What activities regarding integrated pest management and grasshopper and locust control are being supported and why?

##### **Congressional Options:**

**Option 1:** *Congress could ask that USAID set priorities regarding the nature, level, and timing of support for the various groups involved in locust and grasshopper research, monitoring and control. As Congress oversees USAID's planning, it could ask USAID to identify related activities being conducted by others and describe how USAID-supported efforts complement, rather than duplicate, them.*

**Option 2:** *USAID could be encouraged to identify instances where congressional action constrains cost-effectiveness or subverts long-term work in favor of crisis management.*

**Option 3:** *Congress could examine the impact of the State Department's distribution of payments on FAO's locust and grasshopper programs, consider whether Congress' guidelines for payments to U.N. organizations are adequate, and determine whether the guidelines were applied satisfactorily by the State Department regarding U.S. payments to FAO.*

SOURCE: Office of Technology Assessment, 1990.

missions in Africa. Such administrative changes compounded long-standing problems of coordination within USAID and other U.S. agencies.

Now that the insects are in recession, donors and others will be tempted to turn attention to other issues rather than carefully reassessing past

programs and planning more sustainable, preventive approaches. Congress should ensure that this doesn't happen, although this may be the time for leadership of the U.S. effort to shift with new objectives. APHIS represents the United States on the FAO's Desert Locust Control Committee; S&T/USAID has a leadership role in the World Bank Special Program for African Agricultural Research (SPAAR) research task force and participates in a multidonor effort to prepare a global crop protection initiative (31). These agencies can play a larger role now, but their financial resources are relatively insignificant relative to other USAID bureaus and the U.S. State Department which administers funding for U.N. organizations.

Working with other countries' scientists should be a high priority because wasteful duplication already exists in high-priority technical areas. For example, USAID/U.S. Geological Survey (USGS) and World Bank efforts in early warning and forecasting seem to parallel efforts by the Dutch, French, and FAO. Negotiations could eliminate the more costly overlaps and ensure that various components are integrated. An increased proportion of U.S. assistance might be allocated to multilateral organizations because the tied aid requirements of bilateral assistance contributes to duplication of donors' efforts. At a minimum, USAID should track the progress of others' planned or current projects before designing or funding similar ones. And, USAID should share its plans with other donors.

### *The Role of National Crop Protection Services*

**Finding: Many African national crop protection services are poorly equipped to take over a large part of locust and grasshopper monitoring and control or to develop integrated pest management strategies. Better-coordinated regional approaches are needed, but support for building individual crop protection services must be a significant part of donor assistance.**

Africans must set their own agendas for development if efforts are to be most effective (132) and gradually assume more responsibility and leadership for programs. The national crop protection services in sub-Saharan Africa should gradually assume a greater role in leading the 1PM and locust and grasshopper control. In Northwest Africa, however, the national crop protection services already carry out this role.

Numerous avenues can increase the ability of African national crop protection services and other agencies within the Ministries of Agriculture to do this, e.g., training, technical assistance, and institutional development. Currently, many crop protection services in the Sahel are handicapped by institutional constraints, jurisdictional problems, and/or the lack of infrastructure, trained personnel, and working equipment. They also lack information on alternative controls for insect pests. Donors can support applied research by Africans to identify and test new methods, building on indigenous knowledge and practices where possible.

The situation differs among countries, however, so donors need to be flexible and use a variety of approaches. For example, the ability to monitor insects during recessions and to control outbreaks in remote breeding areas varies greatly. In some countries, the national crop protection service already undertakes these activities; in others, neighboring countries or regional organizations assist. The Northwest African countries monitor remote regions for locusts within their own borders. Generally, the four Maghreb countries have well-organized crop protection services (sometimes with specialized locust control groups) and they can respond quickly to insect upsurges. They rapidly established locust control operations with a central headquarters, regional headquarters, and a number of technical and other committees during the recent campaigns.

The Department of Plant Protection and Locust Control of Somalia's Ministry of Agriculture recently proposed to strengthen its locust control service along these lines. The Ministry hopes to establish 9 units, with a total staff of 48, including 7 permanent or mobile field units, to monitor the Desert Locust in its summer and winter breeding grounds and control outbreaks as they begin. The Ministry requested funds for training, supplies (insecticides, application equipment, protective clothing), communication and transportation equipment (including spare parts and camping equipment), and improving pesticide storage facilities. The estimated budget was \$720,000 for 3 years (1).

On the other hand, Mali, whose national crop protection service is restricted to protecting croplands located mostly in the southern part of the country, allowed Algeria and Morocco to con-

duct ground operations in northern Mali so that swarms would not enter the Maghreb region. Also, Algeria and Morocco collaborated on surveillance and control in remote areas near their common border.

The national crop protection services, however, cannot be effective without working with additional national agencies. For example, 1PM requires, among other things, the cooperative effort of crop protection services with agricultural research and extension services, forest services, etc., to identify and use new pest management technologies.

*The Role of African Regional Organizations, FAO, International Agricultural Research Organizations, and Local Groups*

**Finding: Regional groups have a distinct advantage in dealing with regional problems such as grasshopper and locust upsurges. African regional organizations must continue improving their management and financial support to reach their potential. FAO can lead in compiling data, forecasting insect upsurges, and sponsoring meetings; the international agricultural research organizations in Africa can develop alternative control methods.**

**Finding: Local groups' participation in locust and grasshopper monitoring and control has significant advantages. Participation can be encouraged via the involvement of African nongovernmental organizations and donors' support for certain types of training, technical assistance, and pilot projects.**

The recent locust and grasshopper upsurges demonstrated the importance of a variety of African groups and international organizations and highlighted their limitations. The resulting lessons learned have implications for improving U.S. development assistance to Africa.

The sub-Saharan regional control groups—Joint Locust and Bird Control Organization (OCLALAV), Desert Locust Control Organization for Eastern Africa, and International Red Locust Control Organisation for Central and southern Africa—traditionally conducted control in areas beyond the reach of financially strapped national crop protection services. These groups are sorting out their mandates, capabilities, and resources, and deciding the relative amount of forecasting, surveillance, research, and control each will do and

where they will do it. For example, OCLALAV's members recently shifted responsibility for locust and grasshopper control from OCLALAV to their respective national crop protection services.

Donors have been instrumental in shaping these groups' reorganization and need to continue their involvement for their investment to pay off. At the same time, promoting institutional sustainability requires that African member nations take the lead in deciding mandates, organizational structure, amounts of members' dues, and programs. Deciding what activities and organizations to support is extremely difficult because of the changes underway. Donors need to be flexible and consider the whole picture—the relationship of the work of each regional organization to that of the others, FAO, other donors, and national crop protection services—before supporting particular activities.

For example, USAID's decision to fund the Center for Application of Agrometeorology and Hydrology for the Sahel (AGRHYMET) greenness maps has implications for similar programs funded by FAO as well as for relationships among African regional organizations. Also, decisions regarding OCLALAV's new responsibilities, Africans and donors must consider OCLALAV's work in relation to that of the other regional organizations associated with CILSS, especially AGRHYMET in Niamey Niger and the Sahel Institute in Bamako, Mali. AGRHYMET has been steadily increasing its technical forecasting capacity but, like Programme de Recherche Interdisciplinaire Français sur les Acridiens (PRIFAS), and USGS, has problems obtaining field data and disseminating reformation rapidly throughout the Sahel. The Sahel Institute, with trained scientists and up-to-date equipment, has the potential to conduct research and help implement some components of regional 1PM programs. CILSS' crop protection training department in Niger may be able to implement other components. Also, CILSS may be able to help mediate disputes between members that jeopardize survey and control efforts. However, CILSS' track record in 1PM and in resolving Member disputes has been disappointing.

In some cases, collaborative efforts between regional research and control organizations and national crop protection services would increase the effectiveness of both as well as the efficiency

with which donor funds are spent. Such efforts might include adaptive research; information exchanges; fellowships, training, and personnel swaps; institutional "twinning," and sharing facilities.

Problems associated with disputes within nations and concerns between nations need to be alleviated to make pest control more effective. The regional control organizations' mandates do not include resolving internal disputes within countries nor differences between member and nonmember nations. The international Desert Locust task force proposed in 1988 by the countries of the Sahel and Maghreb maybe a model for joint ventures in other areas.

FAO—The questions surrounding the recent locust and grasshopper campaign will remain unanswered until some group becomes responsible for developing standard forms and procedures for use throughout the affected region, and then collects, compiles, and analyzes the data needed for forecasting, for monitoring insect populations, and for selecting control sites. In the United States, USDA collects the type of data needed and FAO, as the comparable international organization, could make similar efforts worldwide. This is likely to demand more resources, especially to develop a public database on pest levels, pesticides used, value of crops, etc.

Also, more coordinated responses are needed during upsurges and recessions. FAO has a long history coordinating these programs and is the only organization with the U.N. mandate and credibility to bring together the large number of donors and affected nations. For example, FAO is applying remote sensing and modeling to the locust problem with more continuity, cohesiveness, and scope than any other organization. So FAO is in a position to assist other donors divide responsibility among competing early warning and remote sensing programs and complement each others' efforts. FAO-sponsored regional conferences can continue to promote donor and African coordination on topics such as priority research and monitoring for migratory pests in remote areas.

The FAO/Emergency Centre for Locust Operations (ECLO) has demonstrated the technical expertise and the willingness to improve its work based on lessons learned during the recent locust and grasshopper campaign. FAO's current efforts to

improve forecasting and implement "strategic control" with multinational teams are examples, and the organization's intention to fund these efforts during recessions deserves U.S. support. FAO must actively educate African, U.S., and donor policymakers on the necessity for laying groundwork during recessions for quicker, more precise responses during upsurges, for focusing on preventive work, and for supporting institutional development for these efforts to succeed.

Continued research is another long term need and FAO is moving ahead on at least two related projects. FAO and the U.N. Development Programme (UNDP) established a joint Scientific Advisory Committee in late 1989 to review research proposed for UNDP and donor funding. Also, FAO/ECLO published the first semi-annual Desert Locust Research and Development Register in July, 1989, identifying current and proposed research.

During the recent campaigns, FAO conducted control operations in some areas of sub-Saharan Africa, highlighting the inadequacy of regional and national African groups. In the short term, FAO's direct participation in control probably will be needed but its goal should be to increase African capacity—regional and national—to mount their own efforts. FAO's successful training and forecasting programs help achieve this. In addition, FAO can help donor and African participants devise ways to monitor the effectiveness of spraying and its impacts on health and the environment.

Several broader problems exist in providing U.S. support to regional and U.N. organizations. Pursuing foreign policy objectives sometimes has resulted in termination of USAID funding in the middle of long term development programs. Also, the various components of U.S. assistance themselves may have contradictory goals and constrain effectiveness. The results of some "policy reform" measures may gut other programs supported by donors, for example, by causing severe cut-backs in government employees (24).

The U.S. Department of State allocates funds to pay assessments and arrears due U.N. agencies, within general congressional guidelines. To some, it appears that the State Department's recent decisions have resulted in FAO's bearing a disproportionate burden of money owed to all U.N. agencies (90). From 1985 to February 1990, the United States fell

\$195 million behind in assessed payments to **FAO**. This amounts to nearly **70 percent** of **FAO's** 1990 annual operating budget. In several instances, **lack of funds** affected **FAO's locust work** adversely, e.g., field control staff were recalled when it appeared that **FAO could** not meet its payroll (91). In January 1990, the Bush administration requested nearly full funding of U.S. assessments and 100 percent payment for arrears, scheduled over 5 years.

Congress' **guidelines** for State's decisions are broad, **emphasize political** and financial **considerations**, and provide the State **Department** with wide latitude (see 124). Authorization for **USAID** and the State **Department** is done in different legislation by the **House Foreign Affairs** and **Senate Foreign Relations Committees**. The **Senate** and **House Appropriations Committees** set **USAID** and the **State Department's** budgets. In each chamber, however, two different subcommittees are involved. **These** various congressional actors differ in **philosophy**, reporting requirements, and the latitude they allow **Executive Agencies**. This constrains U.S. development efforts in Africa. Therefore, the various **congressional subcommittees** have a responsibility for coordinating their activities. For example, the two relevant **Senate Appropriations Committee's Subcommittees**: 1) **Foreign Operations** and 2) **Commerce, Justice; and State; the Judiciary; and Related Agencies**) could together examine the **general** congressional guidelines for funding **UN agencies**, their application to **FAO**, and their substantive adequacy.

International and Regional Agricultural Research **Organizations—ICRAC** and **IITA** are **currently exploring biological and biorational controls** for the **Desert Locust** and certain grasshopper species. **ICRAC** and **DLCO-EA** are among those **testing** the effectiveness of improved chemical insecticides.

These organizations should train the staff's of **Ministries of Agriculture** and conduct joint research with national agencies as part of their research. These international organizations are likely to increase their research's chance of success, build support for their organizations, and increase national capacity in this way. Donors and member nations need to provide continuing support for these efforts to succeed. Also, they should ensure that regular communication takes place

between the scientists at these organizations and those in Europe, the United States, and elsewhere in Africa.

**Participation of Local Groups—**Certain ground survey and control efforts in the recent campaigns were highly successful because of the participation of local groups of farmers and herders. Generally, farmers' groups helped conduct survey and control efforts near their croplands and herders scouted in more remote areas. Local groups' abilities to supply indigenous knowledge about pests and provide donors and others with specific information regarding local needs was less adequately tapped, however.

In the Sahel, farmer brigades were organized by national crop protection services assisted by **USAID** and **UNDP** funding. For example, farmer committees in Senegal and Gambia were trained to recognize the buildup of the **Senegalese grasshopper** and take action in or near their fields (19). Similar training was conducted in **Mali, Burkina Faso, and Niger** (71). Crop protection teams in Mali, aided by **PRIFAS** reports, identified areas of heaviest infestation, setup insecticide stores, and trained farmers to use manual dusters or sprayers to kill **Senegalese grasshopper** as they hatched. Similarly, **Malian farmers**, trained by plant protection and extension officers, monitored egg laying and controlled **Desert Locusts** at the time of hatching (71).

In countries where roads are poor or nonexistent, nomads on camels and farmers on donkeys can reach areas that the crop protection services cannot. In the Sudan, for example, crop protection services hired hundreds of herders on camels as local scouts to monitor insect buildup in inaccessible areas (121).

The more that local people and their organizations take part in decision making about pest management, the less uncertainty exists regarding needs, objectives, and methods that are acceptable and sustainable, and the more likely projects are to capture important information (see box 4-E). Effective pest management that benefits low-resource farmers would build on, rather than disrupt, local means of food security. Farmers' approaches to crop protection have developed historically in ways highly integrated with their social goals and technical capabilities. For example, villages in the Lake Victoria region cooperate in protecting crops from birds by planting the same color and variety of crop at the same

**Box 4-E—Integrating Farmers' and Scientists' Knowledge for Variegated Grasshopper Control**

The Variegated Grasshopper is distributed throughout West and West-Central Africa. Occasionally explosive outbreaks occur, usually when eggs or adults escape control by natural enemies and when spring rainfall is higher than usual. Damage is especially significant because these grasshoppers eat cassava, maize, and beans—crops that farmers rely on to relieve food shortages.

In the early 1970s, parallel studies were undertaken in southern Nigeria after several, frequent, major outbreaks. Paul Richards and others examined local knowledge regarding this pest while the Centre for Overseas Pest Research in London undertook more conventional technical studies. Initially, experts suggested that highly organized control efforts, like those used for the Desert Locust, would be needed for this species. But the pest proved to be a more localized problem, with its life cycle completed within the space of a single farm, and amenable to less centralized control.

Richards found that farmers were well aware of the insect's ecology and, in a few cases, their suggestions regarding effective control anticipated the findings of the London researchers: to mark and dig up egg-laying sites on each farm. Other findings of the research team were beyond the scope of farmers, e.g., ones requiring laboratory facilities.

Also, Richards found that research conducted by outside scientists would have been more useful and cost-effective if farmers' knowledge regarding grasshopper ecology had been considered from the outset. Instead, the scientists apparently reconstructed information that was already available and missed other data that farmers could have provided, e.g., on the relative significance of damage to minor but locally significant crops and oral history regarding the timing and severity of previous grasshopper plagues.

The knowledge possessed by farmers and by London scientists and others was complementary. Scientists provided certain biological details but farmers knew the social context of the problem. Farmers were able to destroy egg-laying sites on individual farms and had already attempted to use this method with limited success. Others, however, such as extension agents, were needed to coordinate community efforts for the program to succeed. Once egg-laying sites were destroyed on blocks of farms, grasshopper numbers were reduced by 70 to 80 percent.<sup>a</sup>

<sup>a</sup>W. Page and P. Richards, "Agricultural Pest Control by Community Actions: The Case of the Variegated Grasshopper in Southern Nigeria," *African Environment*, 1977, vols. 2 & 3, pp. 127-141.

SOURCE: Paul Richards, *Indigenous Agricultural Revolution* (London: Hutchinson & Co., 1985), pp. 146-149.

time, thus spreading risk among all the farmers. Government and donor planners would benefit from studying such approaches. Highly centralized research and management tends to exclude participation by local groups. And most grasshopper and locust control efforts are highly centralized.

The most serious limitation to increased farmer and herder participation is lack of information about improved pest management. Generally, pest manage-

ment networks do not exist, people have little access to appropriate literature, they are not literate, etc. Crop protection services and others can increase their ability to reach larger numbers of farmers and herders by working with existing village or farmer organizations or other non-governmental organizations in the area. The African Development Foundation (ADF) and others have demonstrated that local intermediary groups can play an important role in development programs (130). Many such groups exist within

African countries, including local church groups, that have the ability to mobilize or communicate with people in an area. Information disseminated through these types of groups may be quite effective. For example, one ADF-funded project decreased use of lindane after dancers and a local healer warned people of its use.

### Funding Implications

Some adjustments of U.S. bilateral and multilateral funding may be necessary to ensure that the most effective pest management is undertaken. These can be obtained by:

- reapportionment within current appropriations levels,
- changes to financial structures, such as USAID's Development Fund for Africa, created in 1988, and
- appropriations of additional funds.

### *Reapportioning Current Appropriations*

Some monies needed to support improvements in USAID's grasshopper and locust work may come from internal shifts of funds because the Agency is no longer funding massive control efforts. For example, on-going programs, such as institutional development of African agricultural organizations, may incorporate IPM or improved insecticide use without requiring additional funds.

Congress may want to encourage USAID to allocate additional existing agricultural funds to pest management generally and IPM specifically. Pest management received a declining share of the Bureau for Science and Technology's agricultural budget in recent years. From fiscal years 1977 to 1988, pest management received an overall average of 5.8 percent of S&T/agriculture funds, but in 1986 this sector only received 1.0 percent; in 1987, 3.2 percent; and, in 1988, 1.8 percent (116). The amounts of funds allocated worldwide were small: \$340,000 in 1986; \$900,000 in 1987; and \$520,000 in 1988. This trend, coupled with reduced USAID funding to agriculture in

general, means that few U.S. development assistance funds are being spent on long term pest management.

### *Changes to Financial Structures*

Congress replaced USAID's functional accounts with the Development Fund for Africa in 1988 to provide USAID with increased flexibility and to make funding more efficient. Congress could evaluate the impact of the Development Fund. Early indications are that agricultural funding decreased relative to other sectors as a result, as did pressure to fund activities with quick, visible results. If so, the Development Fund for Africa may neither be achieving its goals, nor be able to serve as a model for other programs.

### *Appropriations of Additional Funds*

There is no doubt that new efforts would require new appropriations. What is not clear is how much these efforts would cost.

Implementing IPM for locusts and grasshoppers and other pests would require funds for planning, training, research, and coordination. Also, funding would be required for preventive work, e.g., monitoring pest populations (as advocated by USAID, FAO, other donors, and affected countries) and improving forecasting systems. For example, establishing the proposed International Task Force for ground monitoring and control of the Desert Locust in remote areas in the Sahel and continuing to produce greenness maps would require new or continued funding. The price-tag for such new efforts is not clear, but USAID will need to estimate some of these costs while planning the AELGA follow-on project. Congress may want to ensure that all components of USAID's follow-on work are considered together.

Providing equipment and supplies can be an important part of efforts to strengthen local, national, and regional African institutions. Some relatively inexpensive items may increase the capacity of national crop protection institutions to monitor insect populations, e.g., fax machines, radios, and spare parts. Other items—such as satellite receiving stations and major research proposals—are far more costly.