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THE NIGER AFRICAN EMERGENCY LOCUST/GRASSHOPPER ASSISTANCE (AELGA) PROJECT EVALUATION

698-0517

A Report Prepared for USAID/N

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LIST OF ACRONYMS

AChE	Acetylcholinesterase
AELGA	African Emergency Locust/Grasshopper Assistance
AELGA/N	African Emergency Locust/Grasshopper Assistance Project, USAID/Niger
AELGA/W	African Emergency Locust/Grasshopper Assistance Project, USAID/Washington
AGRHYMET	Centre Regional de Formation en Agrometeorologie et Hydrologie Operationelle
CIDA	Canadian International Development Agency
CILSS	Comite Inter-Etats de Lutte Contre la Secheresse dans le Sahel
CPS	Crop Protection Service
DCP	Directorate of Crop Protection
DFPV	Departement de Formation en Protection des Vegetaux
DPM	Disaster Preparedness and Mitigation
DRCO	Disaster Response Coordination Office
DCP	Directorate of the Crop Protection Service
DRU	Disaster Relief Unit
ECLO	Emergency Center for Locust Operations, FAO
FAO	Food and Agriculture Organization of the United Nations
GDO	General Development Office
GON	Government of Niger
GPS	Global Positioning System
GTZ	Deutsche Gesellschaft fur Technische Zusammenarbeit
IEE	Initial Environmental Examination
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
LSGA	Limited Scope Grant Agreement
MOA	Ministry of Agriculture
MOH	Ministry of Health
MSU	Montana State University
NPA	Non-Project Assistance
OCLALAV	Organisation Commune du Lutte Antiacridienne et de Lutte Antiaviaire
PA	Project Assistance
PACD	Project Assistance Completion Date
PEA	Programmatic Environmental Assessment
PNC	Niger-Canada Project for Plant-life Protection
PRIFAS	Programme de Recherches Interdisciplinaire Francaissur les Acridiens du Sahel
SAP	System d'Alert Precoce
SEA	Supplemental Environmental Assessment
SYSAPEC	Surveillance, Monitoring, and Pest Early Warning Project, UNDP/FAO, Niger
ULV	Ultra-Low Volume
USAID	United States Agency for International Development
USAID/N	USAID Mission to Niger
USG	United States Government

1.0 EXECUTIVE SUMMARY

The African Emergency Locust/Grasshopper Assistance (AELGA) project mid-term evaluation conducted in 1989 and the Supplemental Environmental Assessment (SEA) for Locust and Grasshopper Control in Niger, completed and approved in 1990 identified ways in which locust and grasshopper populations can be controlled while taking into account economic and environmental considerations. The mid-term evaluation indicated that AELGA had been relatively unsuccessful at instituting activities directed toward long-term control, monitoring, and forecasting of locust/grasshopper problems. The 1989 mid-term evaluation further stressed the importance of institutional development to build upon the nation's capacity to monitor and control locust/grasshopper populations.

Since 1989, AELGA/N, in collaboration with strong efforts from other donors, has made great strides in improving Niger's national capacity to launch effective, organized, and environmentally sound crop protection efforts. Niger's crop protection program has significantly increased its capability to conduct adequate survey and control in recent years. Also, approximately 34,600 farmers in village brigades were trained as Niger's first line of defense against pest infestations. AELGA/N funding in the past six years has virtually sustained Niger's aerial survey and control operations. It has also provided the necessary fuel for ground survey and control, essentially built the entire communication network, and contributed to the expertise level through training.

Niger's crop protection program is nevertheless losing substantial donor support and is consequently being forced into even greater self-reliance. It is during this transition that USAID should pay specific attention to pest management issues in order to maintain the national capacity and assist in its evolution toward sustainable crop protection. Without USAID's supports and many other significant efforts, DCP's capacity to handle pest outbreaks would have been seriously flawed. Given the marginal food production capability in Niger, the potential gravity of crop loss due to insect and rodent infestations, and the resulting possibility of famine, it is vital that AELGA issues play an important role in the DPM.

There exist new opportunities for developing Niger's emergency pest management capacity toward greater self-sufficiency. For example, Niger possesses a unique aerial control capability. This resource should be developed further such that Niger could conceivably "export" its aerial services to provide aerial pest control for the region. USAID/N should continue the CIDA's initiatives in village brigades training. These types of initiatives should be supported to encourage efforts in

developing self-sufficiency. In order for self-sufficiency to develop, initiatives must also be taken to integrate AGRHYMET, CILSS, CPS, DCP, DFPV, FAO, OCLALAV, and donor efforts for a more consolidated and sustainable approach to outbreak pest management even during periods of outbreak recession. These institutions should conduct regular meetings on pest management issues.

The pesticide situation in Niger has improved dramatically in the past five years since the mid-term evaluation. One of the most dramatic developments was the removal of all of the unwanted dieldrin from Niger through AELGA's innovative Niger Dieldrin Disposal Project (NDDP). Empty pesticide containers, however, remain as potential risks to human health in Niger, as containers are a valuable commodity in the country primarily for food, water, and fuel storage. USAID/N has begun an approach to the issue of container disposal with last year's draft of a "Prototype Barrel Disposal Plan" for empty organophosphate containers. The draft should be thoroughly reviewed before implementation.

The security issue in northern Niger remains an impediment to effective locust control. Desert locust population upsurges in key breeding areas of Niger's remote Air Mountains and the Tamesna can result in massive and highly mobile swarms if left uncontrolled. Early intervention against population upsurges can minimize the threat to Niger as well as to other countries in the Sahel, the Maghreb, and the Horn of Africa. Since food security in Niger is dependent on crop protection from pest outbreaks, any activity related to agriculture and disaster prevention must include pest management as an essential mitigation effort to avert crop loss resulting from pests (preharvest crop losses due to pests, according to FAO, average about 35% worldwide).

Part of an overall pest management system is monitoring treated areas for potential environmental effects of pesticides as a means of determining ways in which to refine their use. Environmental monitoring can identify negative effects on flora and fauna, as well as detect improper application methods which can harm human health and increase operational costs. It is imperative that future pest management system includes an environmental impact agenda. Recommendations in the SEA for Locust/Grasshopper Control in Niger must be followed, and stipulations in the Initial Environmental Examination (IEE) for the DPM program must be adhered to.

Locust and grasshopper control involves vigilant surveillance, monitoring and preventive intervention as well as emergency response. The overriding goal is the complete evolution from emergency intervention during plagues to preventive pest management, and from donor-driven to national and regional self-sufficiency with auspicious, comprehensive, and self-sustaining operations. While USAID (through AELGA) and other donors have

made significant progress in developing Niger's crop protection services, the objective of securing a preventive strategy has not yet been attained. Were USAID and DPM not to continue support for pest management activities, the achievement of this goal would certainly be precluded. Furthermore, effective pest outbreak intervention capacity will be derailed and the remarkable gains made over the past five years will have been for nought. USAID/Niger's agenda should include: making pest management a priority within the DPM program's mandate, assisting the DCP in capacity-building, and maintaining inter-agency and regional relationships in crop protection.

2.0 PURPOSE AND PROCEDURES OF THIS EVALUATION

2.1 Background

The Africa Emergency Locust/Grasshopper Assistance (AELGA) Project was initiated in 1987 to assist with a plague of desert locusts, (*Schistocerca gregaria)*, that was rapidly spreading across the semi-arid regions of the Sahel, the Maghreb, and the Horn of Africa. This project was created during the locust plague conditions of 1987; the campaign in Niger was a response to outbreaks of fully gregarious adult swarms and nymphal bands that originated in the Horn of Africa. AELGA/N, however, was formed after locust plague conditions had subsided. From 1990 until the present time, the main acridian pest problem in Niger has been outbreaks of grasshoppers (primarily the Senegalese grasshopper, *Oedalus senegalensis)*.

A mid-term evaluation of the AELGA project was done in 1989, and AELGA/Niger was one of the case studies. Overall the evaluation found that considering budgetary and administrative constraints, AELGA had been quite successful in addressing immediate problems under locust outbreak conditions. The evaluation concluded that AELGA was less successful in effecting activities directed toward long-term control, monitoring, or forecasting of locust/grasshopper problems.

2.2 Purpose of This Evaluation

The purpose of the 1994 evaluation is to conduct a critical assessment of the past activities of the AELGA Project in Niger in light of the project objectives specified in the original Project Paper, the Programmatic Environmental Assessment for Locust and Grasshopper Control in Africa and Asia, the Supplemental Environmental Assessment (SEA) for Locust and Grasshopper Control in Niger, and the mid-term AELGA evaluation conducted in 1989.

Three major elements constitute this evaluation: first, examination of landmarks and lessons learned since 1989. Second, assessment of the extent to which pest management elements have been put in place and how effectively they have been institutionalized within the CPS. Finally, direction and recommendations on how USAID/Niger can best continue to support emergency pest outbreak and other AELGA-like functions in the framework of the Disaster Preparedness and Mitigation (DPM) Project.

2.3 Drafting Procedures

The Niger Africa Emergency Locust/Grasshopper Assistance Project Evaluation was initiated by USAID/N in collaboration with

AELGA/W. The AELGA/N Project Evaluation was conducted in June 1994 by: AELGA/W Project Coordinator, Alise Laroche, Entomologist, Dr. David Evans, and Logistician, Kim Maynard. The Team visited Niger from May 31 until June 21, 1994. One week was spent in the field visiting CPS facilities in Maradi, Zinder, Tahoua, Dosso, and Tillabery. The USAID/N's DRU and AFR/AA/DRCO's AELGA Project in USAID/W assisted in preparation of this evaluation report by providing logistical support for field work, reference documentation, and contacts within the Nigerien government. The Niger DCP provided the team with in-country transportation. The timing of the visit imposed some constraints on the evaluation procedure. It was not the season for pest control operations, and a strike of government workers made it difficult to conduct a comprehensive evaluation. Nevertheless, a great deal of information was obtained in the short time available and the team felt it came away with at least an approximately accurate picture of the pest management situation in Niger.

2.4 Organization of Report

Because this evaluation needed to address the three major objectives cited above, a general background statement on the history and development of AELGA/W and AELGA/N is presented. Following the historical background is an assessment of AELGA/N activities over the years since the 1989 mid-term evaluation. As much of AELGA/N activity has been directed toward sustainability of DCP, some general assessment of DCP's pest management capabilities is incorporated into this section, as well. Detailed information on DCP has been placed in the appendices. A "Future Directions" section follows the evaluation; this section is particularly crucial in light of the shift in AELGA's activities to DPM and the changing donor climate in Niger. Specific recommendations for pursuing these directions are then presented.

3.0 AELGA BACKGROUND

3.1 AELGA/Washington (AELGA/W)

The AELGA Project was initiated in 1987 to assist with a plague of desert locusts that was rapidly spreading across the semi-arid regions of Africa. The project's goal is to contribute to the improved nutritional status and well being of Africans by reducing the threat of locust and grasshopper plague-induced famine, and its associated economic and social suffering. In accordance with the medium-term policy of the "Africa Bureau Locust/Grasshopper Strategy Paper" of February, 1987, the project's purpose is two-fold: (1) treat the recovery and rehabilitation aspects of problems generated by the locust and grasshopper pest problem currently threatening many African countries, and help to bring it back under control; and (2) help to establish improved management and control mechanisms to keep this problem under control in the future.

By 1994, there had been eight amendments to the original AELGA project and the project had been extended through December 1994. The ninth amendment is currently being approved for an extension through March 1997. The project assistance includes the following components: 1) Operations Support 2) Project Coordination 3) Training and 4) Project Management and Evaluation.

Since its initiation, AELGA has focused heavily on building the capacity of African counterparts and regional organizations in the prevention and mitigation of locust and grasshopper outbreaks, as well as rodent control. Furthermore, the project made great strides in integrating emergency response and long-term developmental activities. AELGA continues to engage in research activities in such relevant areas as biological control, use of satellite technology for forecasting and locating the pests, baiting and other pesticide application methods, and assessment of the costs and efficacy of various treatment programs. During the 1992-1994 locust outbreak, AELGA was particularly influential in initiating and leading a proactive strategy that was apparently successful in averting a full-scale plague. Presently, AELGA/W is administered by USAID, Africa Bureau's Disaster Response Coordination Staff (AFR/AA/DRC).

3.2 AELGA/Niger

3.2.1 Background

A major desert locust plague began between 1986 and 1987 when swarms from the Red Sea coast of Eritrea and Sudan moved west across the Sahel. The Republic of Niger lies in part of Africa that is traditionally vulnerable to outbreaks of desert locust

and other grasshopper species that can reach plague levels. As a result of these potential outbreaks, the Government of Niger (GON), the Food and Agriculture Organization (FAO) of the United Nations, Regional Organization Commune Du Lutte Antiacridienne et de Lutte Anti-Aviaire (OCLALAV), and donor organizations including USAID/Niger attempted to launch emergency control operations against the cross-regional plague of locusts and grasshoppers.

3.2.2 Administrative/Management

In June 1988, the USG and the GON signed a Limited Scope Grant Agreement (LSGA) to help control and limit the impact of locust and grasshopper infestations. The USG Disaster Assistance Program for Niger included $400,000 for grasshopper and locust control operations. This amount was used to "buy into" the AELGA Project. The AELGA/N project has been funded through three types of sources: 1) the Regional Africa Project (698-0517), 2) the Regional Sahel Project (625-0517), 3) and the Bilateral Project (683-0517).

In Niger, the AELGA project is administered by the Disaster Relief Unit (DRU) of USAID/N General Development Office (GDO). The DRU also manages other emergency programs such as: food assistance, famine early warning system, floods, screwworm scouting, and outbreak of diseases. At the present time, it is estimated that approximately 90% of AELGA/N's budget is allocated to providing logistical, training, and operational support to the DCP for grasshopper and locust survey and control operations.

3.2.3 Strategy

In 1986 and 1987, the lack of preparedness and inability to do early control in key locust breeding areas in the Horn of Africa permitted gregarization, swarm emigration, and a plague developed. The locust/grasshopper campaign in Niger from 1987 to 1989 exemplified a reactive strategy. Emergency operations were mounted to combat large locust invasions threatening agricultural areas, but concentrating limited anti-locust resources in agricultural areas precluded concerted operations in distant breeding areas. During the 1992 to 1994 locust outbreak, due to the Tuareg nomad rebellion in the north, Niger did not have a workable locust control strategy in that region. However, a proactive strategy was successfully used by other afflicted countries in averting a full-scale desert locust plague. Proaction relies heavily on early detection of population increases in breeding areas and prepositioning of resources. Like reactive control, proactive operations may at times have to be conducted in an emergency context to achieve success. A preventive strategy, where control operations are conducted at the onset of gregarious behavior, is the ideal choice for

locust/grasshopper control. Outbreak prevention will involve continuous locust survey, appropriate prepositioning of locust control resources, and could conceivably rely heavily on alternative means of control to keep locust populations in recession indefinitely (Showler 1994). Employment of preventive and proactive locust/grasshopper control strategies would facilitate optimal results.

4.0 FORECASTING

The mid-term evaluation recommends that AELGA support any activities which allow early intervention in locust/grasshopper control by accurate forecasting. These include egg pod survey, use of greenness maps produced by the Centre Regional de Formation en Agrometeorologie et Hydrologie Operationelle (AGRHYMET), and collaboration with regional (OCLALAV) and international (FAO) organizations to develop forecasting capabilities.

Unfortunately, forecasting capabilities actually seem to have deteriorated since the 1989 evaluation, and some measures should be taken to address this deficit.

The AGRHYMET greenness maps are technically excellent, but in the past they arrived in the field sporadically and long after they were actually produced; there has also not been adequate training in greenness map interpretation among the CPS staff. CPS has lost some of its most critical grasshopper forecasting capabilities because egg pod surveys are no longer conducted for lack of funding. Some previously-important regional locust survey and control organizations (OCLALAV) are nearly moribund, and most recent contact with FAO has only been through the donor coordinating committee in Niger.

4.1 Greenness Maps

The mid-term evaluation recommended that AELGA continue its support to AGRHYMET including use of greenness maps for survey and forecasting. DCP receives greenness maps (funded by AELGA/N) from AGRHYMET every ten days, and these maps are supposedly distributed to regional CPS centers accordingly.

There is presently no method for assuring that greenness maps arrive at appropriate destinations on time, or that they will be interpreted correctly. At Maradi, maps usually arrived weeks late. At Tahoua and Dosso, no maps arrived during 1993.

Three workshops on interpretation of greenness maps have been held at AGRHYMET since 1990, but many of the workshop participants have not actually been field personnel. It is

evident that there are difficulties in interpreting the maps; these difficulties were moot, in that the maps rarely arrived on time anyway.

AELGA/N is supporting an effort to produce a new version of greenness maps which would reflect collaboration, between DCP and AGRHYMET. The new map would include moisture, temperature, wind direction, and possibly locust data in addition to vegetation density.

4.2 DCP Role in Forecasting

Egg pod survey has been DCP's most important forecasting mechanism for grasshoppers. The survey used to be done annually, with funding from FAO and from the Netherlands. There has been no funding for the past two years, and most departments have not done egg pod surveys since that time (1991). Tahoua did carry out a survey for one additional year, using local funding.

Light-trapping at the observation posts has been a useful complementary technique for detecting population peaks of adult grasshoppers; collections are made from traps and recorded daily, and information is relayed to departement CPS twice a week. Light trapping is a much shorter-range forecasting method than egg pod survey, but it is an inexpensive and technically simple procedure.

4.3 Cooperation with Other Countries

The 1989 mid-term evaluation recommended that AELGA continue its association with regional organizations, such as OCLALAV and CILSS, to allow coordination of control, forecasting, and monitoring activities on a regional basis.

AELGA/N funded a visit by three DCP agents to OCLALAV headquarters and the FAO's Locustox project in Dakar, but coordination with regional organizations in West Africa has not been a conspicuous part of AELGA activities in the past five years. AELGA does encourage DCP to work with other countries in locust/grasshopper population forecasting and monitoring. The mid-term evaluation recognized the difficulty of operating within regional programs in stressing the importance of carrying out operations directly so as not to jeopardize locust/grasshopper control, but simultaneously suggested working on building national and regional response capabilities.

5.0 SURVEILLANCE

Both the mid-term AELGA evaluation and the Supplemental Environmental Assessment (SEA) for Locust/Grasshopper Control in Niger expressed concern about the overall lack of planning, organization and coordination among ground survey, aerial survey, egg pod survey, prepositioning, aerial application, ground application, and village brigades.

Due to grasshopper outbreaks, the primary emphasis of the AELGA/N project between 1990 and 1994 has been on grasshoppers as opposed to locusts. Therefore, most efforts at developing the survey system since then have been directed at grasshopper infestations.

In 1989 there were only five survey teams in Niger and prospection relied heavily on word-of-mouth information collected from nomads and the five or six ex-OCLALAV scouts left in Niger. This system was slow and inaccurate. Since 1989, the national survey system has improved significantly. Each of the eight departments have well-trained and organized survey teams and an improved information-gathering system from villagers and farmers (see Appendix 1).

5.1 Security

Since 1992, political instability in the northern part of Niger has negatively affected locust survey and control efforts in Niger's Air Mountains and the Tamesna, both critical Sahelian breeding habitats for the Desert Locust. In the past, the Agadez Locust Control Center in nearby Agadez conducted important surveillance, early warning, and intervention activities. These activities have now been curtailed mainly due to security problems in the region.

Survey teams must be accompanied by military escorts, who are paid per diem by the GON. These costs quickly become prohibitive and Tuarag rebels attacked and killed military escorts in Northern Mali which resulted in the cessation of survey in both northern Mali and northern Niger.

5.2 Strategy and Logistics

The mid-term evaluation was largely concerned with the lack of aerial survey for locusts conducted in the northern, rough terrain of the Air Mountains and Tamesna region due to its ruggedness and strategic desert locust breeding grounds. The SEA reinforced the concept of good ground survey networks in the southern agricultural zone, with minimal reliance on helicopters. It commended the improvements in recent years, including the continued funding of observation posts, purchase of more radios, and training.

Recommendations by the 1989 mid-term evaluation included continued improvements in village brigade training, better surveillance equipment, and identification of survey frequency.

After the mid-term evaluation, greater emphasis was placed on use of aerial surveillance for the non-agricultural zone. This was minimized by both the increased insecurity in the north, and by the shift in attention from locust to grasshopper infestations. Because the territory north of the agricultural zone provides prime breeding ground for locusts, it is critical for prospection. However, given its lack of vegetation except during rainy season, it is not a good habitat for grasshoppers.

AELGA/N contributed immensely to the development of the ground survey network by providing radios for vehicles, airplanes, base stations and observation posts (see Appendix 2). AELGA/N funding was used to purchase new radios and vehicle spare parts; provide technical assistance for the network maintenance, installation, and repair of radios, and to finance a training course for CPS field agents in radio operation and use. It also co-sponsored a radio operation training course with the Nigero-Canadian Crop Protection Project.

As of April 1993, the CPS had 65 high frequency (HF) radios and a list of 14 approved frequencies (3 to 4 of which are actually used), up from 37 HF radio and 7 frequencies, respectively in 1989. Every departement now has an HF radio, a charger and a mobile radio. Each observation post and most arrondissements also have an HF radio and a charger. This network now covers virtually the entire agricultural zone and facilitates critical communication between posts on all aspects of emergency pest management and crop protection issues.

In addition, AELGA/N funded a global positioning system (GPS) unit for each of the three aircraft and 13 CPS field agents at the directorate and the departemental levels. A DCP agent trained the field representatives in survey techniques and aerial pesticide application. **These have revolutionized the efficiency of pest control operations by allowing ground survey teams to locate the exact position of an infestation.** If an aerial application is necessary, the airplane can proceed directly to the location. In ground control, the GPS similarly serves to direct ground crews to target areas.

A critical source of information for locating pest infestations, however, is still the farmer. Canadian funding has provided training to over 34,600 farmers in village brigades, Niger's first line of defense against pest infestations. This training has contributed substantially to the understanding of pest problems at the village level. The CPS collects information regularly from farmers both in the villages and at the market.

The GON early warning system, System d'Alert Precoce (SAP) is an integral part of Niger's disaster "survey-to-response" operation. It is designed to provide a means for gathering information on critical emergency indicators, analyzing data, determining the level of emergency, and deciding on appropriate response. Directly under the Prime Minister, SAP has four permanent employees, but is made up largely of other members assigned from the Ministry of Agriculture, crop protection, livestock, cereals, health and nutrition offices (see Appendix 3).

DPM is beginning to work with SAP on developing greater in-country capacity to mitigate and respond to disasters. The SAP will be an important partner in pest management, crop protection and other AELGA's concerns in the future.

5.3 Survey Operations

During the 1986-1989 Locust Campaign, aerial survey in Niger depended upon donated flight time (very little of which came from the Nigerien military). Since then, DCP aerial capacity has improved tremendously, largely as a result of AELGA/N contributions. AELGA/N has funded all of the maintenance, spare parts, radios, GPS systems and 3/4 of the fuel for DCP's fleet of 3 aircraft; in addition to providing pilot training, per diem for a Luxembourg air crew, and protective clothing, camping equipment, per diem and vehicle fuel for ground support crews. In 1989, 1990, and 1992, AELGA contracted a helicopter specifically for survey operations (co-funded in 1990 with GTZ) for a total of 100-150 hours of flight time annually.

Besides the recommendation of concentrating aerial survey in the northern region, the mid-term evaluation suggested use of technical assistance to develop a strategy for aerial survey and logistics to augment aerial pesticide application. In this respect, it prescribed the use of booms and tanks during survey operations to prevent duplication of effort requiring aircraft to return to the site to spray.

Presently, airplanes are not being routinely used for surveillance, now that the northern region is off-limits and the CPS has been primarily concerned with the more sedentary grasshopper infestations (as compared to highly mobile locust swarms). Ground crews, farmers and observation posts can usually fulfill the survey needs in the southern zone. However, on those occasions when airplanes are used for locust scouting, they carry pesticides for spraying if necessary - although aerial spraying is normally conducted early the next morning when the swarms are still roosting.

The helicopter (which may or may not be contracted this year) normally does not fly with spray booms and a full tank because it

can carry only a small amount of pesticides, is very expensive to operate, and has limited flying range even without loaded tanks.

Very little CPS surveillance could have occurred without AELGA/N funding of fuel for survey vehicles. AELGA/N has also provided essential camping equipment, mobile radios, GPS systems, and per diem for ground survey teams.

AELGA/N's support in developing observation posts for survey has contributed to the decrease in the amount of pesticides used in the past year. When a grasshopper infestation is located, the Surveillance, Monitoring, and Pest Early Warning Project (SYSAPEC) post officer investigates the situation directly and may determine that lack of severity may preclude the need for pesticide application.

Both the mid-term evaluation and the SEA stressed the need for greater comprehensive and longer-term locust control activities, including conducting egg pod surveys to indicate areas demanding greater attention. Despite the Tuareg insurrection, egg pod surveys were conducted in the north for the three years prior to April 1993, financed through FAO. The CPS used information generated by these surveys for their intervention planning. However, no egg pod survey has been done in the past two years for lack of funding, except in the Tahoua departement. In 1993, the GON funded surveys in Tahoua, where the terrain is very difficult to negotiate and egg pod findings are important for directing prospection and treatment efforts. They do not have funding for 1994 and AELGA and other donors have not financed this kind of prospection. AELGA/N, DPM, and other donor projects, should be alert to appeals for assistance from the GON for continuing egg pod surveys.

5.4 Survey Expertise and Training

The mid-term evaluation recommended that CPS hire the ex-OCLALAV scouts for surveillance, given the lack of as well trained personnel within the CPS.

An unspecified number of former OCLALAV employees currently work for the CPS in various capacities. However, the great need for locust experts has diminished since the primary concern now is grasshoppers. The GON has increased the DCP budget to include many more personnel than in 1989, and the DCP considers the present number of survey teams sufficient to cover the agricultural zone.

The mid-term evaluation specified technical assistance for a "train the trainers" workshop for CPS scouts in map reading, survey techniques, radio operation, reporting protocols, pesticide use and safety, collecting information from farmers on

village market days and disseminating information on pesticide use and safety. The workshop was to be conducted on a regional basis or by a short term technical assistant moving around the affected countries in the region.

This training was never expressly sponsored by AELGA, although technical assistance was provided to improve DCP survey operations. An AELGA/N officer is part of the DCP training committee and has financed various courses for CPS field agents in collaboration with other donors. CIDA provided funding for village brigade training and the DFPV at AGRHYMET financed by the Dutch, conducts extensive courses in survey technique, reporting, radio use, insect identification, and many other areas. Field personnel appeared to be knowledgeable and capable of effective surveillance activities.

5.5 Reporting

The mid-term evaluation further recommended that USAID/N distribute the standard survey reporting form prior to a locust campaign and model it in accordance with a generic reporting form developed by FAO.

The DCP currently uses a very good survey reporting form containing numbered codes for such information as plant variety, stage of growth, life cycle stage of insects, level of infestation and type of treatment, as well as number and type of insects caught in light traps at observation posts. The form also reports frequency and procedures for radio transmission of the information from the arrondissements to the DCP. This system appears to be better than adequate.

5.6 Greenness Maps

AELGA/N has provided both survey maps and a series of greenness maps procured from AGRHYMET for DCP use in locust surveillance activities. Although the technical utility of greenness maps is useful for identifying areas most likely to favor locust activity, their application in Niger has been minimal since 1989.

The maps are designed in part to assist locust scouts in the sparsely-inhabited regions of northern Niger by eliminating the need to survey large areas, thus concentrating scouting in the regions where sufficient rainfall has allowed a favorable quantity of vegetation growth for locust populations. This information is also valuable in surveying for grasshoppers which feed on green foliage. While the SEA indicated this as a very useful endeavor, the use of greenness maps in Niger has been hampered by distribution problems in recent years.

Nearly all prospecting is now done by ground crews in the

southern agricultural zone, and none in the vast and remote north, thus eliminating the need for greenness maps. In the south, the increase in the number of survey teams (including use of observation posts), and improved survey techniques and communication network makes the greenness data less critical to surveyors.

Earlier, AGRHYMET sent maps via mail to each of the 8 departments to distribute to the arrondissements and districts. This method was very time consuming, and the maps often arrived weeks to months late, making them less useful. In 1993 AGRHYMET began producing the maps in Niamey. The distribution system by means of car or truck was not feasible, and in 1993, very few greenness maps were received in any of the departments. Neither AGRHYMET, nor AELGA/N which funded purchases of the maps, was fully aware of the situation.

Departement level personnel repeatedly complained of the complexity of greenness maps interpretation. AGRHYMET has conducted 3 training sessions between 1990-1994 in map interpretation. However, the exact number of field level attendees to these sessions are not known.

Nevertheless, the importance of greenness maps is widely recognized. The technology used in greenness map production at AGRHYMET (which provides greenness maps for most of West Africa) is exceptional, including computers, inmarsats, and other elaborate equipment. The significant contribution of greenness maps to locust/grasshopper surveillance should be complemented by adequate distribution strategy.

In March 1994, AELGA/N allocated $10,000 to AGRHYMET and DCP for improving the efficacy of greenness maps. The DCP drafted a proposal to transmit greenness information via radio to the departements and arrondissements from AGRHYMET as soon as it is generated. Each field unit would have a map with a clear, numbered grid overlay. An AGRHYMET technician would radio to the units at specified times and dictate the grid sections to reflect relative vegetation growth along with additional information such as temperature, wind direction, and moisture level. This information on specific areas to search for signs of grasshoppers and locusts would then be used by survey teams and transmitted to the arrondissement and district levels. The actual location of insects would be identified by scouts.

5.7 Coordination

The mid-term evaluation recommended that AELGA work closely with appropriate African regional organizations. OCLALAV was the primary regional organization working in locust control up to the end of the 1980's. Presently, however, OCLALAV's role in crop

protection is diminishing due to lack of funding from the member countries and the donor community. In addition, the dissipation of OCLALAV, the locust center based in Agadez is virtually closed as a result of the Tuareg rebellions in the north. These considerations could have far reaching implications for locust/grasshopper control in Niger.

AELGA/N has cooperated well with other organizations, both formally and informally. FAO held donor meetings regularly for Niger, based on the country's need, and AELGA/N participated in those meetings. These relationships have been important to sharing information on survey findings, emergency operations and unmet needs.

6.0 PESTICIDES

A number of pesticide issues were addressed in the mid-term evaluation and the SEA. In 1989, there was no systematic method of pesticide selection, because donors simply brought in pesticides without consulting DCP. It was recommended that AELGA establish a pesticide bank as a way of expediting the supply of suitable pesticides in realistic quantities. The major item of concern at the time was the consolidation and disposal of an estimated 21,000 liters of dieldrin which had been donated by FAO/UNDP and Libya for the anti-locust campaign. It was recommended in the mid-term evaluation that AELGA place a high priority on the disposal of unwanted pesticide stock and empty pesticide drums.

One of the most dramatic developments in the five years since the mid-term evaluation was the removal of all of the unwanted dieldrin from Niger through AELGA's innovative Niger Dieldrin Disposal Program (NDDP). However, there is a stock of DDVP, donated by Algeria, currently present in Niger (see Appendix 4). This pesticide is highly toxic and volatile and not appropriate for use in the Sahel. Thus the DCP is now seeking an appropriate disposal option for this pesticide. This concern should be addressed and the DDVP should be safely removed from the country for disposal.

Other aspects of the pesticide situation in Niger have improved considerably in the past five years. In the absence of a locust emergency, and the shift of focus to grasshoppers, the pace of pesticide acquisition has been moderated. AELGA has been an active partner in pesticide selection through discouraging DCP from using certain pesticides, and it convinced DCP to exclude lindane from the list of pesticides acceptable for use in Niger. AELGA/N also provides DCP information on pesticide toxicities and has encouraged the development and implementation of Nigerien pesticide legislation.

Fewer donors are currently involved in providing pesticides to Niger than there were from 1987-1989. DCP now receives most of its pesticides from the Japanese and a few other sources, including the Islamic Development Bank. In addition, DCP pesticide stock management and inventory capabilities have been upgraded significantly, mostly under CIDA funding.

Empty pesticide containers remain as potential risks to human health in Niger, as containers are a valuable commodity in the country primarily for food, water, and fuel storage. USAID/N has begun an approach to the issue of container disposal by last year's draft of a "Prototype Barrel Disposal Plan" for empty organophosphate containers. The draft plan suggests use of the containers as fences, road markers, and young tree protection. The plan has been submitted to DCP, GTZ, and CIDA for review and comment.

6.1 Pesticide Selection

AELGA/N provided malathion to DCP in 1989, which was supplied in order to prevent use of DCP dieldrin stocks. Since that time, AELGA/N has not been directly involved in pesticide procurement, and DCP has not officially requested pesticides under the project. The overall preference of DCP is for malathion and fenitrothion ULV formulations; both pesticides are approved for use against locusts and grasshoppers by USAID.

Pesticides represent 70-80% of the DCP budget, and DCP has great interest in minimizing this amount. A proposed DCP research project, for example, is the investigation of the use of materials available in Niger to formulate pesticides.

6.2 Pesticide Safety

AELGA/N's contributions to pesticide safety in the past five years have been valuable. They have been specific actions, which along with those of other donors, become part of the overall safety picture in Niger. Donor coordination on safety issues is critical, and decreasing donor activity in the country could result in pesticide safety deficiencies which are simply not addressed.

The SEA commended initial steps taken by the GON in human health monitoring from pesticide exposure, and recommended continued support for this effort in close coordination with CIDA which had taken a lead role in the realm of human safety. The SEA further suggested that USAID should provide technical expertise, and additional equipment or training for monitoring and collaborating with CIDA producing wall charts on poisoning symptoms and first aid procedures.

The 1989 mid-term evaluation recommended that AELGA train CPS field personnel and health agents in treatment of pesticide toxicity cases, and to develop a DCP/Ministry of Health collaborative workshop on pesticide toxicity prevention, diagnosis, and treatment. Health officials at the district level know the signs and symptoms of pesticide poisoning, how to treat them, and atropine is available (although there is some question about expiration date). The farmer brigades, however, don't necessarily know the symptoms.

AELGA did not become directly involved in pesticide toxicity training in the field, but it has produced and distributed a pesticide poisoning symptom chart in cooperation with CIDA.

An AELGA/W regional Pesticides and Human Health workshop was held in Bamako, Mali in June, 1992, and AELGA/N supported the attendance of an agent from the Ministry of Health and DCP. However, whether or not the information at this workshop was sufficient for trainers to do training at the field level is not known.

AELGA/N was directly involved in acetylcholinesterase testing in 1991 in collaboration with CIDA. Test kits were provided by AELGA, which also funded the production of the report results on the test. In 1992, the Ministry of Health (MOH) took over the responsibility for administering these tests, funded primarily by CIDA. Each departement level health office was given a kit with which they did random sampling of field workers exposed to pesticides, upon the request of the CPS. CIDA no longer finances this program, and although Maradi MOH apparently has continued it, most other departments don't appear to be doing so. AELGA also funded the health personnel involved in the Niger Dieldrin Disposal Plan (NDDP).

Most recently, acetylcholinesterase testing has been supported by CIDA, and both DCP and the Ministry of Health are concerned about how to operate such a monitoring program in the absence of funding (see Appendix 4).

The SEA suggested that DCP be encouraged to collect information about the extent to which radio broadcast warnings before aerial applications have been followed by the population. This has evidently not been done on any formal level, although feedback to the CPS by villagers indicates an understanding of pesticide safety issues.

6.3 Pesticide Legislation

AELGA's encouragement of GON's establishing and enforcing appropriate legislation on pesticides appears to have been quite successful, and represents an effort to address pesticide safety

and environmental issues at what may ultimately be the most effective level.

AELGA/N funded DCP personnel travel to other African countries in order to form an information base for Nigerien pesticide legislation, and a pesticide legislation proposal was submitted to the GON and adopted in 1992. However, no means of enforcement was readily available. AELGA/N sponsored a regional seminar, resulting in the formation of a group of foreign and domestic experts. The legislation adopted in 1992 was further refined over six months of discussion, with enforceability in mind; it was presented once again in January, 1994.

The revised legislation has been passed by the President, and now needs to be signed by Congress. September, 1994 is the target for passage, and the legislation should be enforceable immediately (see Appendix 4).

6.4 Pesticide Storage

The 1989 mid-term evaluation concluded that pesticide storage conditions were poor, with some stocks stored outside and exposed to direct sunlight and extremely high temperatures. AELGA/N responded to the situation quickly and economically: about 64 grass mat sun shelters were constructed with AELGA/N support as a fast and cheap way of storing pesticides out of direct sunlight. The shelters were in place in 1991 at departement and arrondissement warehouse facilities, as well as at some airstrips. Shelters are no longer used for routine storage, as stocks on hand have decreased to the point that all can be accommodated inside warehouses. However, some out-of-date materials remain stored in grass mat shelters. In November 1993, it was reported that the CPS in Tahaoa had pesticides stored outside and exposed to direct sunlight.

In response to the mid-term evaluation's findings, AELGA/N financed sampling of DCP Niamey's warehouse compound soil. The sampling results played an important part in the decision to move DCP stocks to a newly constructed warehouse several kilometers from the inhabited area of Niamey. The warehouse has just been completed, using CIDA funding. AELGA/N will be installing safety and handling equipment. At that point, all stocks will be moved from the DCP warehouse to the new facility. It is anticipated that this activity will take place in late 1994.

Transfer of stocks from the DCP warehouse in Niamey to the new facility outside of the city will be a major transport activity which will occur in the near future. This will be an operation which could pose environmental and human health hazards, and should be supported by appropriate training of all personnel in pesticide handling and transport.

In addition to DCP's central warehouse in Niamey, there are 6 others in the departments. Conditions in some are still not appropriate for pesticide storage, though some improvements have been made with support from AELGA/N, the CIDA project, and GTZ. Training for warehouse personnel was provided by CIDA and AELGA/N. With this year's end of the project, there will no longer be salary or training for handling pesticides at the DCP warehouse. The last training course was given three years ago (see Appendix 4).

6.5 Pesticide Distribution and Logistics

The 1989 mid-term evaluation indicated that pesticide distribution was a difficult problem because of poor roads in some areas and a limited transport network. Prepositioning of pesticide stocks before locust/grasshopper outbreaks was cited as an effective way of meeting the problem, and it was recommended that AELGA provide funding for logistical and technical assistance.

AELGA's funding has not been used for technical assistance, but has been used to provide fuel for distribution and transport of pesticides, along with driver per diem; and AELGA has been encouraging early season prepositioning of stocks at the departemental and arrondissement levels. Materials transported using USAID funds must only be those approved by EPA and USAID (see Appendix 4).

6.6 Pesticide and Container Disposal

Surplus pesticides and empty containers still constitute a problem with public health and environmental implications. Currently, there are an estimated 6,600 liters of liquid and 12,495 kilograms of powder formulation of unwanted pesticide stocks in Niger. Disposal options have been requested by DCP, and the CIDA project will be funding the visit of a consultant in September 1994.

As a temporary measure addressing the problem, AELGA/N and CIDA are collaborating on construction of a fenced area at the new warehouse for storage of obsolete pesticide stocks and empty containers.

DCP is sensitive to the situation and has inquired at the government cement plant in Malbaza about incinerating the outdated stocks. A visit to the plant showed that it was a 40-year-old facility without filters in the stack and no emissions monitoring, and it would not be suitable for such an operation without considerable modification. GTZ has proposed that a cement kiln in Benin be developed as a regional disposal facility (see Appendix 4).

Basic concepts for AELGA's innovative Niger Dieldrin Disposal Program (NDDP) were developed at a Regional Workshop on Obsolete Pesticides and Empty Barrels held in January, 1990. Fifty six thousdands liter of dieldrin (more than twice that originally estimated to be on hand) were successfully consolidated, and removed from Niger to the Netherlands in 1991 for incineration. The program was an outstanding success, but the operation was also very expensive. **Preventing the build-up of unwanted pesticide stocks through development of appropriate legislation and the institution of a multilateral pesticide bank when needed are ultimately cost-effective ways of preventing the pesticide surpluses.**

7.0 CONTROL

A general recommendation in both the AELGA mid-term evaluation and the SEA was better prepositioning, planning and coordination in grasshopper and locust control efforts. A primary concern, in both intervention and surveillance, was overuse of aircraft in the south and inadequate use in the north. The evaluation recommended using the Nigerien fleet (as well as donated aircraft from neighboring nations) to control locusts in the north, where the terrain is remote and largely inaccessible, and employing the ground survey and spray capabilities in the less remote, populated areas of the south. Since 1992, however, as a result of the security problems in the north, the DCP redirected its aerial operations from the north to the south.

The SEA strongly encouraged USAID/W to support IFAD and FAO initiatives in promoting a good prevention program, which would diminish the need for large-scale treatment. It encouraged the adaptation of the three phase treatment strategy, including early pest population treatment, limiting pesticide use on range lands and protected areas, and avoiding late season control operations.

Since 1989, the overall strategy for the coordinated use of surveillance teams, egg pod survey, aerial operations, village brigades, ground application and radio communication has greatly improved (see Appendix 5). The specific AELGA funding for radio equipment, vehicle fuel, training, aircraft operations and technical assistance has had a very positive impact on the effectiveness and efficiency of the CPS.

7.1 Aerial Control

7.1.1 Logistics

The mid-term evaluation advocated that AELGA support aircraft operations, specifically, airstrip repair, maintenance and insurance. AELGA has been the prime donor in Niger's aerial

survey and application programs, financing the vast majority of its training and operating needs (see Appendix 6).

AELGA provided aircraft maintenance by supplying spare parts, helmets, tip tanks, very high frequency (VHF) radios, GPS units, and survey maps. It also financed the aerial base with a base radio and battery charger, and a non-directional beacon. In 1994, AELGA/N is allocating $10,000 for aircraft spare parts, and $44,000 for fuel. It generally pays for 3/4 of the aerial operation fuel requirement, while the GON pays for the other quarter. The aircraft insurance, as specified in the mid-term evaluation, was not provided, though in 1992, private use of the fleet generated enough money to pay for insurance. The GON pays for the insurance now. In April 1992, AELGA/N discussed financing a technical assistant to assist in drafting a proposal for DCP aircraft fleet management. This issue has re-emerged and is being considered once again.

CIDA funded airstrip reparation in 1990, while AELGA/N financed the construction of pesticide shelters at many of the landing strips. They are now in disrepair, however, and many airstrips do not have shelters. AELGA/N also developed a plan, that was never implemented, to construct aprons at the strips for collecting discarded pesticides. This plan ran into problems with administrative coordination between USAID/N and CIDA. Currently, pesticides are being dumped on the ground next to landing strips. **It is important that USAID/N and other donors collaborate to realize a more effective airstrip in Niger.**

7.1.2 Application Technique

The SEA commended USAID/N for following the PEA recommendations on using helicopters for surveys to support ground and air control units, rather than for spraying, except when precision spraying or localized treatment in difficult to reach areas is required. During the 1992-1994 Desert Locust outbreak, however, control operations were not conducted in the northern part of the country due the Tuareg rebellion there.

The SEA also supported minimization of spraying large areas, but stipulated need for a well-equipped and effectively managed survey and control system, with spot treatments only where locusts or grasshoppers are sighted.

Since 1990, the percentage of hectares sprayed annually by aircraft has decreased, while the percentage sprayed by ground crews grew. However, the overall use of pesticides in recent years has diminished, principally for four reasons. First, the CPS now has enough people in the field to supervise and support control operations. Second, the DCP has improved the overall technical skills of CPS personnel (e.g., training on egg pod

surveys in the early 90's allowed them to pinpoint areas to be treated more specifically). Third, SYSAPEC observation posts can now verify the location and type of insects, and the need for and type of pesticides, reducing the need for chemical applications.

Additionally, the DCP has recently drafted a new policy, which has yet to take effect: instead of responding to all infestations with a spray program, they propose to intervene only in cereal crops, and disregard cash crops. Cash crop producers, it is rationalized, have money to pay for their own pesticide treatment. The DCP may act as a technical advisor to cash crop growers, once the pesticide legislation is enforced, but will not use DCP pesticides to protect against insects. CIDA is presently reviewing this draft policy.

7.1.3 Targeting

The mid-term evaluation advocated funding ground crews to assist aircraft in locating targets by using flagging and air-to-ground radios, along with pilot training in pesticide application methods. AELGA/N has subsequently provided all the necessary equipment and means to assist aircraft in locating targets, such as radios, GPS units, vehicle fuel, camping equipment and personnel per diem, as well as pilot training. The current system of aircraft targeting has been very successful, by accounts of both air and ground DCP personnel (see Appendix 7).

7.1.4 Pilot Training

A course on ULV pesticide application and calibration for CPS personnel on ground and aerial control teams was conducted in April 1989 to address the chronic problem of equipment calibration and application technique. Since locust kill estimates were not conducted in 1989, the effectiveness of the very low rate of pesticide application was unknown. The mid-term evaluation, therefore, recommended the training and insisted that it be conducted by a French-speaking technical expert and that it be attended by field personnel, rather than high level officials. The mid-term evaluation suggested that further training in spraying operations along with field monitoring was needed. By 1991, after an analysis of aerial operations and application technique, the SEA concluded that these issues were adequately addressed.

Between 1991 and 1994, AELGA/N funds were allocated to per diem for the Luxembourg pilots and crew operating two ag aircraft for two months (200 hours) of the grasshopper/locust control campaigns. The cost per month for one person is 4,839,995 CFA (not devalued, approximately $17,600). Although this measure fits within the AELGA mandate, it is extremely expensive and does not promote internal capacity building. **An alternative would be**

to train more Nigerien pilots in agricultural spraying.

The lead DCP pilot has consequently requested AELGA to fund his agriculture pilot instructor training in the US so that he may then instruct other pilots in Niger. (He has taken his role in the pest control effort very seriously and has proved to be a tremendous asset to the program.) This would entail three months of instructor school plus one month of ag instructor training. Failing acceptance of this proposal, AELGA has been requested to fund ag pilot training in California for two more Nigerien pilots, similar to the program the lead pilot attended in 1987.

7.1.5 Safety

Concern about health and safety issues has been a continuous part of the AELGA mandate. According to the DCP aerial operations section, all pilots fly with masks and safety equipment. They apparently adhere to the regulations of washing out airplane tanks between changes in chemicals, and dispose of unused pesticides at the most remote air strips possible. At this point, there is no other disposal method for excess pesticide in aircraft tanks, or for tank rinsates.

Before aerial application, the CPS alerts the local population of the impending operation, warning them to stay indoors, not to go into the fields, to cover their water containers and to never eat any grasshoppers or locusts afterwards. These announcements are also broadcast on the radio and spread around the markets.

Nevertheless, there is a problem with people consuming sprayed grasshoppers. Police have been known to confiscate insects being sold in the market after a local spray operation. Sprayed birds that are fat from feeding on rice grains are apparently consumed in large quantities, particularly around the Tillabery region, despite public warnings. Although there are no recorded cases of human poisoning from eating locusts and birds, this could be a potential health hazard.

7.1.6 Coordination

AELGA is mandated to facilitate cooperation among donor organizations. AELGA's participation in the donor committee throughout the latter part of the 1992-1994 locust outbreak was key to rapid response to emergency needs. The committee, consisting of the major resident donors such as USAID represented by AELGA, GTZ, CIDA, etc., along with Algeria, Morocco, and multilateral and regional organizations such as FAO and OCLALAV, was well-organized and effective in responding to the requirements of the campaign. However, since this last locust outbreak, the donor committee has grown fairly lax. The FAO representative in Niger is very knowledgeable and informed on

locust and grasshopper situations in Africa and will be able to coordinate a quick response to pest outbreaks at the donor level.

The current grasshopper problems have been more loosely resolved, by means of consistent contact on an informal basis. There appears to be little duplication of effort in recent years.

7.2 GROUND CONTROL

The mid-term evaluation encouraged the use of ground rather than aerial control in the crop-producing areas. It advocated increasing ground control effectiveness by better planning and prepositioning of equipment and commodities, village brigades deployment, and egg pod surveys.

Even though the security situation in the north has precluded the use of aerial applications there, the marked improvement in Niger's ground control program since 1989 has eliminated some of the need for aerial operations in other places in Niger. Because grasshoppers have supplanted locusts as the greater threat to crop protection in Niger since 1990, ground operations have been targeted on grasshoppers. Whether or not ground control operations could effectively be concentrated on locusts and other pest populations could not be determine at this time. Both the percentage of area treated by air and the overall use of pesticides decreased in 1993, largely as a result of some of DCP's grasshopper control efforts.

7.2.1 Logistics

In support of ground control efforts, the mid-term evaluation recommended that AELGA provide funds for vehicle fuel to help for prepositioning pesticides, surveillance, ground support of aerial treatment, and ground control operations. In response, AELGA/N established a gas coupon system, stipulating that non-USAID-approved pesticides may not be transported using these funds, and that they be used solely for the above activities. AELGA/N recently authorized the use of USAID fuel also for rodent control. In the Zinder region, where rodents are most prevalent, the use of AELGA funds to suppress rat and gerbil populations is essential to crop protection.

The supply of gasoline has been crucial to the entire crop protection effort. Without this kind of fundamental support, the survey and control operations would have been greatly reduced. Nevertheless, the program has not been without its troubles. On the US Government side, the system requires justification of gas expenditures before replacement fuel coupons can be issued. This provides a good control and reduces the possibility of

inappropriate use. However, maintaining the complicated documentation process often slows down the fuel distribution to the point of stalling. On the GON side, the Department of Agriculture adds another bureaucratic layer by requiring the coupons to go to its department at the district level first before the coupons can be distributed to the CPS. Although AELGA and the DCP recently developed a new record keeping system, the underlying problems have not been solved. A rigid monitoring system could likely become a bureaucratic constraint to quick emergency response.

Consequently, pesticides are not prepositioned readily or easily for lack of vehicle fuel. Another important repercussion is the difficulty obtaining gas for emergency pesticide distribution and control operations in a timely manner. This disrupts any preparedness gained through training and improved resources.

Because AELGA funding provides fuel solely for prepositioning, survey and treatment, and requires very detailed accounting, operational requirements such as training and information dispersal to village brigades, as well as visits to arrondissements, are not possible using USAID gasoline. The Canadian's PNC project has funded fuel for fulfilling these needs up to this point, but there is grave concern for the future of these requirements once they leave.

Another problem is the great distances both between some departments (such as Zinder) and Niamey, and between departments and arrondissements. Some arrondissements do not have gas stations, which makes the procurement of fuel both impossible without going into the cities and also costly.

AELGA/N also allocates money for vehicle spare parts. The bulk of those on hand are commonly replaced parts, such as air filters and spark plugs. While this is very valuable, there is a serious problem in procuring less accessible motor parts. Consequently, numerous transportation cars and distribution trucks lie broken and immobilize awaiting repair. One fundamental reason is the lack of Toyota distributors in Niger; all parts must be ordered, which can take an entire campaign season.

AELGA also supplies camping equipment for ground control teams needing to spend extended amounts of time in the field, and provides per diem for them. The per diem process, however, suffers from two administrative problems. First, most CPS personnel do not have enough money on hand to bring a sufficient amount with them. This requires a payment of per diem in advance, which is difficult to get from USAID. Secondly, the USAID paperwork for reimbursement is tedious and complicated, and often results in rejected vouchers. Moreover, the actual payment could take up to 9 months by the time the request has been adequately submitted. Then, each CPS agent must travel to Niamey

in order to cash the check. Although this system offers some degree of control, it is extraordinarily cumbersome and tends to negate the real purpose behind per diem. It is critical that USAID/N establish a more realistic and effective administrative system for per diem travels.

7.2.2. Application Technique

Although pesticide treatments were not monitored, better ground control techniques have presumably resulted from the Department of Crop Protection Training (DFPV) center. Through DFPV and other training centers, AELGA/N has helped finance courses for other Western Sahelian countries in intervention techniques, grasshopper identification, greenness map reading, radio use, vertebrate pest management, environmental issues, and warehouse management, among others. In addition, AELGA/N funded a calibration training in April 1993 that instructed CPS technicians on both ground and aerial equipment calibration methods.

7.2.3 Village Brigades

The mid-term evaluation encouraged the strengthening of village brigades. However, because both CIDA and GTZ were concentrating on building up the capacity of Niger's village brigades, AELGA relegated itself to collaborating on other training programs.

There are more than 34,500 farmers who have been trained and equipped by CIDA to handle grasshopper and locust infestations as a first line of defense (see Appendix 8). Their training includes safety and health measures, disposal methods, insect identification, application technique, storage, and severity assessment. Village brigades interviewed appeared to have assimilated and retained the appropriate information.

Village brigades principally use ULV formulations, because powder formulations were reported to be awkward and dangerous to mix, necessitate hard to come by water, need 10 kilos per hectare to treat vs 1.5 liters per hectare with ULV, and the equipment to disperse non-ULV formulations is more expensive, ULV sprayers also require fuel unless they are exhaust nozzle sprayers or battery operated, and breaks down more easily than that used to disseminate the pre-mixed ULV solution.

The effectiveness of the brigades' quick response could be constrained by the difficulty of obtaining AELGA-funded fuel to pre-position pesticides prior to and during emergencies. Concurrently, there has been a shift away from using village warehouses in favor of using district storage facilities in some

arrondissements. The rationale given for this was to better govern the use of pesticides.

8.0 ENVIRONMENT

Both the 1989 mid-term evaluation and the SEA stress environmental concerns in Niger, with some measures recommended for mitigating the environmental impact of pest control activities. These include monitoring and sampling to determine impact of spraying on the environment, mapping and avoiding treatment of environmentally sensitive areas, use of alternative control methods, and minimization of areas sprayed through accurate pest monitoring and forecasting.

Many of the AELGA/N activities discussed in this evaluation address these measures; some others, such as environmental monitoring, will need to be developed. Environmental impact mitigation issues become especially prominent with the shift of AELGA-like activities to the DPM program (see Appendix 9).

DCP has been reducing amounts of pesticides sprayed, and areas covered, over the past several years. This trend results from the reduced amounts of pesticides that are entering the country, as well as the great improvement in DCP inventory/management procedures. The SYSAPEC observation posts have contributed to this trend as well. SYSAPEC posts allow timely and accurate verification of infestation reports, and on-site monitoring of situations by a DCP agent. The outcome has been better information on which to base intervention decisions.

The 1989 evaluation referred to environmentally sensitive areas in Niger, and mentioned an "awakening environmental consciousness." In interviews with CPS personnel, there was no indication that control programs took environmentally sensitive areas into consideration. **Aerial and ground spraying of avicides are routinely done on the rice croplands close to the banks of the Niger River**.

One significant change in operations by DCP is in the draft stage: DCP plans in the future to intervene in cases of cereal crops only, not cash crops. A private network will need to be developed for distribution of control materials for cash crops, and DCP will act in a technical advisory capacity only. The policy change will require training of private sector people to distribute, manage, handle, transport, and apply pesticides. There is a need for a workshop for private sector importers and distributors of pest control materials prior to DCP's concentration only on food crops.

8.1 Monitoring [Ecotoxicology]

A great deal remains to be done in building an environmental monitoring capacity in Niger, but as a beginning step, AELGA sponsored a DCP team's visit to Dakar to evaluate possibilities of affiliating with the FAO-sponsored Locustox Project. Locustox is compiling information on environmental impacts of locust control programs. The program supports research on pesticide effects on non-target organisms, as well as fates of residues in soil and water. It also screens pesticides, develops methodologies appropriate to specific situations, and trains scientists from the region. Another team will be sent to Dakar to finalize a Memorandum of Understanding (MOU) between DCP and Locustox. The MOU will allow DCP access to the Locustox information and will allow participation in Locustox research and training.

An operational gas chromatograph at the Ministry of Health analytical laboratory gives GON the capacity for pesticide residue analysis. This semi-private analytical laboratory is capable of analyzing soil, water, and foodstuff samples. DCP has been able to use the laboratory for analyzing pesticide formulations and active component concentration. The sample analysis capacity of the apparatus actually gives Niger the theoretical capability of being a regional center for analysis of pesticide residues. The facility belongs to the Ministry of Health: access to it is limited, and the Ministry may be unaware of the potential value of sampling (see Appendix 9). **Collaboration with the Ministry of Health will be needed for enforcement of residue tolerances.** USAID/N should sponsor informational sessions for Ministry of Health, Ministry of Livestock, and DCP on existing capacity for residue analysis and present possibility of Niamey acting as a regional analytical center.

8.2 Sensitive Areas

The SEA recommended that AELGA/N develop a document for DCP on identification of environmentally sensitive areas and recommendations for developing appropriate treatment strategies (including no treatment). AELGA has urged DCP to limit spraying of sensitive areas, but it has not provided specific assistance in recognition of the areas or mitigation of control measures. There has been no systematic attempt at mapping environmentally fragile areas in Niger. These areas include wetlands and the entire northern portion of the country, in addition to a system of national parks, game reserves, classified forests and nature reserves. The Niger River itself, along with associated wetlands, constitutes a major sensitive ecosystem. **There is a critical need for discussions on the development of a program to measure the adverse effects of pesticides on the environment.** The Worldwide Fund for Nature (WWF) has been active in Niger and has baseline data on flora and macrofauna in various habitats.

It has no data on non-target arthropods, but has expressed willingness to cooperate with USAID/Niger in measuring the adverse effects of pesticide use.

8.3 Training and Public Awareness

The 1989 mid-term evaluation recommended a regional conference for senior government personnel. It also recommended that AELGA support organizations with environmental concerns.

AELGA sponsored a national workshop on Environmental and Human Health Impacts of Pesticide Use in June, 1993, and has developed an educational pamphlet on environmental impact of pesticides. There is, however, no evidence on the impact of this workshop on operational activities. The procedure in aerial operations is to avoid bodies of water when spraying, to wash out tanks as pesticides are changed, and to dispose of unused chemical pesticides at remote air strips. These measures are more a result of pilot training in the U.S. rather than information distributed in Niger.

9.0 RESEARCH

The 1989 mid-term evaluation recommended that support of research on control alternatives, either in terms of alternative pesticide formulations or control techniques, should be continued. The research projects and methods require supervision, however, and a peer review process should be instituted. Researchers should work in close collaboration with national research organizations.

The major agricultural research organization in Niger is the National Institute for Agricultural Research, located in Maradi, and mandated by GON to carry out ag research throughout the country (see Appendix 10).

AELGA-supported research is not being done in Niger, although opportunities for future activities seem plentiful. In the past, the AELGA/W project funded a Neem research project. Many of these studies have shown that neem could be developed as a source of viable crop protection agents such as control of crop pests and disease transmitting insects, fuel wood, construction, soil amelioration, shed, and other purposes. Niger could play a critical role in further developing these kinds of initiatives.

The recent CFA devaluation and dwindling numbers of donors make pesticides extremely expensive, and DCP is now interested in finding alternatives to the techniques and materials in standard use for insect control. **Mechanisms for submission and review of proposals, and monitoring of research activity need to be developed and communicated to DCP and the Universities in Niger.**

Proposals for research on alternative control techniques should also be solicited from researchers outside of Niger. It is possible that, through AELGA/W, research being successfully conducted on locust biological control will be expanded from other African countries to Niger.

9.1 Biological Control

The Departement de Formation en Protection des Vegetaux (DFPV), located at the AGRHYMET site in Niamey, began biological control investigations on locusts and grasshoppers at the end of 1989. The pathogen being considered was a fungus in the genus *Metarrhizium*. The research has been funded primarily by the Netherlands, but intriguing possibilities exist for collaboration with US researchers.

Montana State University has a project which is examining prospects of locust/grasshopper biological control by *Beauveria bassiana* and *Metarrhizium* funded by AELGA/W in Mali, Cape Verde, and Madagascar, and both genera seem equally likely as potential control agents. If MSU received support from AELGA to conduct its research in Niger, the two projects would need to be carefully coordinated to prevent duplication of effort (see Appendix 10).

9.2 Traditional Methods

AELGA/N has not been supporting research in traditional methods of insect control, but CPS is now interested in exploring traditional methods of insect control as a way of reducing dependence on costly and sometimes inaccessible pesticides; and mitigating the public health and environmental effects of chemical control.

Traditional (cultural) grasshopper or locust control methods are not conspicuous in Niger. Millet with long spikes might be planted because growers are aware that the plants are less attractive to grasshoppers, and mixtures of crop species may be planted as a way to "spread the risk" of insect damage. Traditional locust control methods such as digging up egg masses, or digging trenches in the path of advancing hopper have not been observed much recently, as populations have become accustomed to waiting for application of pesticides (see Appendix 10).

10.0 TRAINING

The problem of locust/grasshopper plagues can be averted through long-term development and research processes, although it is equally important to recognize that ongoing outbreaks and plagues must be dealt with in an emergency context in order to help maintain food security. Also, institutional development including training, cannot eliminate the possibility of future outbreaks, but it can conceivably facilitate early interventions to mitigate outbreaks and avert plagues. The AELGA Project Paper and subsequent amendments addressed the critical needs for training to address the long-term problem of pest outbreaks. Through its own initiatives and collaboration with other donors, the AELGA project has in the past, and continues to serve as a critical agent for the long-term institutional development of the DCP's capacity to combat current and future pest outbreaks (see Appendix 11).

The Niger-Canada Project for Plant-life Protection (PNC) has been active in institutional development in the past 20 years. Its main objectives included: short-, medium- and long-term training for DCP agents; training village brigades; and environment/human health strategy development and implementation. At the field level, about 34,500 farmers have been trained in crop protection activities across the country. About 1,000 women were trained in garden crop protection including spraying, safety precautions, and neem extract use. In addition, 15 women have completed agriculture advisory training at the Kollo agriculture training center and are assigned to different DCP units. The project is now in its final year, and its disengagement could have far-reaching implications unless training is continued as appropriate.

The DFPV has also contributed greatly to institutional development in Niger. Its objective is to contribute to food self-sufficiency by improving the protection of crops and stored products against pests, diseases, and weeds (see Appendix 12).

Since 1989, most of the mid-term evaluation's recommendations on training have been followed and pursued by Nigeriens. As a result of both indigenous and donor efforts, Niger has made great strides in improving its capacity to mount effective, organized, and environmentally sound anti-pest management.

11.0 FUTURE DIRECTIONS

Food security in Niger is largely dependent on adequate crop protection. Crop loss due to pests averages 35% worldwide; post-harvest loss adds another 10-15% to the losses. Chronic drought conditions tend to favor or even trigger major pest outbreaks, particularly in the arid and semi-arid regions of Africa. Such infestations can ravage the crops of subsistence farmers and result in famine.

Niger's Air Mountains are a key breeding ground for the desert locust, which, if left uncontrolled, can devastate huge portions of farmland and spread across all of Sahelian Africa, the Horn of Africa, the Maghreb, the Arabian Peninsula, and Western Asia to India. Early intervention against population upsurges is vital to protect Niger and its neighbors, and can preclude re-infestation by successive generations.

Although Niger has not been plagued with major locust outbreaks for several years, the threat remains. Recently, however, the Senegalese grasshopper has destroyed vast amounts of crops and, though less dramatic than the locust, is a more chronic menace to agriculture, causing significantly more damage over time. Other pests such as birds and rodents also pose a serious risk to Niger's food security.

The future of pest management in Niger is greatly dependent on the quantity and quality of attention it receives and resources that are allocated to it in the coming few years. This is a transitional time regarding crop protection in Niger due to the disengagement of many donors, and the development of a new strategy within the DCP.

The overarching goal is the complete evolution from emergency intervention during plagues to preventive pest management, and from donor-driven to national and regional self-sufficiency with auspicious, comprehensive, and self-sustaining operations (see Appendix 13). Because of the enormous gains made in DCP over the past five years, the relative competence with which it currently operates, and given appropriate guidelines and assistance, the DCP can realize this objective.

Should this evolution fail to occur, Niger's crop protection capability would likely fall back into a state of decreasing proficiency and increasing dependency on foreign aid and technical assistance, pest problems may erode the agricultural base, and food insecurity will inevitably result. At that point, mitigation and prevention initiatives will have become things of the past as once again foreign donors would intervene on an emergency bases in an attempt to prevent widespread crop disaster and famine.

USAID/N's role in this evolution is critical. It's own developing direction in disaster prevention and mitigation should include three essential elements: First, it is vital to maintain a strong focus on pest problems; Second, it should support every effort to promote and facilitate self-reliance of DCP; and third, it must coordinate closely with the DCP and other agencies involved in pest management and crop protection.

11.1 DPM and Crop Protection

11.1.1 Organizational Mandates and Opportunities

The Disaster Preparedness and Mitigation (DPM) program stands to be a prototype model project for disaster preparedness, mitigation, and relief at the USAID Mission level. Therefore, it is vital that DPM seriously address the critical role crop protection/pest management plays in food security and disaster mitigation in its overall structure and mandate.

In the midst of its own organizational changes, unless substantial focus is allocated to crop protection issues, there is a risk the DPM will lose the hard work AELGA has contributed to the proficiency of the DCP. AELGA funding in the past six years has virtually sustained Niger's aerial survey and control operations. It has also provided the necessary fuel for ground survey and control, essentially built the entire communication network, and contributed to the expertise level through training. Without these and many other significant efforts, DCP's capacity to handle pest outbreaks would have been seriously flawed. Given the marginal food production capability in Niger, the potential gravity of crop loss due to insect and rodent infestations, and the resulting possibility of famine, it is vital that AELGA issues play an important role in the DPM.

Through the DPM's Initial Environmental Examination (IEE) and the Project Paper, DPM is **required** to deal with pest outbreaks. The SEA for Locust and Grasshopper Control in Niger must also be reviewed and observed as part of DPM's efforts to address pest outbreak problems. Specifically, due to the administrative transfer of AELGA to DPM, AELGA's obligation to support the Directorate of Crop Protection now falls under DPM. This includes short-term technical assistance and training, maintenance of communication systems, surveying (e.g., aircraft rental for surveillance and characterization of infested areas), and commodity procurement for items such as greenness maps, fuel, radios, and spare vehicle and airplane parts. Any emergency pesticide procurement and use under the terms and conditions of the PEA and the Niger SEA, must therefore conform to the pesticide procedures set forth in AID Regulation 16 (22 CFR Sect. 216.3).

Specific issues in the SEA for locust and grasshopper control that need to be addressed by DPM should include: 1) alternative disposal of obsolete pesticide stocks, 2) disposal of empty pesticide containers, 3) monitoring human exposure to pesticides, 4) provide health personnel with training and workshops on pesticide related issues, 5) monitoring and sampling for impact of spraying on the environment, 6) mapping for locust survey, 7) selection of pesticides, 8) survey and communication, 9) minimize areas sprayed, 10) economic data and economic thresholds, 11) personnel support and training to ensure sustainability of the national capacity.

At the PACD of the AELGA/N project on December 31, 1994, DPM is expected to incorporate activities similar to those currently managed by the AELGA project into its program. The DPM program, a sector grant with a discrete project component, is a five-year, $18 million effort designed to improve the disaster early warning, preparedness, planning, and response capabilities of the GON, while reinforcing local capacity through decentralized projects. Crop protection is an important part of this process, but it is so far not a definite element of DPM's planning.

DPM has two components: non-project assistance and project assistance. The $10 million non-project assistance component includes policy, legal and institutional reforms, and establishes the program's emergency fund. The emergency fund will finance smaller-scale food shortage-related disaster relief, and promote mitigation efforts. Although emergency pest control as well as mitigation activities fits into this category, there is no indication that any mechanism is in place for the implementation of a long-term pest management program.

The $8 million project assistance component will finance long-term technical assistance, USAID administrative support, the DRU transition, commodities, training, studies, pilot activities for disaster mitigation, and evaluations and audits. This component includes DCP financing and on-going support for crop protection activities.

The DPM project is being implemented by a team from the RONCO Consulting Corporation. The RONCO team in Niger brings a blend of technical expertise and experience in financial management, famine early warning and response, training and institution building. However, currently the team lacks technical expertise for addressing pest management and crop protection concerns. In January 1995, however, a new position is expected to be added to the RONCO team. It is particularly important for DPM to maintain a level of experience and knowledge of crop protection issues during the transition phase. One way to guarantee a focus on AELGA concerns is to create a Crop Protection Specialist position as part of the DPM team. This would ensure adherence to IEE stipulations and SEA recommendations and address the critical

role pest management plays in food security in Niger. It would maintain the necessarily concentrated focus on critical crop protection issues during this transition period and beyond, and provide a conduit for immediate response to emergency outbreaks of locust, grasshopper or other pests, should they occur.

11.1.2 Environment

Environmental issues that are currently under AELGA's direction will fall within DPM's mandate at the end of CY 1994. These issues include environmental monitoring, pesticide management, and health and safety, among others, and specific actions are recommended in the SEA. These are critical, not only to the preservation of Niger's fragile and beleaguered ecology, but to the protection of its agricultural production capacity, scant as it is.

Part of an overall pest management system is monitoring treated areas for potential environmental effects of pesticides, as a means of determining ways in which to refine their use. Monitoring can indicate negative effects on flora and fauna, as well as detect improper application methods which can harm human health and increase operational costs. Although monitoring tends to produce variable results, it can be a valuable feedback tool in control operations and can be used in designing modifications of pest management activities. Hence, a DPM-sponsored activity may be measuring pesticide residues in the environment as a means of monitoring. An example of a possible DPM-funded activity in this area would be training of CPS technicians in appropriate environmental monitoring methodologies.

Pesticide disposal is yet another issue DPM will have to confront in response to SEA recommendations. Although the NDDP was a spectacular success, obsolete and degraded pesticides and pesticide containers still constitute a threat to human health and the environment in Niger. This is an issue that will remain prominent until stocks of other obsolete/unwanted pesticides are disposed of and legislation is in place that prevents buildup of surplus stocks. DPM should work with the DCP to develop a policy for the disposal of pesticides and the prevention of new disposal problems.

The current AID policy of puncturing, crushing, and burying empty containers is of dubious value in Niger, as the empty containers are a valuable commodity in the country. USAID/N has begun addressing the issue by drafting a "Prototype Barrel Disposal Plan" for empty organophosphate pesticide containers. The draft plan suggests use of the containers as fences, road markers, and young tree protectors. The plan has been submitted to the DCP, GTZ, and CIDA for review and comment. This draft plan should be critically reviewed before implementation. This is an initiative

that DPM could pursue.

Another environmentally significant issue is DCP's proposed policy shift to only intervene in insect problems on food crops, and not on cash crops. USAID will need to monitor this situation carefully, as the result could be the proliferation of a private sector network to procure, manage, handle, and apply pesticides. Although the intervention policy change reduces the amount of pesticides applied under the auspices of DCP, the existence of this network that may run parallel to DCP's pest control structure may be problematic. It could conceivably increase the overall need for environmental impact mitigation, pesticide safety measures, pesticide storage facilities, and training in pesticide management, and application in Niger.

Attainment of food security by Niger requires that locust/grasshopper issues not be viewed in isolation from other crop-destroying organisms. All of these pests are a part of the complex of plant-feeding species which compete with the human population for food, and they will need to be considered by any program which attempts to develop self-sufficient agricultural systems. Food security in Niger is contingent not only on locust and grasshopper control but protection from other crop-destroying organisms such as quelea birds, rodents, bean aphids and tree locusts. All of these pests are a threat to food security, and must be considered by DPM in its mitigation activities.

11.2 DCP and Capacity Building

11.2.1 Self-Sufficiency

The next few years will be a crucial time in the future of Niger's crop protection program, and, therefore, in the future of its food security. Major donors are either leaving Niger permanently or reducing their roles significantly. The DCP must now assemble its resources and attempt to initiate an evolution toward self-reliance.

CIDA, through the Niger-Canada project for plant-life protection (which has been in Niger for two decades), is leaving Niger at the end of December 1994. Canada has been the single largest contributor to the DCP and has played a critical role in developing its capacity to handle pest outbreaks. Although CIDA has developed a disengagement plan containing a strategy for increasing the DCP's financial resourcefulness, it is doubtful that the DCP will be able to continue at the high level of effectiveness developed over the past 5 years without outside funding.

The Canadian plan contains many crucial recommendations (see Appendix 14) for increasing DCP's internal capabilities and

making DPC more self-sustaining with income-generating projects, such as the Pilot Project (see Appendix 15). However, given the financial situation of both the majority of the Nigerien population and those in neighboring countries requiring pest management, the likelihood of the DCP being able to collect enough operational funds from crop protection recipients is poor. Consequently, DCP will continue to require a certain amount of foreign assistance to maintain its present capacity to combat agricultural pest problems.

The SEA (and PEA) strongly recommends developing the self-sustainability of the DCP. It suggests support for conferences, workshops, short and long term training, research, and technical assistance to promote self-sufficiency. Continued provision for AELGA concerns inside DPM should be augmented by increased support for income-generating projects within the DCP. In light of the global reduction in foreign aid, upcoming projects should have a clear focus on improving self-sufficiency. Fortunately, the Niger DCP currently has a substantial number of competent individuals with innovative ideas who are interested in developing such projects. DPM should make every effort to encourage this type of self-motivation.

One example of this type of effort is the Pilot Project mentioned above. AELGA has provided perdiem for 4 Luxembourg air crew for the campaign season for several years now. The cost per person for one month is nearly equivalent to 3 years of salary for one Nigerian pilot. The per diem money could be used instead to train other Nigerien pilots and to assist in promoting their efforts to provide aerial services for purposes other than Niger's grasshopper and locust campaigns, such as campaigns in Mauritania and Senegal which have later pest outbreak seasons, as well as aerial photography and geological survey.

Another example, is the expansion of the use of the gas chromatograph at the Ministry of Health analytical laboratory for pesticide residue analysis. This lab could be the testing center for the entire Sahel, instead of continuing the normal practice of sending specimens to Europe to have them analyzed. In addition to management training and other program-development assistance, the DPM program should also encourage these kinds of initiatives.

11.2.2 Integrated Pest Management

Increasing the DCP's self-sustainability will involve reducing its dependency on foreign-donated pesticides. Integrated pest management (IPM) is a means toward achieving this by using all available control methods to produce the most environmentally and economically sound management program. IPM is not an alternative to chemical pesticides but may reduce their use by applying them

more judiciously. Determination of intervention thresholds, correct timing of sprays based on pest population dynamics, and use of non-chemical control tactics are among examples of modern and prudent pest management methods.

IPM can decrease pest losses, lower pesticide use, and reduce overall operation costs, while increasing crop yield and stability. Successful IPM programs have been developed for a variety of pests on various crops. Specifics of an IPM program will depend on the crop, cropping system, pest complex, economic values, social conditions, availability of personnel, and other factors and constraints.

DPM should encourage the development and use of IPM tactics to decrease pest-induced crop losses, lower pesticide use, and reduce crop protection costs, while increasing harvests and stability.

11.2.3 Preventive Control

Concurrently, a preventive control strategy can have a tremendous effect on the amount of pesticides used. The anti-locust campaign from 1986 to 1989 employed a reactive strategy, when unpreparedness and lack of early control in key breeding areas permitted gregarization, swarm emigration, and breeding in other regions without disruption. Costly and widespread emergency operations were then necessary to protect crops from large locust invasions.

DPM should promote a proactive and preventive, rather than a reactive pest management strategy. This requires surveillance and monitoring capabilities at national and regional level. Such a strategy requires intensive surveillance between plagues, and during the transition from solitary to gregarious phases. Enhanced survey and forecasting (including the use of remote sensing and global information systems) could be combined with the least toxic control tactics to hold locust populations in recession indefinitely throughout locust recession distributions. Preventive measures should also be developed, as appropriate, for grasshopper infestations. Sustained adherence to preventive measures can effectively reduce pesticide requirements.

Proactive intervention has already been used for locust and grasshopper control in Niger by conducting egg pod surveys and prepositioning pesticide stocks and equipment. However, the diminution of funding prevented egg pod surveillance last year, and reduction in other support could decrease future prepositioning programs. **DPM needs to encourage and support preventive, minimal-cost control strategy.**

11.2.4 Traditional Control

Another pesticide-reduction measure is the use of traditional, non-chemical methods of combating pest outbreaks. A number of factors have coalesced to present an especially strategic time for building the capacity of the DCP to identify, evaluate, and institute traditional controls. The recent CFA devaluation has caused pesticides to become extremely expensive in Niger, and reduced donor activity results in smaller quantities of pesticides available. CARE and the World Bank have shown interest in supporting Nigerien traditional methods projects, and the GON is increasingly aware of the importance of mitigating environmental impacts during pest control programs. Consequently, traditional methods of insect control are becoming a high priority within the DCP.

Evaluation of traditional method effectiveness should be an important component of the DPM program, as will implementation procedures. Some methods are simply environmentally inappropriate, such as cutting down trees to prevent quelea birds from nesting; some require considerable labor from farmers who are accustomed to waiting for chemical control. The fact that economic constraints as well as environmental impacts now drive the DCP interest in traditional methods should make the task of convincing growers easier.

11.2.5 Biological Control Research

There may be biological control options in a preventative context that will also reduce the overall use of pesticides. The fungal pathogen *Beauveria bassiana* has been tested by MSU in the US and in parts of Africa to assess its control potential for locust/grasshopper. Another pathogen being considered is the fungus *Metarrhizium*. Additional work will be needed to determine if these fungual pathogens can specifically be useful for locusts/grasshoppers control in Niger, climatic and environmental conditions in the field will impact the microbial control agent, and formulation appears to play an important part in the longevity of these materials under field conditions.

Large population explosions of locusts/grasshoppers might be conducive to the development of epidemics of endemic pathogens. At the time of population collapses a search for more effective pathogens would be appropriate. The search for indigenous pathogens should be done in collaboration with institutions that possess the experience and equipment necessary for pathogen survey, isolation and characterization.

DPM should support research on the use of microbial agents for locust and grasshopper control, such as that currently being funded by AELGA/W, as well as other donor projects. Montana

State University is currently administering a biological control project funded by AELGA/W in Cape Verde, Mali, and Madagascar. Preliminary results indicate that biological control may be effective, especially if used as part of an overall biointensive IPM program. **USAID/N should invite AELGA/W and MSU to explore initiates in developing a biological control program in Niger.**

11.3 Coordination

11.3.1 Niger Coordination

The current changes taking place regarding AELGA/N, DPM, USAID/N, and CIDA disengagement related to crop protection should be discussed thoroughly with DCP. There is limited information transfer on these new directions, and the directorate level of the DCP understands little either about upcoming changes in USAID/N program structure, or the ensuing effect these changes will have on crop protection operations in Niger. DPM should request and receive input from DCP, which is an important source of information on pest management issues.

DPM should develop a coordinating structure through which it has mandatory, regular contact with the DCP, SAP, GTI, FAO and donors. (DPM coordination with SAP and GTI is already in place.) The availability of funds and their allocation should be readily known by all possible participants.

11.3.2 Regional Coordination

Of serious concern to the future of crop protection in Niger is the ability to fight locust and grasshopper outbreaks. In recent years, attention was given almost exclusively to grasshoppers, and only minor emphasis on birds, rodents and locusts. Even though there is some overlap in control capabilities for handling locust and grasshopper outbreaks, DCP may not be prepared for potentially disastrous locust infestations. Compounding this problem is the lack of a strong regional pest control center.

Before 1987, OCLALAV played a vital role in regional coordination since most of the Sahelien countries lacked both expertise and personnel to function independently. But, because of the relative scarcity of locusts in the Sahel in the past five years, and member country's ensuing financial disengagement, OCLALAV has deteriorated as an operational regional entity. CIDA is proposing to resurrect OCLALAV as a coordinating body, in part to supplant their own significant role in pest management that will go unfilled at the end of the year.

Opinions vary on the need for such a regional coordination unit, as well as on the appropriateness of OCLALAV to assume the part.

There is, however, no doubt as to the importance of clear communication and early warning between countries during locust outbreaks due to the insect's long flying range. Effectively protecting food security and assuring self-sufficiency rely on good regional coordination and the maintenance of a high state of preparedness.

In Niger today, even with the increased capabilities of the DCP, the SAP, the early warning systems, and the use of more integrated pest management, there may still be a need for an independent coordinator, particularly for locust outbreaks. This structure could work directly with the national CPS, rather than through a regional office, as OCLALAV did in the past.

On the other hand, Niger appears to be an opportune country in which to start a regional approach to locust/grasshopper control. It is conceivable that CILSS, which already has research, remote sensing, and training functions throughout most of the Sahel, could provide the overarching organizational structure for a regional survey and control entity for West Africa. This entity within CILSS could supplant or fold in OCLALAV staff and functions, as well as the aerial crop protection services available in Niamey. DPM should explore this concept with guidance from AELGA/W. DPM's role should be to maintain relationships with regional coordination efforts, as this is an important mitigation activity that will have significant effect on crop protection, should future locust outbreaks occur.

12.0 RECOMMENDATIONS

12.1 GENERAL

1. The environmental ramifications of emergency pest control operations must be addressed with respect to the dispensations provided for under the AELGA Programmatic Environmental Assessment and the Niger Supplementary Environmental Assessment.

2. DPM should develop a strategy to maintain AELGA's dual functions of operational response and longer-term preparedness activities.

3.CILSS could provide the overarching organizational structure for a regional survey and control entity for West Africa. This entity within CILSS could supplant or fold in OCLALAV staff and functions, as well as the aerial crop protection services available in Niamey. DPM should explore this concept with guidance from AELGA/W.

4. Food security in Niger is contingent not only on locust and grasshopper control but also protection from other crop-destroying organisms such as quela birds, rodents, bean aphids and tree locusts. All of these pests are a threat to the food supply, and must be considered by DPM in its mitigation activities.

5. An assessment of DPM's management activities should be done in June 1995. Because of the drastic organizational changes occurring in pest control operations in Niger at the end of 1994 (transfer of pest management concerns from AELGA to DPM, loss of CIDA, end of SYSAPEC), a thorough examination of results of these changes needs to be conducted. It should ascertain whether the remaining pest management programs are providing the necessary training, prevention, mitigation and intervention activities.

6. Work with Peace Corps volunteers to: assist with prevention, surveillance, treatment, and other relevant activities; train the trainers in the field; provide a field link with DPM on safety, health issues, liaise with the CPS; and propose sponsors for DPM projects. Train them in pesticide use, survey, health and safety issues.

7. Fund a (part-time) position within DRU to continue oversight of critical pest management activities within USAID/N, DPM, and Niger. The primary responsibility of this person would be to help facilitate Niger as the

seed country for the overall regional network of locust/grasshopper control. This person will liaise among multilateral, bilateral, and regional donors as well as private and national institutions in the interest of preventive and proactive locust/grasshopper issues. He/she will also be the conduit for emergency response to pest outbreaks, should there be major infestations.

8. Support efforts of DCP to control other major outbreak crop-destroying organisms in addition to locusts and grasshoppers; as food security in Niger cannot be attained by viewing locust/grasshopper problems in isolation from those caused by serious pests such as rodent and tree locusts.

12.2 HEALTH

1. Support pesticide safety and health information campaigns using local language and culture (such as training, posters, leaflets, market booths).

2. Monitor avicide exposure of human population in rice-growing wetland areas, especially where quelea birds are consumed.

3. Promote health training and activities associated with pesticide intoxication for MOH, such as more acetylcholinesterase testing, and pesticide ingestion treatment.

12.3 LOGISTICS

1. Provide adequate funding for spare parts including extra motor parts and maintenance of not only vehicles, but pumps, spray equipment and other machinery.

2. Streamline the administrative procedures for such things as per diem, ordering airplane parts and gas coupons.

12.4 CAPACITY BUILDING

1. Support activities that are income generating and encourage the self-sufficiency of DCP, such as the Pilot Project (see Appendix 15). Discuss with the Minister of Agriculture the use of Niger DCP airplanes in other countries for locust and grasshopper control purposes. Additional income-generating proposals are: use the Niger

DCP aerial facilities to maintain Mali's and other regional airplanes; assess the capability of MOH laboratory to provide services such as residue and product testing of samples from all CILSS countries, as well as from private growers.

2. Continue the personnel management training program begun by CIDA in order to develop DCP's self-sufficiency and capacity.

3. Provide a fund cite for two new pilots to be trained in California in spray and pest management operations as soon as possible so that they can quickly become operational. Train other Nigerien pilots and assist in promoting their efforts to provide aerial services for purposes other than Niger's grasshopper and locust campaigns, such as campaigns in Mauritania and Senegal which have later pest seasons, as well as aerial photography and geological survey.

4. Initiate procedures for establishing a radio communication system from AGRHYMET to departements to facilitate information exchange on greenness levels as well as temperature and wind direction. This proposal recommends that each CPS center be provided with a coordinate grid corresponding to the greenness map of its area. Greenness information could then be radioed directly from Niamey, with indications of strategic coordinates which should be surveyed by CPS. This method of getting information directly to the field will greatly improve survey and forecasting capabilities. A DCP technical expert should be trained in radio maintenance and repair and be based at either AGRHYMET or DCP in Niamey, then have the expert train someone in each departement on basic radio maintenance.

12.5 PRIVATE SECTOR

1. Organize a workshop for private sector importers and distributors of pest control materials prior to DCP's concentration only on food crops. Provide proactive support as private sector pest control network develops.

12.6 COORDINATION

1. Conduct a short seminar for DCP on DPM, its mandate, how it works and how other agencies can benefit and contribute.

2. Liaise closely with CIDA during its last six months to

maintain a follow up on important CIDA-funded activities such as: village brigrade training, personnel management training, etc.

3. Continue to send an AELGA representative, or pest management specialist to the international donor meetings.

12.7 PESTICIDES

1. Fund the DCP to develop an implementation program for the new pesticide legislation. Provide training in entomology, pesticides, and residue analysis to personnel involved in pesticide legislation enforcement. It would be particularly desirable to train border personnel as a way of monitoring pesticides which could illegally enter Niger.

2. Collaborate with other donors to develop a plan to construct aprons at air strips for collecting discarded pesticides.

3. Provide technical assistance to DCP prior to and during the transfer of pesticide stocks to the new warehouse. Continue training on pesticide safety, handling, loading, transporting, unloading, and storing.

4. DPM should continue to assist the DCP in the development of a conceptual and procedural framework for a pesticide disposal management plan.

5. Communicate with GTZ about progress on use of a cement kiln in Benin as a regional facility for unwanted pesticide disposal. Procure technical assistance to evaluate eventual suitability of GON cement kiln at Malbaza.

12.8 ENVIRONMENT

1. Sponsor informational sessions for Ministry of Health, Ministry of Livestock, and DCP on existing capacity for pesticide residue analysis. Present possibility of Niamey acting as a regional analytical center.

2. Institute training program for DCP personnel on developing regular water, soil, and foodstuff pesticide residue analysis.

3. Encourage participation in international environmental monitoring activities, such as the Locustox Program.

4. Assess the ramifications of mitigation interventions on

the environment and natural resources base. Then environmental impact mitigation measures need to be taken, preferably by resident technical expertise.

5. Promote the adoption of preventive and proactive control of pests in the DPM project.

6. Initiate discussions with DCP on ramifications of private sector control of cash crop insects. Encourage employment of appropriate monitoring, training, and legislation enforcement measures within the GON. This Evaluation Team also concurs with the actions recommended by the DPM Program's Environmental Review (ER) & the Environmental Monitoring Evaluation Mitigation Program (EMEMP) to address environmental impact mitigation.

7. Measuring pesticide residues in the environment is an excellent way of monitoring, and requires a residue analysis laboratory for full implementation. Control programs should incorporate residue analyses, as well as observations of qualitative behavioral changes in non-target organisms in and around any pesticide sprayed areas. CPS applicators must be trained to note unusual behavior of fauna in the area.

8. Initiate discussions on the development of a program to measure the adverse effects of pesticides on the environment. World Wildlife Fund (WWF) has been active in Niger and has baseline data on flora and macrofauna in various habitats. It has no data on non-target indicator arthropods, but has expressed willingness to cooperate with USAID/Niger in measuring the adverse effects of pesticide use.

9. Develop a document for DCP personnel on the identification of environmentally sensitive areas and recommendations on appropriate treatment strategies and limitations. Environmental stipulations in the SEA and the PEA for Niger should also be distributed to DCP.

10. Continue efforts to initiate a dialogue between the DCP and donors on the coordination of pesticide donations. Encourage the grasshopper/locust donor coordination committee to meet regularly, as an ideal forum for discussing coordination of pesticide donations.

11. Continue to follow and review current efforts in research and monitoring to refine the DCP control strategy in efforts to minimize areas sprayed. The current strategy of treating early season populations, limiting treatment of rangeland and protected areas, and avoiding late season treatments is commendable, and should be encouraged.

12. Promote and encourage the undertaking of crop loss assessment studies in Niger, in an effort to prevent spraying unless an economic threshold of locusts/grasshoppers is exceeded.

12.9 FORECASTING

1. Support CPS egg pod survey activity with donations of gasoline coupons and field gear to provide precise information about where interventions can occur.

2. Encourage increased light trapping activity as an inexpensive low-maintenance method of grasshopper and other insect population forecasting and survey. Provide technical assistance in interpreting light trap collections.

12.10 RESEARCH

1. Formulate procedures for submission and review of proposals monitoring of research activities in alternative control techniques. Conduct informational workshop with DCP on procedures for proposal submission.

2. Provide support to the INRA (Institute National de Recherche Agricole) to carry on the CARE research on traditional control methods. This type of support could contribute to minimizing areas treated by pesticide, as well as having obvious environmental, economic, and public health ramifications.

3. Strongly encourage MSU to visit Niger to expand ongoing Biological control research to Niger. Facilitate communication between researchers on the DFPV's and MSU's *Metarrhizium* and *Beauvaria* projects. USAID/N should invite AELGA/W and MSU to explore initiates in implementing a biological control project in Niger.

4. Encourage research by DCP to investigate the possibility of formulating pesticides using locally-available materials.

5. DPM needs to encourage and support preventive, minimal-cost control strategy.

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AELGA EVALUATION

SCOPE OF WORK

I. Purpose of Evaluation

The purpose of the evaluation is to conduct a critical assessment of the past activities of AELGA project in Niger in light of the project objectives specified in the original Project Paper, subsequent amendments, and the mid-term AELGA evaluation conducted in 1989.

There are two particular evaluation elements to this project. Many improvements have occurred since 1989 with Niger being at the forefront of many activities. The first point to be covered in this evaluation will be to examine these landmarks and the lessons learned. The evaluation process will need to review the extent to which the locust/grasshopper monitoring and control elements were put in place by virtue of the various campaigns, and to what extent these have been institutionalized. It should also suggest what initiatives, if any, might be appropriate for attaining this goal. Similarly, the need to control other pest species should be addressed.

The second element of the evaluation should be comprehensive lessons learned and recommendations sections. Beginning in 1994, Crop Protection activities are to be under the jurisdiction of the Disaster Preparedness & Mitigation (DPM) Program. The report must include recommendations on how the Mission can best continue to support pest management and other AELGA-like functions in the framework of the DPM project.

The project evaluation will be conducted in accordance with A.I.D.'s project evaluation procedures and provided a summary history of the project performance to date, lessons learned or to be learned. The evaluation team will provided recommendations based on its findings.

II. Background

The objective of the AELGA Project is to provide assistance to manage locust/grasshopper populations. By doing so, the project reduced famine and related negative economic and social impacts by reducing these outbreaks. The three main purposes of AELGA are (1) to provide short-term technical assistance and training to help alleviate the immediate locust/grasshopper threat to food security in Africa; (2) to provide medium-term capacity building to help bring about improved and sustainable management of grasshopper and locust outbreaks threatening African countries, and (3) to provide a response mechanism for "other emergencies" that may arise in the Africa region.

From June 1988 (date of the signature of the AELGA LSGA), through 1990, the AELGA project in Niger had in general covered the emergency operations in providing assistance to the GON Directorate of the Crop Protection Service (DCP), based on a biannual plan prepared by the DCP and submitted to a Donor Coordination Technical Committee chaired by the Ministry of the Foreign Affairs and Cooperation. At the end of the 1989 locust plague, USAID/Niger expressed a desire to develop a long term development policy for the DCP and to continue to provide emergency assistance as needed.

The program which was developed included assistance in pesticide selection, pesticide distribution and monitoring, pesticide safety, egg pod, ground and aerial survey, and aerial and ground application of pesticides during locust and grasshopper outbreaks.

III. STATEMENT OF WORK

The team will generate a report on results of the evaluation following the document format and content requirements established by A.I.D. In addition to the standard reporting requirement outlined in the A.I.D. project evaluation procedures, the team will address key technical and administrative concerns in the appropriate sections of the project evaluation, including the following:

- Current and alternative locust/grasshopper prevention and control strategies and priorities, and the relative effectiveness of these strategies.

- The role of applied research in forecasting the surveillance methodologies, their impacts on determining location and timing to launch control operations.

- Training programs in pesticide management and disposal as well as, in other relevant fields.

- Project management and monitoring; dissemination and implementation of results and findings.

- Program impact measurement and analysis.

- Assess the effectiveness of decentralization within the Directorate of Crop Protection (DCP) and how both support and operations can be strengthened. Do the treatment brigades work effectively at the local level?

- Assess the technical/environmental aspects of treatment options, especially in relation to the impact of late treatment. Recommend optimal treatment scenarios.

- Provide recommendation for future AID support to DCP.

IV. Technical Assistance Personnel

A. Entomologist:

1. Entomological research regulatory and/or extension background in pest management with a minimum of 7 years' experience required.

2. Field experience with crop and/or rangeland pests, pest control and environmental implications of the misuse of pesticides.

3. Ability to undertake field observation, and interact with local officials, technicians and scientists.

4. Knowledge of AID's evaluation methods and ability to evaluate the capabilities and potential of the various foreign governmental bodies involved.

5. Ph.D. in Entomology, or appropriate subject required.

6. English skill at S/R 4 and some knowledge of French.

7. Previous African experience desired.

8. Previous experience with Locust control issues in Africa or Asia required.

B. Logistician:

1. Background with experience in Locust outbreaks in Africa or Asia.

2. Experience with emergency logistics required.

3. Ability to undertake observations and review training, research, and application programs and materials for completeness and effectiveness.

4. Knowledge of AID's evaluation and ability to evaluate the capabilities and potential of the various foreign governmental bodies involved.

5. At least 5 years of logistics experience required.

6. English skills at S/R 4 and French skills at S/R 3 required.

7. Previous Africa experience desired.

V. Suggested Work Plan

The evaluation will examine work performed under the AELGA project in the following areas:

A. Evaluate the current and projected locust/grasshopper programs. Analyze options/decisions/evaluation from available records of host country, missions, regional organizations and FAO.

B. Consider potential for IPM program elements: Evaluate current active ingredient options (alternatives), decisions, and impacts.

C. Evaluate viable alternative pesticides and formulations used in wide area (large plane) applications, baits, barrier treatments and ground or aerial applications.

D. Evaluate the potential for new or improved control technologies (e.g. Neem, Nosema bait, other pathogens, parasites, crop varieties/alternative crops, and mechanical methods).

E. Evaluate the increased use and sophistication of various technologies for survey, detection and modeling, greenness maps, etc., by host country plant pest services, missions, regional organizations, and FAO.

F. How can current programs be modified to include viable IPM options, and what research and development is needed to further advance this evolution (e.g. field identification of comparative efficacy/human-livestock-environmental impacts)?

G. How will this approach reduce/mitigate human, livestock and environmental concerns (storage/disposal/critical environmental areas/endangered species/ground and surface water)?

VI. Oversight. Liaison and Reports

The Contractor will report to DPM Project officer (M. Sullivan) and work in cooperation with the AELGA Technical Advisor, Kondo Mahamane, and the Acting DRU Coordinator. The contractor is expected to work in close cooperation with DCP and DRU staffs.

USAID/Niger's Disaster Relief Unit will provide administrative support for the Contract Team, including liaison with USAID offices and related services. USAID/Niger will also, through DRU, provide a vehicle and driver for the official use of the contractors. No security clearance is required and the contractors are not expected to require any office or material support from USAID other than that which is available from project sources.

A final draft of the bilateral evaluation of the AELGA project will be submitted before departure for review by the USAID AELGA Project Officer. This report will include a project

overview, evaluation recommendations and rationale, a tie-in between the bilateral and regional projects, recommendations as to how to incorporate pest management into the Disaster Preparedness & Mitigation Program, Annexes, and Appendices. A final report will be sent to USAID/Niger within three weeks of the team's departure.

APPENDIX 1

Expertise de la Direction de la PV

Source: PNC. 1994. Alternatives De Fonctionnement et De Financement De La "PV" au Niger. CIDA, Niamey, Niger.

6.4. EXPERTISE DE LA DIRECTION DE LA PV

La structure distincte de la Protection des Végétaux existe au Niger depuis 1967. Elle a été érigée en Direction en 1986. Cette structure repose essentiellement sur les brigadiers phytosanitaires (≈ 33 000), formés à travers le pays et équipés dans le but de maîtriser les premières attaques de déprédateurs.

Afin de remplir sa mission, la PV a mis en place, avec l'appui des projets qui le soutiennent, un programme de formation aussi bien des cadres que des paysans à travers les brigadiers phytosanitaires.

La PV dispose actuellement de 86 agents au total dont 23 à la Direction à Niamey, 39 au niveau des DDA et SAA, 8 au niveau des postes de contrôle et 16 en formation.

À ce chiffre, il y a lieu d'ajouter 20 auxiliaires (10 chauffeurs, 5 mécaniciens automobiles, 2 secrétaires, 1 gardien, 1 jardinier et 1 planton).

Concernant le personnel cadre, on peut faire les constats suivants :

- Au niveau de la Direction, les 23 agents se répartissent ainsi : 10 ingénieurs, 9 techniciens supérieurs ou conseillers agricoles et 4 cadres moyens de l'administration générale.

- Au niveau des DDA et SAA, le personnel PV comprend 4 ingénieurs et 35 techniciens supérieurs et conseillers agricoles.

- Les huit agents placés au niveau des postes de contrôle sont des cadres moyens. Il faut néanmoins signaler qu'un progrès important a été réalisé à ce niveau, dans la mesure où, suite à l'adoption de la législation phytosanitaire, la PV a remplacé des agents techniques et conducteurs d'agriculture par des cadres spécialisés en PV.

Par ailleurs, la structure du personnel cadre de la DPV est caractérisée par :

- la présence de 14 ingénieurs sur les 86 agents, dont 10 basés à Niamey;

- bonne spécialisation des cadres en matière de protection des végétaux : entomologie, phytopathologie, acridologie, agronomie. Quant aux cadres moyens, ceux-ci ont pour la plupart suivi la formation spécialisée en protection des végétaux;

- faible préparation des cadres au 'management' des différentes ressources avec lesquelles ils ont à conjuguer;

- en comparaison avec les autres Directions ou Ministères, l'équipe de la DPV est relativement jeune;

Mais il y a lieu de souligner que la plupart des cadres se trouvant dans les DDA et SAA ont une longue expérience (entre 9 et 20 ans).

Si l'on tient compte des 16 agents en formation pour le compte de la PV, on peut conclure que cette dernière dispose d'un potentiel appréciable en ressources humaines.

Par ailleurs, les quelques 33 000 brigadiers phytosanitaires formés et encadrés par les agents de la DPV et de la Direction de l'Agriculture constituent un appoint considérable en expérience dans le domaine de la lutte phytosanitaire.

En résumé de cette partie relative au différents actifs de la PV, on peut dire que grâce au soutien des donateurs, cette Direction dispose d'un potentiel important, aussi bien en infrastructures qu'en moyens logistiques et humains.

APPENDIX 2

AELGA Project NXP Status

AELGA PROJECT NXP STATUS AS OF APRIL, 1994

PREPARED BY KONDO MAHAMAN, AELGA PROJECT ASSISTANT

APPROVED BY MICHAEL SULLIVAN, AELGA PROJECT OFFICER

ITEM DESCRIPTION	UNIT PRICE $	NUM BER	LOCATION	STATUS	DATE IN
VHF IC-AE TRANSCEIVER	447.35	2	AIRPORT LIONEL	GOOD S/N 19161 & 03097	8/20/92 PO # 2326
EM46 SPEAKER/MICRO	36.75	2	AIRPORT LIONEL	GOOD	"
CM60A MULTI CHARGER	496.75	1	AIRPORT LIONEL	GOOD	8/20/92 PO # 2326
CM35AC BATTERY CHARGER	91.95	1	AIRPORT LIONEL	GOOD	8/20/92 PO # 2326
GPS NAGELLAN		1	DIFFA	GOOD	
GPS MAGELLAN		1	ZINDER	GOOD	
GPS MAGELLAN		1	MARADI	GOOD	
GPS MAGELLAN		1	TAHOUA	GOOD	
GPS MAGELLAN		1	DOSSO	GOOD	
GPS MAGELLAN		1	TILLABERY	GOOD	
GPS MAGELLAN		2	CNA AGADEZ	GOOD	
GPS MAGELLAN		3	SIPE/DCP NIAMEY	GOOD	
GPS MAGELLAN		1	DCP/NIAMEY	GOOD	
GPS TRIBLE AVPAC II		1	AIRPORT NIAMEY	GOOD S/N 3115A03811	

BATTERY CHARGER ATOMELEC		1	DRU/ANNEX FEWS	GOOD	
BATTERY CHARGER ATOMELEC		1	DRU/ANNEX	NEW	
VHF IC-A2 TRANSCEIVER		2	BAOUA/SIPE NIAMEY	GOOD	
TIP TAKS		2	AIRPORT ON CESSNA 188 5U-ABH	GOOD	
TIP TANKS		2	AIRPORT ON CESSNA 188 5U-ABC	GOOD	
MOTOROLA RADIO WITH ACCESSORIES		1	SAA GAYA	GOOD	
MOTOROLA RADIO WITH ACCESSORIES		1	SAA SAY	NEW	
MOTOROLA RADIO		1	SAA TERA	GOOD	
MOTOROLA RADIO		1	SAA TESSAOUA	GOOD	
MOTOROLA RADIO		1	GOURE	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE 1348ARN8	NEW	
MOTOROLA RADIO MOBIL		1	VEHICLE 0163ARN1	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE 0167ARN1	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE 3852NY1A	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE 02474ITRN8		
MOTOROLA RADIO MOBIL		1	VEHICLE DIFFA	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE TILLABERY	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE TAHOUA	GOOD	
MOTOROLA RADIO MOBIL		1	VEHICLE ZINDER	GOOD	

MOTOROLA RADIO MOBIL		1	VEHICLE MARADI	GOOD	
MOTOROLA RADIO		1	MAGASIN DPV NIAMEY	NEW	
MOTOROLA RADIO		1	MAGASIN DPV NIAMEY	NEW	
MOTOROLA RADIO		1	MAGASIN DPV NIAMEY	NEW	
RADIO ICOM VHF CM-7G		1	GAMBO AIRPORT NIAMEY	GOOD S/N 16595	
ANTENNAS		7	MAGASIN NIAMEY	NEW	
TUR NERS		2	MAGASIN DPV NIAMEY	NEW	
PROGRAM CARDS		2	MAGASIN DPV NIAMEY	NEW	
TOYOTA LAND CRUISER No. 2881 ITRN8		1	DIRECTOR DPV NIAMEY	GOOD	
MOTOROLA RADIO		1	SAA DOUTCHI	POOR CONDITIO N	
BATTERY CHARGER		1	DDA TILLABERY	GOOD	
BATTERY CHARGER		1	SAA TERA	POOR	
BATTERY CHARGER		1	DDA DOSSO	POOR	
BATTERY CHARGER		1	DDA DIFFA	GOOD	
BATTERY CHARGER		1	DDA TAHOUA	GOOD	
BATTERY CHARGER		1	SAA ZINDER	GOOD	
BATTERY CHARGER		1	SAA GOURE	GOOD	
BATTERY CHARGER		1	CNA AGADEZ	GOOD	
BATTERY CHARGER		1	SAA DOUTCHI	GOOD	
BATTERY CHARGER		1	SAA GAYA	GOOD	
BATTERY CHARGER		1	SAA TANOUT	GOOD	
GPS MAGELAN		1	PEACE CORPS HAMDALLAYE	GOOD	

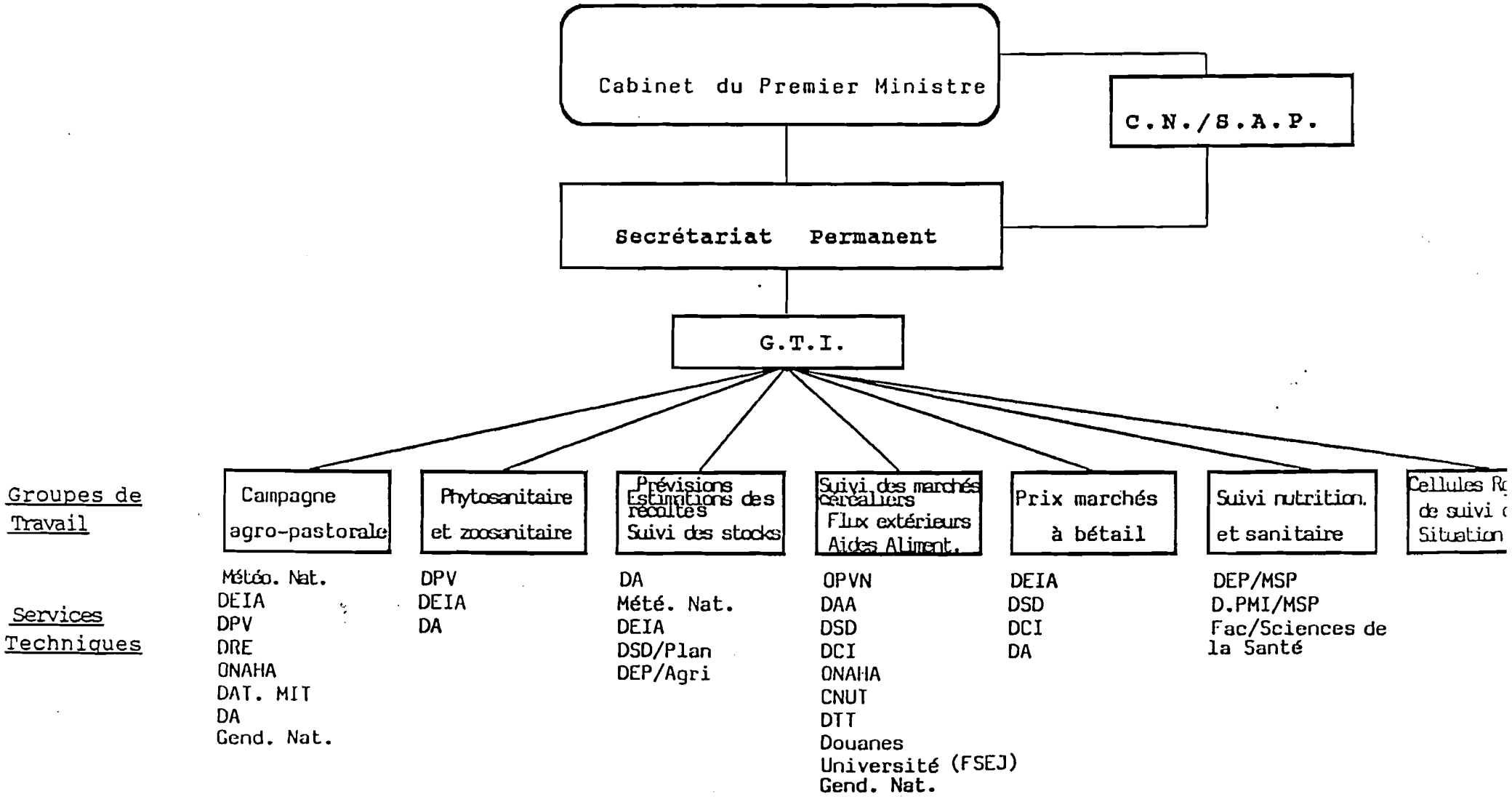
6

LOVIBOND CHOLINESTERASE TEST KIT	525.00	1	CHARLES/CIDA PROJECT DPV/ NIAMEY	GOOD	PO #9266

APPENDIX 3

Organigramme Du SAP

ORGANIGRAMME DU S.A.P



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APPENDIX 4

Pesticides

PESTICIDES

PESTICIDE SAFETY

The mid-term evaluation stressed that protective clothing suited to local conditions be provided to control personnel: in the Sahel, the control period can coincide with the hottest temperatures. AELGA has not been involved in supplying safety gear, all of which is provided by other donors(CIDA, GTZ).

It was noted in Niamey that while all pesticide distributions for the present year have been made, two departements have not yet received safety gear for the Village Brigades. Brigades receive safety training before they obtain pesticides, and members reported that they wear safety gear when actually treating with pesticide. They acknowledged the discomfort of the gear when treating under Niger's climatic conditions.

DCP informs Health Ministry agents where they should be doing acetylcholinesterase (AChE) testing, and tests are to be done before and after treatment. A sample is taken from each brigade in areas designated by DCP. 120 people per year have been sampled for AChE since 1992. No dangerous levels have been detected. AChE testing had not been done during the past two years in Dosso. It had been funded by the Canadians up to that time, and was done in cooperation with MOH.

Brigade members are informed of the symptoms of pesticide poisoning, and are told do go to the nearest health center for treatment. Antidotes are pre-positioned at health centers, as it is assumed they might be used unnecessarily if they were kept in the villages, away from the supervision of health personnel.

None of the brigade members at Surimalidi, a few miles from Maradi (individuals had been brigade members for approximately two years) had ever been tested. This was also a village that had not yet received safety gear from DCP.

Air service operations are preceded by radio announcements informing people in the region to be treated of the timing of spray operations. Populations are instructed to cover water supplies, stay out of fields, and not to eat locusts.

PESTICIDE LEGISLATION

The proposed legislation covers import or export of plant products or chemicals, application guidelines, and which agricultural chemicals are allowable for use in Niger. Funding is a problem for support of enforcement procedures. There are inadequate numbers of border personnel, and these individuals have received only two weeks of training. More extensive training on entomology and pesticides would be one mechanism for improving the enforcement of the existing legislation. At present DCP is proceeding under the assumption that the law is virtually in place, and has compiled a list of approved dealers, 22-23 approved pesticides, and a list of several compounds which are not approved for use in Niger.

DCP felt that more information on environmental effects of using particular pesticides under different circumstances was needed, and there was interest in developing more training and partnerships for assistance in accumulating information of pesticides and the environment.

Collaboration with the Ministry of Health will be needed for enforcement of residue tolerances. A newly operational gas chromatograph in the MOH's semi-private analytical laboratory is capable of analyzing soil, water, and foodstuff samples. DCP has been able to use the laboratory for analyzing pesticide formulations and active ingredient concentration.

DCP in Niamey felt that the "informal market" in pesticides was not a serious problem in Niger because of the relatively stringent authorized dealer procedures in current and proposed legislation. However, conversations with technical and field staff indicated that a considerable assortment of unauthorized and unmonitored products might be entering the country from Nigeria. Conversations with the customs agent at CPS Border Station, Magaria, indicated that no pesticides have come into Niger at that point for over a year. Virtually all agricultural chemicals seen have been fertilizers. If pesticides are to enter, the agent talks with the chief of the arrondissement, who authorizes the import, and coordinates with DCP in Niamey.

About 100 tons of corn, millet, and sorghum enter Niger at Magaria from Nigeria each month. The agent has not been looking for insect pests, and does not expect to quarantine materials. Only niebe beans are exported into Nigeria, and they are treated before loading.

The Magaria customs agent was aware of the pending legislation, but had no information on it. He knew there was to be a training program on the new legislation in July, 1994. He summarized the situation by mentioning that the border with Nigeria is 3000 k long, and impossible to keep tightly controlled.

PESTICIDE STORAGE

The system of warehouse inventory for both the equipment and pesticide storage facilities was developed with CIDA support, and there is concern in DCP that the system might deteriorate as the aid is discontinued: even the inventory cards which serve as the information base of the system have been produced by the Canadians.

DCP WAREHOUSE, NIAMEY: The facility was secure, inside a walled and guarded compound. Ventilation was adequate.
Bagged formulations were stored off the floor on pallets, and liquid containers neatly stacked at manageable heights. Current stocks were kept separate from last year's stocks. The warehouse operates on the "First in, first out" (FIFO) principal, and last year's stocks will be drawn from when first when additional pesticide is needed in the field. Two years is regarded as the maximum allowable age for pesticide stocks; in recent years, the rate of arrival of stocks has matched the rate of distribution to the field, and there has been no appreciable buildup of surplus stocks. (An exception was approximately 2817 kg of 2% Permethrin powder which was received in 1987 and which can no longer be used.) There was concern among warehouse personnel that manufacturers provide no definite guidelines on expiration dates of pesticide stocks.

CPS WAREHOUSE, MARADI: The warehouses were ventilated and secure, located within a guarded compound. Bags were stored directly on the concrete floor. Most of the stocks were fenitrothion or carbaryl insecticides, some about two years old.

About 100 25 k bags of lindane powder and 25 55 gal drums of DVP liquid were in storage. Empty cardboard boxes were stored in the warehouse, and designated for burning.

CPS OBSERVATION POST WAREHOUSE, TESSAOUA: The warehouse was ventilated, and had a concrete floor. A smaller GTZ-financed warehouse was adjacent, and was to be used for village pesticide stocks. The facility had not received its pesticide allocation for this season, and 32 l cyhalone 1.6 ULV and 400 k dursban from the previous year were stored inside.

8 200-l drums of malathion, donated by the Danes in 1991 were stored outside in one of the AELGA grass mat shelters. They had remained there because of the objectionable odor and the fact that the drums are beginning to leak.

CPS ARRONDISSEMENT WAREHOUSE, MAGARIA: The building was locked, and the team did not have access. It was secure and vented, but not fenced. There was a strong malathion odor. The arrondissement had not yet received this season's pesticide stocks.

CPS ARRONDISSEMENT WAREHOUSE, DOGONDOUTCHI: The warehouse was lockable, constructed of concrete with a metal roof and properly

ventilated. It was not fenced but was sited directly across from a Gendarmarie. Dogondoutchi has not received its pesticide stocks for this year. Some cyhalone 1.6 ULV and dursban 450 ULV and powder remained from the previous season.

10 200-l drums of DDVP ULV from 1989 were stored in a grass mat shelter. About 40 25-kg bags of lindane were stored inside the warehouse.

CPS Departement WAREHOUSE, DOSSO: 4 200-l drums of diazinon and 3 200-l drums of malathion (Danish, 1991) were stored outside within the walls of a demolished warehouse. The warehouse is secure, vented, has a concrete floor and is inside a secure compound. Bags were palletized. This year's stock had been received, and was kept separate from some of last year's stock which remained. When needed, 200 l drums for aerial application are stored in a grass mat shelter next to the main warehouse.

A proposed DCP research project is the investigation of effects of storage in the sun on active components of pesticides.

PESTICIDE DISTRIBUTION/LOGISTICS

At the second quarter of the year, usually in April, DCP in Niamey disburses stocks to the CPS at the departement level. Amounts disbursed are based on those used in the previous year's treatment. Any surplus from that previous year is designated as first to be used in the coming year.

After the April disbursements of pesticides from DCP Niamey to departements, CPS distributes pesticides to the CPS arrondissement facilities and to the districts. Pesticides are not kept in the villages; the growers report pest problems to the village brigades who approach the chief of the village, who then requests the pesticide allocation from the mayor of the Commune. At the brigade level, accounts are kept of amounts of pesticide used and are inventories made of what quantities remain. Inventory copies go back to CPS at the districts and the arrondissement levels. The time involved in getting pesticide from local stocks to the villages was two days, assuming the needed material was in hand at the district CPS.

CPS Maradi indicated interest in warehouses for prepositioning pesticides in some villages that are inaccessible for lack of good roads or deteriorating conditions during the rains, or are at especially high risk from insect attack.

CPS Tahoua has prepositioned its pesticide stocks at the arrondissement level. Distribution in this departement is challenging because of long distances and bad roads. It is particularly important to distribute pesticides at the district level before the rains erode the roads; if rains come before the

stocks are distributed, they are brought as close to where they are needed as possible, and village brigades take them the rest of the way.

CPS Dogondoutchi Arrondissement is in a region that has a growing season that begins early and extends until late in the year. Pesticide acquisition differs from that in some of the other arrondissements: the commune buys pesticide for use early in the season, and pays for the gasoline to distribute it.

CPS Tillaberi has distributed its stocks to arrondissements. Some material has been pre-positioned beyond the arrondissement level in the GTZ-funded district warehouses.

PESTICIDE DISPOSAL

Deterioration of pesticide stock by exposure to high temperatures has great environmental ramifications, and is especially problematic when containers are kept outside. Concentrations increase as solvents evaporate, active compounds become degraded unpredictably, and powder formulations become caked and impossible to apply.

The situations at several pesticide stockpiles applied as of 1992. At the time of our discussion, the director of the Environment Department was about to go into the field, in part to determine the current status of these stocks:

Tillaberi	350 kg Coumafine (rodent control):	caked*
	2645 kg other powder formulations:	caked
	1000 l liquid formulations:	unusable
	48 200-l containers:	empty
Tahoua	1950 kg powder formulations:	caked
	4800 l liquid formulations:	unusable
Agadez	2600 kg powder formulations:	caked
	2400 l liquid formulations:	unusable
	2150 containers:	empty
	(attractive to farmers as watercontainers)	
Difa	7000 l liquid formulations:	unusable
	98 containers:	empty
Zinder	7175 kg powder formulations:	caked
	14,154 l liquid:	unusable
	49 gas (fumigant) containers:	unusable
	549 containers:	empty

* Unusable powder formulation

Maradi	5864 kg powder formulations:	caked
	5250 l liquid formulations:	unusable
	460 containers:	empty
DCP, Niamey		
	4650 kg powder formulations:	obsolete
	(at least some of this quantity includes the Permethrin referred to in the PESTICIDE WAREHOUSE section above)	
	4050 l liquid formulations:	unusable
	28 containers:	empty
	4050 l liquid formulations:	unusable

Although there is only a limited number of pesticides approved for use in Niger, there is a wide variety actually in the country. These unapproved pesticides, along with the stocks of degraded or outdated pesticides, constitute a disposal problem.
Empty containers are stored in the DCP warehouse in Niamey, and may be reused for pesticide formulation. Empty containers are a much greater problem in the field. DCP attempts to have them returned to Niamey, but of 15-20000 containers distributed, only a few ever come back; it is assumed that most are used as containers for food or water, and thus constitute a potentially serious health hazard.

Containers encountered by village brigade members were usually plastic. Disposal is covered during brigade training, and all empty containers are reportedly cut and buried.

APPENDIX 5

Les Actifs, Resources et Expertise de la PV

Source: PNC. 1994. Alternatives De Fonctionnement et De Financement De La "PV" au Niger. CIDA, Niamey, Niger.

6. LES ACTIFS, RESSOURCES ET EXPERTISE DE LA PV

L'insuffisance de documentation a rendu le traitement de ces points très difficile. Pour élaborer cette synthèse, la mission s'est principalement basée sur la documentation existante : rapports de la Direction de la Protection des Végétaux, rapports des projets nigéro-canadien et nigéro-allemand.

Cette documentation a été complétée par l'exploitation de fiches préparées pour chaque groupe d'actifs et qui ont été remplies par les services de la DPV, en fonction de la disponibilité des informations demandées.

Les informations dont nous avons disposées ne permettent pas de procéder à une identification précise de chaque élément d'actif avec sa valeur. Nous passerons en revue les groupes d'actifs et tenterons d'estimer une valeur pour chacun d'eux en francs CFA*** .

6.1. LES BÂTIMENTS

6.1.1. Au niveau de la Direction de la Protection des Végétaux

Bureaux

- **Direction** : La Direction est abritée par un bloc comprenant deux bureaux, deux secrétariats et une salle radio.
- **Bloc Projet GTZ** : Comprenant cinq bureaux, un secrétariat, un petit magasin et un laboratoire.
- **Bloc projet Nigéro-Canadien** : Comprenant 10 bureaux, une salle de réunion, un secrétariat et une salle informatique.
- **Bloc projet SYSAPEC** : Avec quatre bureaux, une salle informatique, une salle de traitement de données, un magasin de divers.
- **Bloc annexe** : deux bureaux et une salle de réunion.
- **Bloc laboratoire** de phytopathologie et d'entomologie

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*** Il est à noter que les montants apparaissant dans cette section font référence à la valeur du CFA avant la dévaluation de janvier 1994, où le taux de change par rapport au $Can était

Magasins

- Un magasin de produits phytosanitaires;
- Un magasin de pièces détachées.

N.B. :Un nouveau magasin de produits phytosanitaires est (en train d'être) construit à Sorey (à 15 km de Niamey), sous financement du PNC. Il a une superficie de 600 m² pour un coût total de 70 millions de francs CFA, incluant un ensemble d'infrastructures : bureau, logement de gardien, château d'eau, piste d'accès, branchement électrique.

Garage

- Un bloc garage–bureau assure les réparations de l'ensemble du parc automobile de la Direction de la Protection des Végétaux.

Documentation

- Un bloc bureau, salle de documentation.

6.1.2. Au niveau des postes de contrôle phytosanitaire

Sept bureaux-logements sont localisés au niveau de certaines localités frontalières pour assurer le contrôle à l'exportation et à l'importation aussi bien des produits agricoles que des produits phytosanitaires. Il s'agit de Gaya, Konni, Dan Issa, Adaré, Sassoumbroum, Matameye et Torodi.

6.1.3. Au niveau du Centre National Antiacridien d'Agadez

- Bloc-bureau comprenant six pièces;
- Logement à cinq pièces;
- Une base à In'Abangarit.

6.1.4. Au niveau des Directions Départementales de l'Agriculture et des Services Agricoles d'Arrondissement

Au niveau des Directions départementales de l'Agriculture, la DPV dispose de 6 magasins de stockage localisés à Dosso, Tahoua, Agadez, Maradi, Zinder et Diffa, permettant de réceptionner les produits et matériels transférés à partir de la DPV.

Au niveau des Services agricoles d'Arrondissement, la capacité de stockage vient d'être renforcée par la construction de 7 magasins de 130 m2 chacun à Tchirozérine, Birni N'gaouré, Dakoro, Bouza, Mainé-Soroa, Tillabéri et Tanout. Le coût moyen de ces magasins est de 7 millions de francs CFA.

6.1.5. *Au niveau des brigades phytosanitaires*

Le projet nigéro-allemand GTZ a financé la construction d'entrepôts au niveau des brigades villageoises. La répartition de ces entrepôts est donnée comme suit :

Situation des entrepôts de 1989 à 1991

Départements	Nombre prévu	Nombre réalisé
Agadez	60	48
Diffa	30	30
Dosso	90	68
Maradi	165	121
Tahoua	120	62
Tillabéry	81	18
Zinder	119	81
TOTAL	665	428

Le projet a déboursé 106 196 334 de FCFA pour la fourniture des matériaux de construction (ciment, tôles, portes et fenêtres) et la main d'œuvre spécialisée, soit en moyenne 248 000 francs CFA par entrepôt. Le coût d'un entrepôt étant estimé à 500 000 francs CFA, les paysans ont participé, par la fourniture du banco, des briques, du sable, ainsi que de la main d'œuvre à hauteur de 252 000 francs CFA par entrepôt, soit 50,4% du coût total.

6.1.6. *Base aérienne*

La PV dispose d'une base aérienne localisée à l'aéroport de Niamey. Cette base est pourvue d'un hangar construit en 1986, ayant une superficie totale de 800 m^2 (2 bureaux de 14 m^2 chacun, un atelier magasin de 40 m^2, des toilettes de 10 m^2 et un atelier de maintenance de 720 m^2). Le coût à la construction de l'ensemble est estimé à 70 millions de francs CFA.

Du point de vue financier, le rapport sur le coût de la lutte phytosanitaire en 1991 au Niger, élaboré en novembre 1991 par Stanislav Manikowski et Ismaël Mouddour, a estimé les constructions de la Direction de la Protection des Végétaux comme suit :

Au niveau de la DPV	=	15 789 590 FCFA
Aux autres niveaux	=	109 887 517 FCFA
TOTAL	=	125 677 107 FCFA

Eu égard à l'ensemble des bâtiments ci-dessus listés, ce montant semble très faible.

En effet, au niveau national, on peut supposer que le montant mentionné ne concerne que le bloc abritant les bureaux de la Direction de la Protection des Végétaux, ignorant les blocs qui logent les différents projets. En tenant compte de l'ensemble du complexe, il faudrait probablement multiplier le montant indiqué par trois ou quatre, soit entre 45 et 60 millions de francs CFA.

De même, le magasin en construction à Sorey d'une valeur estimée à 60 millions de francs CFA n'a pas été pris en compte, ainsi que le hangar abritant la base aérienne construit en 1986 pour un montant de 70 millions de francs CFA.

Au niveau des Services Agricoles d'Arrondissement, seuls deux des sept magasins ont été pris en compte pour un montant de 12 738 885 FCFA, alors que les sept magasins ont coûté 50 157 959 FCFA.

De même, le coût des entrepôts villageois a été estimé à 91 148 632 FCFA contre 106 196 334 FCFA comme indiqué plus haut.

En tenant compte de tous ces éléments, le montant de 125 677 107 FCFA devrait être majoré d'au moins 200 000 000 FCFA pour avoir une estimation des coûts de construction des bâtiments utilisés par l'ensemble du système de la protection des végétaux, soit environ 320 millions de francs CFA.

Même en tenant compte de l'ensemble des amortissements, on constate que la PV dispose d'un potentiel en bâtiment assez considérable.

6.2. MOYENS LOGISTIQUES

6.2.1. Moyens de transport

Direction de la Protection des Végétaux

Le rapport établi par le responsable du parc automobile de la PV en date du 19 novembre 1993, fait apparaître la situation suivante :

- ◊ Toyota station wagon Land cruiser = 6 véhicules
- ◊ Toyota pick up = 2 véhicules
- ◊ Toyota double cabine = 2 véhicules
- ◊ Isuzu pick up = 3 véhicules

◊ Mitsubishi	= 1 véhicule
◊ Peugeot 505 + Peugeot 504	= 2 véhicules
◊ Fiat Panda 4x4	= 1 véhicule
◊ Volkswagen bus	= 2 véhicules
◊ Camions de transport UNIMOG	= 4 véhicules
◊ Camions HINO	= 3 véhicules
◊ Mercedes 15-13	= 1 véhicule

Comme on le constate, la Direction de la Protection des Végétaux dispose d'un impressionnant parc automobile de 27 véhicules, composé de 17 véhicules de mission, de 2 véhicules pour le transport du personnel et de 8 camions pour le transport des produits et matériels, dont un est destiné au traitement anti-aviaire.

Au niveau des départements

La DPV a mis à la disposition des Directions Départementales de l'Agriculture le parc automobile suivant :

- 7 véhicules de tournée tout terrain (un par département exception faite de la Communauté Urbaine de Niamey);
- 12 véhicules de traitement équipés (Diffa=2, Zinder=1, Maradi=2, Tahoua=2, Dosso=1, Tillabéri=1, Centre National antiacridien d'Agadez=3);
- 64 Motocyclettes Honda CG 125 réparties au niveau des districts agricoles comme suit : 6 à Agadez, 13 à Diffa, 3 à Dosso, 25 à Tahoua et 17 à Maradi).

Il y a lieu de signaler que le Projet nigéro-canadien dispose d'un important parc qui vient en appui à la Direction de la Protection des Végétaux et qui pourrait lui appartenir à la fin dudit projet. Il s'agit de :

- 1 Peugeot 504 Break et une Peugeot 505 Dangel	= 2 véhicules
- Mitsubishi Pajero	= 1 véhicule
- Toyota Land Cruiser SW	= 5 véhicules
- Toyota Pick up	= 9 véhicules
- Toyota Corolla	= 2 véhicules

Soit 19 véhicules dont le coût total s'élève à 116.883.830 francs CFA.

D'autre part, la DPV dispose de quatre aéronefs qui sont :

Type	Modèle	Année d'acquisition	Valeur actuelle
CESSNA	A 188 B	1984	35 000 000 FCFA
CESSNA	A 188 B	1986	35 000 000 FCFA
CESSNA	A 185 F	1978	15 000 000 FCFA
(actuellement non opérationnel)			
CESSNA	C 337 D	1992	25 000 000 FCFA
(acquis à l'état d'épave, puis remis en état de vol)			

Source : Note présentée par M. Gambo Ibrahim, responsable de la base aérienne de la DPV.

Du point de vue financier, le rapport «coût de la lutte phytosanitaire en 1991 au Niger» ci-dessus mentionné a estimé le matériel roulant de la PV à 137 951 830 FCFA.

Probablement ce chiffre ne concerne que le parc automobile propre à la DPV.

Si l'on tient compte de tous les appuis, notamment de ceux du Projet nigéro-canadien et de la base aérienne, il faudrait multiplier ce chiffre presque par trois (116 millions pour le PNC et 110 millions pour la base aérienne).

Même en déduisant les amortissements, on constate que la PV dispose d'un potentiel de transport et d'intervention assez important.

6.2.2. *Équipements*

Appareils de traitement

En plus des camions de traitements et des aéronefs déjà mentionnés, le potentiel d'intervention de la PV comprend 29.400 appareils de traitement répartis comme suit :

- 25 000 appareils ULV à piles;
- 2 500 appareils motorisés à dos;
- 1 900 appareils à pression entretenue.

Moyens de communication

La DPV est reliée aux Directions Départementales de l'Agriculture non seulement par téléphone, mais aussi par Téléfax et par Radio.

Le dispositif radio comprend 21 radios fixes et 22 radios mobiles installées sur véhicules.

Autres équipements

Il s'agit d'équipements de bureaux, de laboratoire, d'outillage et surtout de pièces détachées pour le parc automobile et la base aérienne.

L'inventaire pour les pièces détachées de véhicules n'est pas à jour; le dernier inventaire complet date de janvier 1992. Néanmoins, le récent inventaire partiel réalisé pour les pièces des véhicules de marque HINO et TOYOTA laisse apparaître une réserve importante en pièces détachées pour ces deux marques de véhicules qui sont les plus importantes de la DPV.

Concernant la base aérienne, l'inventaire réalisé par le responsable fait état d'une valeur estimée à 10 millions de francs CFA pour l'outillage et à 15 millions pour les pièces détachées.

Du point de vue financier, le rapport «coût de la lutte phytosanitaire en 1991 au Niger» a estimé à 89 095 054 FCFA la valeur des équipements de bureaux, du laboratoire, des magasins et des garages. Les autres équipements, toujours pour 1991, furent évalués à 118 444 144 FCFA.

6.3. STOCKS DE PRODUITS PHYTOSANITAIRES

Un récent inventaire fait au niveau du magasin des produits phytosanitaires de la DPV, indique les éléments ci-après :

	Produits liquides	Produits solides
Stock de départ	52 932 litres	161 407 kg
Réception 1993	161 637 litres	127 950 kg
Stock disponible pour 1993	214 569 litres	289 357 kg
Ventilé dans les DDA	165 611 litres	220 495 kg
Stock restant au magasin	48 958 litres	68 862 kg

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L'inventaire n'indique pas les quantités de produits réellement utilisées au niveau des DDA. Toutefois, si l'on tient compte du fait que la DPV assure la ventilation des stocks dans les DDA suivant les besoins exprimés par ces dernières, on peut imaginer qu'une bonne partie des stocks ventilés n'est pas disponible.

Il y a lieu de signaler que depuis quelques années, la PV reçoit les produits phytopharmaceutiques presque exclusivement du Japon, sous forme de subvention, dans le cadre du KR 2. Ainsi, le rapport annuel de la

DPV de 1992 (dernier rapport annuel disponible), fait état de réception des produits suivants du Japon : 142 900 litres de produits liquides, 197 165 kg de produits en poudre, 120 appareils de traitement, 2 véhicules de 10 tonnes de transport, 7 véhicules Pick Up, et 1 véhicule Station Wagon de mission.

De 1986 à 1993, la PV a reçu dans le cadre de cette assistance japonaise, un total de 3 591 332 000 yens japonais soit environ 7 milliards de francs CFA sur un total de 4 450 milliards de yens (8,900 milliards de francs CFA), soit une moyenne de 875 millions de FCFA par an.

Cette moyenne est tombée à 650 millions de francs CFA pendant la période de 1990 à 1993.

Donc si cette tendance continue, on peut dire que la PV pourrait bénéficier (à court terme du moins) de 650 millions de francs CFA dans le cadre du KR 2 japonais par an pour faire face à ces besoins en produits et matériels de traitement.

Or, les besoins sont sans commune mesure avec ce montant.

Ainsi, le rapport «coût de la lutte phytosanitaire en 1991 au Niger» a estimé les coûts des pesticides de la façon suivante :

Constitution du stock de pesticides (DPV)	= 409 680 000 FCFA
Transférés aux DDA	= 1 010 620 000 FCFA

Soit au total 1,419 milliards de francs CFA. Mais il s'agit là de produits consommables. Par conséquent, seul le récent inventaire ci-dessus indiqué et les possibilités réelles dans le cadre du KR 2 doivent être pris en considération.

6.4. EXPERTISE DE LA DIRECTION DE LA PV

La structure distincte de la Protection des Végétaux existe au Niger depuis 1967. Elle a été érigée en Direction en 1986. Cette structure repose essentiellement sur les brigadiers phytosanitaires (≈ 33 000), formés à travers le pays et équipés dans le but de maîtriser les premières attaques de déprédateurs.

Afin de remplir sa mission, la PV a mis en place, avec l'appui des projets qui le soutiennent, un programme de formation aussi bien des cadres que des paysans à travers les brigadiers phytosanitaires.

La PV dispose actuellement de 86 agents au total dont 23 à la Direction à Niamey, 39 au niveau des DDA et SAA, 8 au niveau des postes de contrôle et 16 en formation.

À ce chiffre, il y a lieu d'ajouter 20 auxiliaires (10 chauffeurs, 5 mécaniciens automobiles, 2 secrétaires, 1 gardien, 1 jardinier et 1 planton).

Concernant le personnel cadre, on peut faire les constats suivants :

- Au niveau de la Direction, les 23 agents se répartissent ainsi : 10 ingénieurs, 9 techniciens supérieurs ou conseillers agricoles et 4 cadres moyens de l'administration générale.

- Au niveau des DDA et SAA, le personnel PV comprend 4 ingénieurs et 35 techniciens supérieurs et conseillers agricoles.

- Les huit agents placés au niveau des postes de contrôle sont des cadres moyens. Il faut néanmoins signaler qu'un progrès important a été réalisé à ce niveau, dans la mesure où, suite à l'adoption de la législation phytosanitaire, la PV a remplacé des agents techniques et conducteurs d'agriculture par des cadres spécialisés en PV.

Par ailleurs, la structure du personnel cadre de la DPV est caractérisée par :

- la présence de 14 ingénieurs sur les 86 agents, dont 10 basés à Niamey;

- bonne spécialisation des cadres en matière de protection des végétaux : entomologie, phytopathologie, acridologie, agronomie. Quant aux cadres moyens, ceux-ci ont pour la plupart suivi la formation spécialisée en protection des végétaux;

- faible préparation des cadres au 'management' des différentes ressources avec lesquelles ils ont à conjuguer;

- en comparaison avec les autres Directions ou Ministères, l'équipe de la DPV est relativement jeune;

Mais il y a lieu de souligner que la plupart des cadres se trouvant dans les DDA et SAA ont une longue expérience (entre 9 et 20 ans).

Si l'on tient compte des 16 agents en formation pour le compte de la PV, on peut conclure que cette dernière dispose d'un potentiel appréciable en ressources humaines.

Par ailleurs, les quelques 33 000 brigadiers phytosanitaires formés et encadrés par les agents de la DPV et de la Direction de l'Agriculture constituent un appoint considérable en expérience dans le domaine de la lutte phytosanitaire.

En résumé de cette partie relative au différents actifs de la PV, on peut dire que grâce au soutien des donateurs, cette Direction dispose d'un potentiel important, aussi bien en infrastructures qu'en moyens logistiques et humains.

APPENDIX 6

Niger Aerial Operations

NIGER AERIAL OPERATIONS

Interview with Ibraham Gambo, by Niger AELGA Evaluation Team June 1994.

(Gambo trained in California Agriculture aerial treatment school in 1987 for three months, funded by AELGA)

Because of security issues, no aerial survey and very little spraying is done north of Tahoua between 1992-1994.

Aircraft, Facilities and Equipment

2 Cessna 188, Niamey (one donated by US in 1986)
1 Cessna 185, Agadez (being repaired after a hard landing)
1 Cessna 337, Niamey (private, also being repaired) used for locust prospection only
1987 Canadian-built hangar, Niamey

A helicopter is usually donated for each campaign season (normally a Bell 206 Long Ranger or an Alouette). It is used only for surveying, particularly in the intermediate zone between the agricultural area and the northern dry country and carries only 100 liters of fuel, limiting its range. It usually flies 100 hours a year. It is uncertain as to whether there will be a helicopter this year. Airplanes are not used for any grasshopper surveying.

In 1990, a number of airstrips were repaired. There has been no major repair effort since then, but when needed, a truck pulling leveling equipment will clear the runway before aerial operations take place in the area. Not all airstrips have pesticide shelters and many of those that exist need to be repaired. The proposed USAID-funded pesticide apron plan for the landing strips has never been implemented .

About 1/4 of the avgas used comes from the GON, 3/4 from USAID. The GON pays for the aircraft insurance.

A French mechanic has been there for 3 years and expects to be there for another 3 years, depending on the direction of the operation. He has trained 3 Nigerien mechanics and helps determine the cost of running the aerial operation (he estimated 38,516 CFA per hour to operate an airplane, not including pilot salary and not considering the recent devaluation of the CFA). The aerial crew performs maintenance on private aircraft to earn money. They would like to assume maintenance of the Mali crop protection aircraft.

USAID funds the procurement of spare parts for the aircraft, about $32,000 a year. There has been some serious problems in the logistics of ordering the parts. Because of the inability to specify directly from the aviation company the part needed, they often receive incorrect items. The mechanic, therefore, often has to order an entire new component instead of the small piece needed. He estimates this has inflated costs 4 times (he could do the same

job with $8,000, given better control over the ordering process) and he has many usable parts on hand that are missing only minute elements.

Pesticide Use

The planes are equipped with micronaire nozzles. They are calibrated by using the standards recommended in the Agriculture Herbicide and Pesticide Handbooks, ground test strips and kill estimates, and adjusting calibration accordingly.

Calibration standards used in Niamey:

Fenitrothion 1000 ULV	.25 l/h for grasshoppers
	.5 l/h for desert locusts
Malathion 96% ULV	.65 l/h for grasshoppers
	1 l/h for desert locusts

These two are the main pesticides used though others are sprayed occasionally. Gambo recommends certain pesticide to be used at times, that the DCP may or may not need, but he does not fly when he feels it is unsafe. Pilots are trained to wash out the tank when changing pesticides, wear masks, and never spray over water.

Target Demarkation

Burning tires have not been used for flagging since the GPS system were put in place in 1992. Each aircraft carries a Trible GPS system, donated by AELGA. However, the Garmine are easier to use, and Gambo has requested another GPS unit of this variety.

For grasshopper control, ground survey crews radio to the local DCP station with a GPS location, which is then transmitted to Niamey (each station checks in at 0800 every morning). The next morning, the pilots locate the site with GPS and ground crews contact them on the VHF radio with the requested spray pattern at the location. After completing a test pass, the airplanes continue with 100 meter swaths in the direction of the grasshopper movement. Ground crews remain on the ground in the area after spraying to calculate results. There has been a problem with lack of fuel for the ground vehicles occasionally.

Aerial Strategy

In July, during the planting season, grasshoppers eat the seeds and small plants. Airplanes spray the newly planted areas using a minimal amount of pesticide. The grasshoppers then migrate to the north to eat the new grass. Spray operations follow suit as far north as Tahoua. The grasshoppers, and the ensuing aerial operation moves south with the rains when the northern areas dry up. In August the helicopter prospects in the intermediate zone and generally finds high concentrations of grasshoppers. By September they expect a lot of grasshoppers in the agricultural zone that can eat the new millet and lay eggs, which stay in the ground for 9 months. Egg pod surveys are done in the ag zone with DCP ground crews. Pilots may stay up to one week using the same

landing strip treating the same region.

21 days after the locust swarms land in a certain vicinity, hoppers are found, and pilots expect to spray in the area.

Ground crews have a truck carrying fuel and pesticides, a small pickup with the mechanic and radios (VHF). The landing strip will have the HF radio.

Gambo conducts his own training on ground crew operations, calibration, pesticide safety, etc. He also gives seminars for all CILSS country pilots in conjunction with Agrhymet training.

Radio broadcasts announce when and where aerial spraying will occur, and warn against eating any grasshoppers, being in the fields, following the planes, and having uncovered water containers. (Police can confiscate any grasshoppers being sold in the market, if there is danger of them having been treated with pesticides.)

Reporting
Pilots fill out a Daily Pesticide Use Form and a Summary Pesticide Report. The DCP uses the information from the forms to calculate control efforts, locust patterns, etc.

Survey
Aerial survey is done only for locusts in the afternoons with a full tank of pesticide. However, they generally don't treat until the morning. OCLALAV does not do any prospecting.

Other Pests
The Government pressures the DCP to control bird pests because of the marginality of the food production in the country, and because people will cut down trees in their fields to eliminate the bird population. Under these type of special conditions, when requested (not in the rainy season) the pilots spray the birds with Quelotox, generally at night and away from water.

APPENDIX 7

Utilisation du G.P.S.

I.G./M.S.Z.

REPUBLIQUE DU NIGER

MINISTERE DE L'AGRICULTURE ET DE L'ELEVAGE

DIRECTION DE LA PROTECTION

/DES VEGETAUX/

Monsieur GAMBO IBRAHIM, pilote agricole
Responsable technique de base Aérienne
Direction de la Protection des Végétaux

/-/

Monsieur CHARLES KELLY, Coordonnateur,
Aide d'Urgence en cas de Sinistre,
USAID-NIGER

OBJET : Utilisation du G.P.S.

Suite à l'utilisation du GPS TRANSPAK monté sur deux de nos avions CESSNA 188, j'ai l'honneur de porter à votre connaissance ce qui suit :

- le vol d'essai de navigation a été concluant, c'est un moyen de navigation très précis. Selon que l'on reçoive 4 satellites ou deux, les informations que l'on reçoit sont plus ou moins completes.

- Avec 4 satellites on peut avoir en mode. AIR sur la destination affichée, les élements de navigation suivants :

- le cap à suivre pour aller à la destination

- la distance actualisée à chaque instant qui reste pour arriver à la destination.

- la route vraie que vous deviez suivre pour corriger l'effet du du vent tendant à vous écarter de la route.

- Si vous êtes exactement sur la route, il apparait un trait vertical sur un rond central (| "|"ϕ"|" |). Par contre si vous vous êtes acartés de la route à gauche ou à droite, le trait bouge à droité ou à gauche proportionnellement à la grandeur de votre écart (|"|"o"|" |) (| "|"o"|"| |) pour vous donner le sens de votre correction de route.

- Votre vitesse de déplacement par rapport au sol apparait également sur l'écran.

- le temps qui vous reste pour arriver à destination aussi.

- si le pilote a besoin d'autres informations à savoir le temps de vol ou l'heure d'arrivée il peut les obtenir en plaçant le bouton rotatif sur Time.

- s'il veut savoir sa position, la date, l'heure il place le bouton en position POS.

- s'il veut avoir la distance au point de destination, la route et le cap il place le bouton en position DIST.

- s'il veut aller à une autre destination, il l'affiche en position WPT (Waypoint).

- S'il veut changer de mode de navigation sol, mer, air il place le bouton en position Set-up pour choisir.

Pour des traitements aériens, les GPS sont très utiles parce que si les avions en sont équipés.

1°) le pilote est a mesure d'aller la ou il doit traiter avec précision même si la superficie est petite.

2°) il y va tout droit donc économise le temps, le carburant et surtout l'usure des pièces changeables. A ce titre, il est important de noter que le moteur, l'helice, le régulateur d'helice, les magnétos, le démarreur et l'alternateur ont un potentiel de 1.200 heures de fonctionnement.

.../...

Donc en gagnant même 10 minutes sur un vol, nous gagnons 10 minutes sur la vie des pièces citées et du carburant. Un GPS peut être amorti trsè vite.

3°) une fois qu'une localité est choisie comme site de traitement ou un point quelconque (FIX), en exécutant les passes à partir de ce point en éloignement, le GPS donne avec précision :

a) le cap suivi par l'avion

b) le cap du point ou village que l'on traite à tout moment; pour y revenir c'est facile.

c) l'écart latéral par rapport au point ou au village au fur et à mesure de l'on exécute les passes.
C'est le cross-track-error (XTE) et à partir de la on sait la largeur totale des bandes traitées.

d) on a également la distance à partir de laquelle on s'arrête de traiter pour virer et revenir en sens inverse pour la passe suivante .

e) on peut savoir aussi avec précision les coordonnées géographiques de l'avion à tout instant. Ceci est très interressant parce que tout prospecteur muni de GPS peut reperer les Coordonnées de sa position. Pourvu que son véhicule soit équipé de HF, il peut appeler un avion qui traite dans la zone ou si lui même a un poste portatif VHF Talkie-Walkie il peut communiquer avec l'avion et passer des informations. Mais cela suppose que l'équipe terrestre sache manipuler correctement un GPS et que d'autre part une méthode de travail soit retenu entre le pilote et son prospecteur. Je suggère pour ma part qu'une formation soit donnée à des agents très motivés à suivre les avions durant les traitements.
Cette formation contiendra quelques notions d'orientations afin que le pilote et le prospecteur parlent vraiment le même language. J'ai eu à utiliser mon GPS sur une voiture.
J'ai découverts qu'il donne les même informations que dans l'avion : la direction de mouvement du véhicule, sa vitesse et aussi les coordonnées.

On peut donc faire un bon travail, précis de prospecteur. L'utilisation du GPS TRANPAK est souple. On peut l'utiliser en ne receptionnant que 2 voir 3 satellites sur mode Land ou SEA et cela convient très bien même quand il s'agit d'avion. L'unité de mesure devient le kilomètre comme en voiture.

Pour conclure, je dirai que les GPS rentabilisent les traitements car ils rendent globalement l'orientation plus facile, font gagner du temps.

Le Responsable Technique

- GAMBO IBRAHIM -

DRV AERO
Responsable Technique

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APPENDIX 8

Capacite Institutionnelle Nationale et Regionale

Source: PNC. 1994. Alternatives De Fonctionnement et De Financement De La "PV" au Niger. CIDA, Niamey, Niger.

La réelle manifestation d'une volonté de l'État après celle qui a consisté à créer la DPV en 1985, a commencé à se concrétiser en 1990 lorsque la Conférence Nationale a recommandé la création d'un fonds de développement rural pour financer la protection des végétaux et la santé animale. Cette recommandation est aujourd'hui prise en compte puisque les textes de création d'un Fonds National de Développement de l'Agriculture et de l'Élevage (FNDAE) sont en cours d'élaboration. Une certaine prise de conscience du problème est également perceptible aujourd'hui chez certains partenaires du Ministère de l'Agriculture tels le Ministère des Finances et du Plan, les collectivités locales et dans certains milieux décisionnels.

5.5. CAPACITÉ INSTITUTIONNELLE NATIONALE ET RÉGIONALE

L'analyse de la capacité institutionnelle se fera à travers celle de la Direction de la Protection des Végétaux (DPV) en tant qu'instrument de l'État au niveau national, et celle des collectivités locales, des projets agricoles et des organisations rurales (coopératives, brigades phytosanitaires) au niveau régional.

S'agissant de la DPV, elle constitue aujourd'hui l'instrument privilégié au niveau national en matière de défense des cultures. Son positionnement actuel dans l'organigramme du Ministère de l'Agriculture et de l'Élevage (MAG/EL) lui confère une autonomie d'action qui lui permet d'agir avec rapidité et efficacité et en tout état de cause mieux que si elle avait été maintenue dans la position de simple service de protection des végétaux comme ce fut le cas avant 1985.

Au plan institutionnel, la DPV est une structure opérationnelle à travers ses services et sections spécialisées, son système de prospection, notamment le Centre National Antiacridien et ses services départementaux et antennes d'arrondissement.

La DPV dispose des ressources humaines de qualité, d'équipement –notamment sa base aérienne–, de matériel roulant (véhicules de traitement et de transport) et de pesticides divers lui permettant d'assurer une couverture phytosanitaire du territoire qui, sans être totale ou suffisante, est quand même satisfaisante.

L'analyse du fonctionnement actuel de la DPV fait ressortir deux constats majeurs pouvant influencer sa capacité d'intervention.

Le premier constat est lié à l'interdépendance DPV-DA aux niveaux régional et sous-régional. Il est en effet important de noter que la capacité opérationnelle de la PV serait sérieusement limitée si elle ne s'appuyait pas sur les structures régionales de la Direction de l'Agriculture qui mettent réellement en œuvre les programmes de la DPV avec l'appui matériel de celle-ci.

Le second constat résulte de la trop forte dépendance de la DPV des bailleurs de fonds qui fournissent pratiquement tous les moyens nécessaires aux interventions (équipements, produits et matériel de traitement.

véhicules, financement, etc.). Il convient de rappeler, à titre d'illustration, que pour l'année 1991, les donateurs ont fourni 81% des moyens nécessaires aux interventions.

Ainsi, même si la capacité d'intervention de la DPV paraît assez satisfaisante aujourd'hui, il n'en demeure pas moins qu'elle reste tributaire des structures de la Direction de l'Agriculture et surtout des bailleurs de fonds. Avec le retrait déjà commencé de ces bailleurs de fonds, la PV, dans sa forme actuelle, connaîtra probablement de sérieuses difficultés. Déjà cela se fait fortement sentir dans le fonctionnement de certains services ou cellules (Études biologiques, suivi-évaluation, CNA, etc.).

La nécessité de solutions alternatives s'impose avec évidence.

S'agissant des collectivités locales, leur capacité d'intervention se mesure à l'importance des allocations budgétaires consenties en faveur de la protection des cultures. Ces allocations sont de l'ordre de quelques millions dans le meilleur des cas, c'est-à-dire dérisoires. La raison essentielle à cela est que traditionnellement la protection des végétaux a toujours été prise en charge par l'État. Il n'y avait donc aucune disposition prise au niveau de ces collectivités en vue de financer la défense des cultures. Actuellement les collectivités sont mal préparées pour participer au financement de la lutte phytosanitaire en raison non seulement des habitudes mais aussi de la réduction de leurs ressources financières et des difficultés de collecte des taxes qui alimentent leurs budgets.

S'agissant des projets agricoles, des ressources sont souvent dégagées pour financer la protection des végétaux dans leurs zones d'intervention.

L'analyse de l'action des projets fait apparaître qu'il s'agit assez souvent d'interventions ponctuelles non organisées et intégrées dans leur politique. Ainsi en ce qui concerne les projets agricoles, on peut parler de capacité potentielle puisqu'ils disposent d'assez de ressources. Il s'agit à leur niveau de faire prendre en compte dans leur politique et stratégie d'intervention et ce de manière systématique et organisée, la protection des végétaux au même titre que les autres intrants agricoles.

En ce qui concerne les organisations rurales, il s'agit essentiellement des coopératives auxquelles on peut ajouter les brigades phytosanitaires créées par la DPV.

S'agissant des coopératives, elles ne disposent pas de capacité réelle d'intervention. Le système coopératif est caractérisé par une grande faiblesse institutionnelle, des problèmes organisationnels, financiers et matériels. En réalité, c'est toute la politique coopérative qui est déficiente.

On peut cependant tenter d'analyser la capacité d'intervention des coopératives à travers celle de la Centrale d'Approvisionnement (CA) dont l'objet est «la gestion des intrants agricoles destinés au monde rural (matériel agricole, engrais, produits phytosanitaires, semences, autres équipements et fournitures agricoles)».

Comme on peut le constater, la CA devrait théoriquement approvisionner les coopératives, le monde rural en général, en produits phytosanitaires et autres équipements.

La CA est dotée de l'autonomie de gestion mais n'a pas de statut juridique. Le principal problème de la CA et qui en limite considérablement la capacité d'action est le manque de fonds propres pour assurer ses approvisionnements et son fonctionnement. Elle était tributaire de subventions de l'État supprimées en 1985/86, de crédit accordé par la CNCA qui a elle même cessé ses activités, et de lignes de crédit des pays donateurs et autres organismes internationaux.

Actuellement l'action de la Centrale d'Approvisionnement se réduit à la gestion des aides fournies à l'État par la coopération internationale. Ces aides sont constituées d'engrais, matériel agricole et produits phytosanitaires dont la gestion s'effectue dans des conditions très difficiles, compte tenu des problèmes financiers que rencontre la CA.

S'agissant des brigades villageoises, leur formation et leur mise en place ont débuté en 1983 et aujourd'hui plus de 7 000 brigades sont formées, soit environ 33 000 brigadiers à travers toute la zone agricole du pays. Les fonctions ou tâches dévolues aux brigadiers phytosanitaires ont beaucoup évolué. Au début ces formations fonctionnèrent en un appui aux agents de l'agriculture et de la PV dans le domaine des traitements des cultures. Aujourd'hui elles sont beaucoup responsabilisées et leurs tâches vont de la signalisation aux premiers soins en cas d'intoxication en passant par les traitements des cultures et denrées stockées et l'entretien des appareils de traitement. Il s'agit par conséquent de structures opérationnelles.

Cependant l'analyse de l'action et du fonctionnement du réseau des brigades phytosanitaires révèle des insuffisances qui limitent par conséquent leur capacité d'intervention. Parmi les problèmes les plus importants on cite la non disponibilité de produits et le non équipement des brigades en appareils de traitement. Les produits et les appareils sont détenus par les services techniques (SAA, DDA et CDA).

Il y a également les problèmes liés à la formation des brigadiers. Certains thèmes sont en effet mal maîtrisés et il paraît nécessaire de procéder à des recyclages afin de maintenir et même améliorer la compétence technique et organisationnelle des brigadiers.

La résolution de ces problèmes techniques et matériels et plus particulièrement une nouvelle orientation et une nouvelle stratégie élaborée et appliquée dans un esprit de plus grande responsabilisation des instances locales et des producteurs devraient permettre d'accroître la capacité d'intervention des brigades phytosanitaires et d'augmenter leur efficacité.

5.6. CAPACITÉ DES PAYSANS ET DES PRODUCTEURS

La capacité des paysans et producteurs en matière de lutte phytosanitaire est une donnée actuellement très mal maîtrisée.

La situation actuelle est surtout caractérisée par une certaine prise de conscience et une certaine volonté qui se traduit par une timide prise en charge ou participation au financement des traitements. C'est ainsi que les agriculteurs achètent les piles nécessaires aux appareils ULV de traitement, fournissent des compensations financières aux brigadiers phytosanitaires et même, pour une certaine catégorie d'entre eux achètent les pesticides nécessaires au traitement de leurs champs, même si par ailleurs les quantités achetées sont souvent insuffisantes. Ce sont surtout les paysans pratiquant des cultures de rente qui entrent dans cette catégorie (riz, oignon, coton, niébé, arachide, cultures maraîchères).

Les paysans sont donc très préoccupés par les problèmes phytosanitaires et semblent prêts à prendre davantage part au financement de la protection des cultures.

Mais en plus des problèmes actuels liés à la faiblesse des circuits d'approvisionnement en pesticides et appareils de traitement, on peut se demander si les paysans, malgré leur volonté, ont la capacité financière de prendre en charge ou même de participer de manière significative à la prise en charge financière de la protection des cultures ? Les cultures de rapport peuvent-elles contribuer en même temps au financement des traitements des cultures vivrières (mil, sorgho) ? Si oui, jusqu'à quel niveau ?

En tout état de cause, on peut affirmer qu'actuellement la capacité d'intervention des paysans est fortement limitée par les problèmes énormes liés au financement (absence de crédit), à la faiblesse des circuits d'approvisionnement, aux insuffisances de la politique agricole, à la commercialisation des produits agricoles et à l'environnement économique en général.

L'analyse du partage incontournable des coûts de la protection des cultures soulève de nombreuses questions aujourd'hui sans réponse. Aussi, il semble nécessaire d'engager une étude approfondie sur la question. Il s'agit en réalité d'un problème de fond dont la solution nécessite une approche globale qui intégrerait les politiques, les stratégies et la technique.

5.7. LA DPV – POSITIONNEMENT ET ORGANISATION

La DPV est une direction centrale du Ministère de l'Agriculture et de l'Élevage (MAG/EL). Jusqu'en 1985 il ne s'agissait que d'un service de protection des végétaux situé au sein de la Direction de l'Agriculture. À partir de 1985 le service de la protection des végétaux fut érigé en direction.

APPENDIX 9

ENVIRONMENT

ENVIRONMENT

ENVIRONMENTAL MONITORING

Part of an overall pest management system is monitoring treated areas for potential environmental effects of pesticides as a means of mitigating environmental impact of control. Monitoring can indicate negative impacts on flora and fauna, as well as detect improper application methods which can impact human health and increase operations cost. Measuring pesticide residues in the environment is an excellent way of monitoring, and requires a residue analysis laboratory for full implementation. Control programs should incorporate residue analysis, as well as qualitative behavioral observations of non-target organisms near any pesticide target areas. CPS pesticide applicators must be trained to note unusual behavior among fauna of the area.

Although monitoring is likely to produce variable results, it can be a valuable feedback tool in control operations. It can provide some general conclusions on effects and can be used in designing modifications of pest management activities. Given the large number of variables that can affect results and the limited resources likely to be available for monitoring, the most practical ways to assess the effects of pesticide applications may be mortality and population counts and behavioral observations. Baseline conditions for an indicator species and its habitat should be determined prior to pesticide application, and post-application monitoring should be conducted at intervals sufficient to allow assessment of both immediate and long-term effects. It is also important to select species with demonstrated sensitivity to pesticide exposure (indicator species).

A Varian 3400 gas chromatograph, obtained through the CIDA project, can be used for analysis of organophosphate or organochlorine residues in soil, water, and plant or animal tissues. Two Nigerien technicians have been trained to use and service the chromatograph. Within three months, there should also be the capacity to analyze carbamates and coumarines with thin layer chromatography.

Gas chromatography has also been used to monitor pesticide formulations. (Last year a donation of pesticide from Nigeria was sampled, and only one out of five samples was confirmed to be at the concentration listed.)

The laboratory has enough replacement parts and consumables to operate the analytical equipment for 6 months after the Canadian project ends. Another source must be found after that time. GTZ was cited as a possibility.

Environmental monitoring requires a residue analysis laboratory for full implementation. Control programs should incorporate residue analysis, as well as qualitative behavioral observations of non-target organisms near any pesticide target areas.

Given the large number of variables that can affect results, and the limited resources likely to be available for monitoring, the most practical ways to assess the effects of pesticide applications may be mortality and population counts and behavioral observations. Baseline conditions for an indicator species and its habitat should be determined prior to pesticide application, and post-application monitoring should be conducted at intervals sufficient to allow assessment of both immediate and long-term effects. It is also important to select species with demonstrated sensitivity to pesticide exposure.

In terrestrial ecosystems, selection of soil microorganisms or other low-tolerance invertebrates as indicator species is recommended. Monitoring animals of economic value or threatened status should also be required. In cases where pesticide persistence is an issue, residues should be measured. Populations of vertebrate predators, such as birds or prey, are likely to fluctuate too much to make population counts an effective monitoring tool. However, reproduction monitoring of carnivores (e.g., observations of egg conditions, birth defects, infant mortality) may be a useful tool in determining the effects of pesticides known to affect reproductive success, particularly in cases where baseline data are known.

APPENDIX 10

RESEARCH

RESEARCH

NATIONAL RESEARCH INSTITUTE at MARADI

The Institute has five divisions: Rainfed Crops, Irrigated Crops, Natural Resource Management, Farming Systems and Extension, and Animal Production. Major crops on which research is being done are millet, sorghum, groundnuts, and cowpeas. Some insect control projects are investigating alternatives to chemical control. The Original Research Council of the Institute is the body that makes decisions on support of proposals submitted to the Institute.

Biological Control

The focus of the DFPV biological control research was originally on locusts, but because of fluctuating populations and high mobility of locust species, efforts began emphasizing control of grasshoppers instead. Implications of successful grasshopper control, however, have to some extent been extended to possible control of locusts.

The DFPV project investigated a number of grasshopper pathogens, with fungal species apparently the most likely candidates as control agents. Field collections of pathogenic fungi were made in West Africa and the Southern Arabian peninsula, along with surveys of local grasshopper and locust populations for likely fungal species. The most likely fungal species as a biological control possibility was a common West African species, Metarhyzium flavoviride. It was particularly virulent, and under optimal conditions could kill a desert locust in five days. The time period under actual field conditions may be closer to 10 days; but the first mortality starts to occur a week after application.

Preparing the virus consists of rearing the organism on a rice-based artificial medium, harvesting the spores, and formulating with oil. Virulence of the cultures tends to decline with time, and must be checked periodically, the cultures reinoculated with spores from field-collected material. Shelf life of spores is at least six months. There is some confidence about the ability of the fungus to control grasshoppers, but it is uncertain whether the pathogen could be produced in sufficient quantities at an economic level that would be competitive with the chemical pesticides.

Field cage studies show that the fungus can be effective on desert locusts, but evaluation is difficult for effectiveness on unconfined populations. The fungus is not self-proliferating, but would need to be regarded as a microbial insecticide. Hopper bands have been sprayed, but once again, mobility as the hoppers continue their development has not allowed adequate assessment of the technique.

Full scale production of the fungus has not been done; if funding is available, a pilot plant will be developed, to be located in Coutenou, Benin.

Traditional Methods

Maradi CPS has made an inventory of traditional control methods in 60 villages, highlighting those which show promise. If the control methods are shown to be effective, CPS would like to publish a guide to traditional methods of insect control, to be distributed to CPS district facilities. A method which pointed the way in the project is the application of a mixture of petrol, peppers, water, and detergent for use against bean aphids. CPS is interested in identifying the active ingredients in this and other alternative pesticides. CPS has submitted a project proposal to the National Institute of Agricultural Research in an effort to allow quantitative determination of the effectiveness of the inventory of traditional methods being compiled by CPS. CARE has been partially funding the project, and is ready to extend support if the National Institute accepts the project proposal. The World Bank has also shown willingness to support the project, given a mechanism for confirming effectiveness of the alternative control methods.

APPENDIX 11

Training Under AELGA/N

TRAINING UNDER AELGA/N

List of DCP agents trained under the AELGA project

2 Nigerien pilots
2 agents at the Marfin Management seminar in Ivory Coast
1 agent in montpelier for Integrated Pest Management (IPM)
1 agent in Strasbourgh for the Symposium on IPM
1 agent in Bamako for the Health Workshop
4 agents in Dakar for the Locustox project visit
1 agent in Abidjan for the Management course

Other persons benefited from training under the AELGA project

1 agent of the Ministry of Health for the Bamako Health Workshop
AELGA Project Assistant for training on:

- Project Implementation Course in the US
- Integrated Pest Management course in the US
- Environmental Impact Assessment course in the US
- Bamako Seminar on Health Issues
- Accra Workshop on Integrated Pest Management
- Locustox Project visit in Dakar

Other in-country Workshops & Training funded under AELGA/N

- Conference on Disposal of Pesticide Containers and Obsolete Pesticides
- Training on Radio Use
- Workshop on Pesticide Impact on Human Health and Environment
- Training on Rodent Control and Monitoring
- Workshop on Pesticide Legislation
- English Class Training
- Greenness maps reading
- Grasshopper Identification at the DFPV center

APPENDIX 12

Department of Crop Protection Training (DFPV)

DEPARTMENT OF CROP PROTECTION TRAINING (DFPV)

The Project for Training in Crop Protection was established in 1981, following a request by the Member States of the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS). In 1986, the DFPV's objective is to contribute to food self-sufficiency by improving the protection of crops and stored products against pests, diseases and weeds.

DFPV regular Activities:

- A two-year training course for Crop Protection Technicians - A four-month training course in Crop Protection, intended for the following professional categories:
    - o teachers at agricultural schools crop protection
    - o senior technicians and agronomists
- Specialization of Agricultural Engineers and Agronomists in their last year of study
- The organization of workshops, covering certain specialized topics in Crop Protection
- The dissemination of information on Crop Protection in the Sahel

APPENDIX 13

Alternatives de Fonctionnement et de Financement

Source: PNC. 1994. Alternatives De Fonctionnement et De Financement De La "PV" au Niger. CIDA, Niamey, Niger.

9. ALTERNATIVES DE FONCTIONNEMENT ET DE FINANCEMENT : LES GRANDES ORIENTATIONS

Les résultats de la première phase de l'étude sur les alternatives de fonctionnement et de financement de la protection des végétaux ont été présentés sous la forme de trois scénarios (cf. tableaux 3a et 3b). Le choix de ces scénarios a été basé sur la nécessité de regrouper un certain nombre de possibilités de fonctionnement et de financement réalisables à des degrés divers (court, moyen et long terme), mais aussi en tenant compte de certains critères jugés incontournables dans le contexte actuel. Ces critères constituent les repères de toute la réflexion engagée dans le cadre de cette étude afin de déboucher sur des scénarios définitifs de fonctionnement et de financement, scénarios qui sont proposés dans ce document. Ces critères sont les suivants :

- la nécessité d'assurer un service public en ce qui concerne certaines activités de protection des végétaux. C'est pourquoi on retrouvera, et ce pour tous les scénarios, une confirmation des responsabilités de l'État dans son rôle d'élaboration et de mise en œuvre de politiques PV, d'élaboration et de suivi d'un cadre légal, de définition et de suivi d'une réglementation environnementale ;

- une plus grande implication du secteur privé dans les activités de protection des végétaux. Cette implication ne pourra se faire cependant sans certaines mesures d'accompagnement;

- une participation plus grande des paysans et producteurs au traitement de leurs cultures. Il est cependant difficile, voire impossible, à l'heure actuelle de déterminer leur niveau de capacité de prise en charge. L'étude «Analyse de la capacité de prise en charge par les paysans des activités PV» actuellement en cours devrait apporter toute la lumière sur le sujet. Il n'en demeure pas moins que tôt ou tard les paysans et les producteurs devront contribuer davantage aux traitements de leurs cultures compte tenu de la rareté des ressources publiques;

- une «redynamisation» des coopératives et une plus grande implication de leur part en matière de protection des végétaux, entre autres. Une démarche est actuellement en cours afin de rendre ces structures plus autonomes et éventuellement plus investies auprès des paysans et des producteurs;

- une plus grande participation des institutions régionales et des collectivités locales. Dans le contexte de décentralisation à venir au Niger, ces institutions auront un rôle majeur à leur niveau.

La deuxième phase de l'étude s'était donc appuyée sur ces scénarios comme base d'une réflexion plus poussée devant aboutir à des propositions concrètes et réalistes.

TABLEAU 3a
OPTIONS STRATÉGIQUES (SCÉNARIOS) PV

FONCTIONS	Scénario I		Scénario II		Scénario III	
	Resp.	Struct	Resp.	Struct	Resp.	Struct
1.0 Elaboration politique en PV	MAG/EL	DPV	MAG/EL	DPV	MAG/EL	DPV
1.1 Mise en oeuvre politique PV (stratégie, programmation)	MAG/EL	DPV	MAG/EL	DPV	MAG/EL	DPV
1.2 Mise en application politique PV	Tous inter	Toutes	Tous inter	Toutes	Tous inter	Toutes
2.0 Cadre légal						
2.1 Élaboration législation et réglementat.	MAG/EL	DPV	MAG/EL	DPV	MAG/EL	DPV
2.2 Contrôle réglementaire / frontières / pesticides / végétaux	MAG/EL	DPV D.A	MAG/EL	DPV D.A	MAG/EL	DPV D.A
2.3 Réglementation environnementale	MAG/EL	DPV MHH/MSP	MAG/EL	DPV MHH/MSP	MAG/EL	DPV MHH/MSP
3.0 Interventions (cultures + denrées stockées)						
3.1 Contre infestations majeures (fléaux)	MAG/EL	DPV	MAG/EL	Pri/ONG	MAG/EL	Para pub (EPA, EPIC, SEM (3.1 - 3.2)
3.2 Contre infestations d'importante moyenne	MAG/EL	Coll. loc.prj	Coll. loc.prj	Pri/ONG Projet	coll. Locale	
3.3 Contre infestations localisées	Prod. Grp prod	Prod. Grp prod	Prod. Grp prod	Privé Prod	Prod. Grp prod	Privé Para-pub
4.0 Appui / Conseil / Formation	MAG/EL	DPV	Col. loc	Privé/ Projet/ ONG	Group. prod.	Privé Para.Pub autres
5.0 Signalisation / Prospection	MAG/EL	DPV DA	Col.loc	Prod..	Col.loc	Group prod.
6.0 Recherche	MAG/EL	INRAN DPV (Tests)	MAG/EL	INRAN DPV Autres	Para-public	Privé Ins.Rég. INRAN
7.0 Approvisionnement / Distribution	MAG/EL	centrale d'app...	MAG/EL + col (stocks sécurité)	DPV + col.L	P.Pub (stocks sécurité)	P.Public
			Privé (distri. trait.)	Group prod.	Privé (distr + trait)	Group prod.
8.0 Recueil d'information Statistiques / circulation et coordination de l'information	MAG/EL Inst. Rég.	Oclalav DPV SYSP	MAG/EL Inst.Rég.	OCLALAV DPV SYSAPEC	Para-public. Inst.Rég	Para-public OCLALAV SYSAPEC

MAG/EL : Ministère de l'Agriculture et de l'Élevage
DPV : Direction de la Protection des Végétaux
D.A. : Direction de l'Agriculture
MHE/MSP : Ministère de l'Hydraulique et de l'Environnement/Ministère Santé Publique
Coll.loc. : Arrondissement et commune
Prod. : Producteurs
Grp. prod. : Groupement de producteurs
Prj. : Projet
INRAN : Institut national de recherche agronomique
OCLALAV : Organisation commune de lutte anti-acridienne et anti-aviaire
Para-public : EPA : Établissement public à caractère administratif
EPIC: Établissement public à caractère industriel et commercial
S.E.M.: Société d'économie mixte
O.N.G. : Organisation non gouvernementale
Privé : Commerçants, ONG, Coop, Concession
SYSAPEC : Système d'alerte précoce des ennemis de culture (Projet FAO)

Tableau 3b
AVANTAGES ET INCONVÉNIENTS DES DIFFÉRENTS SCÉNARIOS

SCÉNARIO I

AVANTAGES	INCONVÉNIENTS
• Plus grande responsabilisation de l'État • Clarification des rôles et attributions entre intervenants • Assure la continuité avec l'existant, donc acceptation plus facile • Maintient les acquis en matière d'expertise technique	• Charges très lourdes • Déresponsabilisé les intervenants autres que l'État • Présomption de lourdeur administrative, de centralisation excessive et d'insuffisance de marge de manœuvre • Provoque un désintéressement des partenaires régionaux • Expertise technique trop centralisée à Niamey

SCÉNARIO II

AVANTAGES	INCONVÉNIENTS
• L'État conserve la responsabilité de définir les orientations générales la législation, ainsi que l'application de cette dernière • Transfert des responsabilités vers les autres intervenants; d'où leur responsabilisation et une présomption de plus grande efficacité	• Incertitude par rapport à la capacité de prise en charge des intervenants • Il y a des ajustements à faire par rapport à la situation existante (ex: réglementation fiscale, organisation des coopératives, formation)

SCÉNARIO III

AVANTAGES	INCONVÉNIENTS
• Transfert de responsabilités vers d'autres intervenants (responsabilisation)	• Incertitude relative au degré d'autonomie des entités parapubliques (EPA, EPIC, SEM)
EPA : • Assure un contrôle complet de l'activité par l'administration • Continuité du service public	EPA : • Trop grande mainmise de l'administration
EPIC : • Continuité du service public • Autonomie de gestion	EPIC : • Exigences de l'intérêt général par rapport aux intérêts privés • Lourdeur des mécanismes de gestion
Régie : • Assure l'essentiel des tâches publiques	Régie : • Aucune individualité propre sur le plan financier
Concession : • Union Nationale des Coopératives (UNC) • O.N.G.	Concession : • Exigence de l'intérêt général par rapport aux intérêts particuliers • Ne peut s'appliquer qu'à des services pour lesquels une contrepartie financière peut être demandée • Impose un minimum de libéralisme économique

Le travail réalisé l'a été sur la base d'un horizon moyen de trois ans (1995-1997) et selon une approche de scénarios glissants adaptés au cas spécifique de chaque fonction. Il convient de rappeler ici que l'analyse des missions et responsabilités de la Direction de la Protection des Végétaux (DPV) fait ressortir essentiellement trois grandes catégories de mission. Ce sont :

- Une mission de conception,
- Une mission d'ordre réglementaire,
- Une mission d'ordre technique.

Huit (8) principales fonctions ont été identifiées à l'intérieur de ces missions. Elles sont :

- Conception, élaboration et mise en œuvre de la politique nationale en matière de protection des végétaux (PV),
- Définition d'un cadre légal = élaboration de la législation et de la réglementation phytosanitaire et application de cette législation,
- Prospection-signalisation (prévention),
- Interventions,
- Appui-Conseil-Formation,
- Liaison–recherche–vulgarisation,
- Approvisionnement-Distribution,
- Recueil d'informations et statistique, circulation et coordination de l'information.

De ces huit (8) fonctions, le concept du désengagement ne s'applique en réalité qu'à trois fonctions principales, au niveau desquelles il est possible d'envisager un désengagement significatif de l'État au profit d'autres partenaires qu'ils soient privés ou publics. Ces fonctions sont les suivantes :

- la fonction **Approvisionnement-Distribution**
- la fonction **Intervention** et la fonction **Prospection-Signalisation**, intégrée à la fonction Intervention pour fin de rapport

Ces deux fonctions *représentent à elles seules plus de 80% du coût de la lutte phytosanitaire au Niger*, estimé à près de 1,5 milliard de FCFA en 1991, non compris les coûts administratifs des régions et de la structure centrale.

- S'agissant de la fonction «conception-élaboration et mise en œuvre de la politique nationale en matière de PV» ainsi que la fonction «Législation-Réglementation phytosanitaire», pour des raisons d'intérêt public, elles relèvent de l'État (DPV) et ne peuvent être transférées à d'autres

partenaires. Ainsi peu importe le scénario, elles demeurent du ressort de l'État (DPV). Bien plus, ces deux fonctions seront renforcées dans le cadre de la nouvelle mission de la DPV induite par les alternatives de fonctionnement et de financement. Il en est de même de la fonction «information-statistique» et de la fonction «Prospection-signalisation», même si une part de ces activités pourront être réalisées par d'autres partenaires.

- S'agissant de la fonction «Appui-Conseil-Formation» qui apparaît être une des fonctions majeures de la DPV et devant même être renforcée, elle se révèle être un déterminant important des autres fonctions. Aussi est-elle traitée horizontalement au sein de l'ensemble des fonctions. Il est à noter cependant que les partenaires privés auront un rôle à jouer au niveau de cette fonction, parallèlement à l'action renforcée de la DPV.

Chacune des fonctions traitées a été subdivisée en sous-fonctions. Pour chaque sous-fonction, il sera précisé l'option retenue (maintien à la DPV, désengagement total immédiat ou progressif, désengagement partiel ou progressif).

De plus, pour chaque sous-fonction, la structure de responsabilité qui précise le maître d'ouvrage est décrite, de même que les structures de réalisation (maître d'œuvre) et les structures de financement.

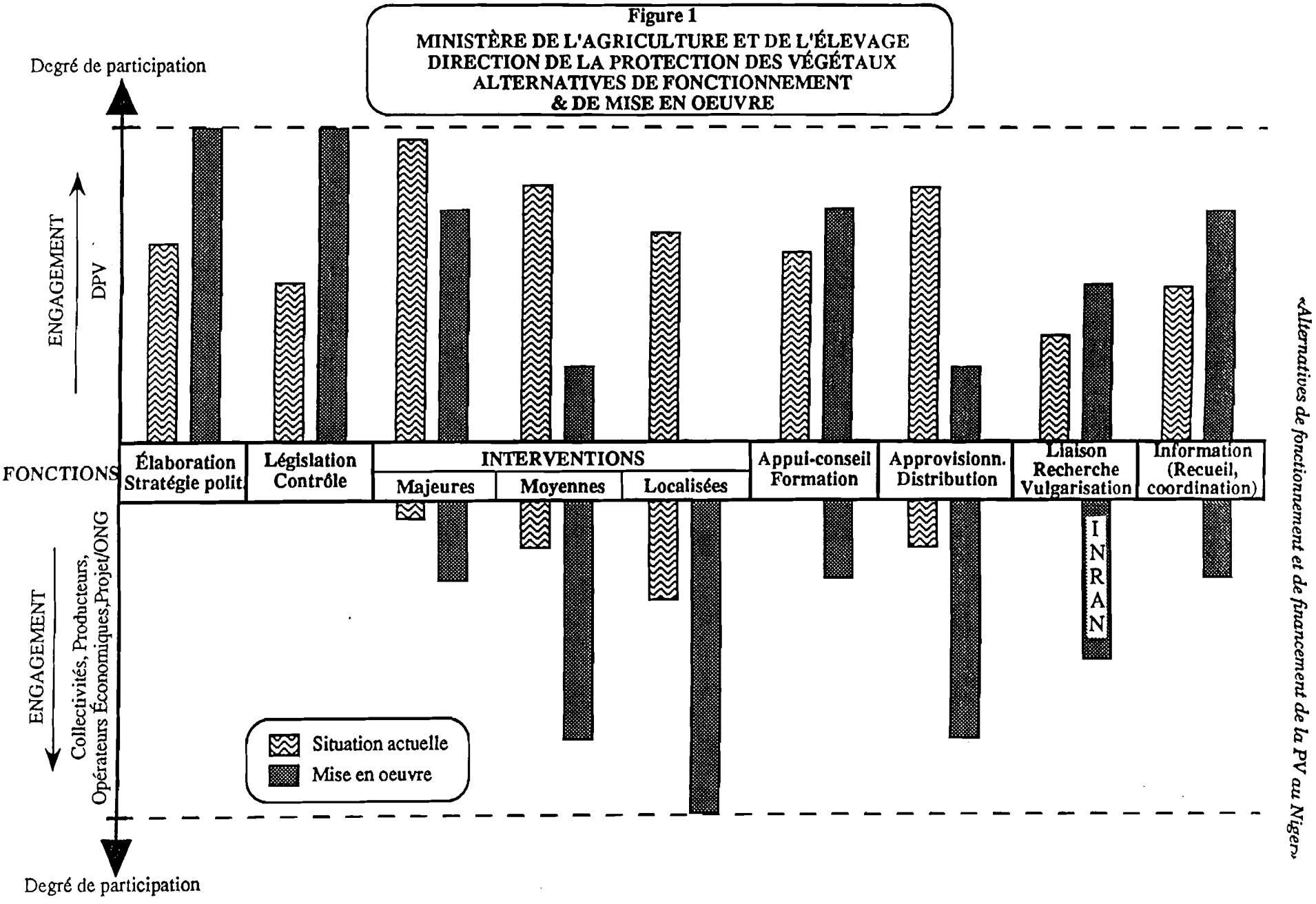
Les grandes lignes des alternatives de fonctionnement et de financement peuvent se résumer comme suit par fonction. La figure 1 de la page suivante représente sous forme d'histogramme les engagements/désengagements à prévoir pour l'ensemble des fonctions de la PV.

9.1. Fonction Conception-Élaboration politique et stratégie en matière de Protection des Végétaux

Comme cela a été dit plus haut, cette fonction est une des prérogatives majeures de la DPV et elle ne peut en aucun cas être transférée ou déléguée à une autre partie. Mieux, dans le cadre de la nouvelle mission de la DPV, cette fonction doit être renforcée.

La DPV reste donc le maître d'ouvrage, mais elle assurera la réalisation avec d'autres partenaires telle la Direction de l'Agriculture.

Au plan du financement, les charges relèvent de l'État.



«Alternatives de fonctionnement et de financement de la PV au Niger»

9.2. Fonction Législation-Contrôle

Cette fonction ne fera pas l'objet de désengagement et reste du ressort exclusif de la DPV.

Fonction essentielle, elle sera renforcée dans le cadre du nouveau mandat de la DPV et de la nouvelle législation phytosanitaire devant prochainement entrer en vigueur.

La DPV est par conséquent le maître d'ouvrage, mais la réalisation sera assurée par elle en collaboration avec les services spécialisés des Ministères de la Santé Publique, de l'Hydraulique et de l'Environnement (Direction de l'Environnement), des Finances et du Plan (Services des Douanes) et de l'Intérieur.

Le financement est assuré par l'État.

9.3. Fonction Intervention

Elle comprend trois sous-fonctions :

- Les interventions majeures[1],
- Les interventions de moyenne importance,
- Les interventions localisées.

- S'agissant des interventions majeures, il n'y aura pas de désengagement de la DPV qui en assume la responsabilité totale au niveau de la maîtrise d'ouvrage. Au niveau de la réalisation, c'est la DPV qui interviendra avec ses propres moyens et/ou sous-traitera tout ou partie de l'activité aux opérateurs économiques agréés.

  Il faut signaler que même à ce niveau il n'y a pas absence totale de l'action des producteurs et autres structures régionales (brigades, collectivités).

  Au plan du financement, celui-ci sera prioritairement assuré par l'État (avec contribution éventuelle des bailleurs de fonds au travers de projets agricoles nationaux et régionaux) et secondairement par les collectivités locales et les producteurs dans une moindre mesure.

- En ce qui concerne les interventions de moyenne importance, l'option proposée est un désengagement partiel mais significatif de la DPV. Ce désengagement qui se réalisera de manière progressive ne sera jamais total, mais le poids des activités reposera désormais prioritairement et

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1 Pour une définition technique des différentes normes définissant les types d'intervention, le lecteur se rapportera au document *Rapport du séminaire «Atelier sur l'élaboration d'une stratégie d'utilisation des produits phytosanitaires à des fins publiques»*, Direction de la Protection des Végétaux - Projet Nigéro-Canadien (PNC), Juin 1993, pp.10-14.

essentiellement au niveau régional (collectivités locales, PV régional, projets régionaux, ONG et opérateurs économiques agréés).

Au niveau de cette sous-fonction, la maîtrise d'ouvrage est confiée à la Direction Départementale de l'Agriculture (DDA).

Les structures de réalisation sont constituées par les services des DDA, les brigades phytosanitaires, les producteurs et les opérateurs économiques agréés.

Le financement sera assuré par les DDA, les collectivités, les projets, les ONG et les producteurs.

- Enfin, en ce qui concerne les interventions localisées, le maître d'ouvrage est le producteur. La structure de réalisation est constituée par le producteur, les brigades phytosanitaires et les opérateurs économiques autorisés.

  Le financement sera assuré par le producteur.

Au plan général, il convient de faire remarquer que la mise en œuvre du désengagement tel que proposé ici devra tenir compte d'éléments tels que la nature des spéculations et les zones de culture. C'est ainsi que les cultures vivrières (mil et sorgho) pratiquées dans la frange Nord du pays ne pourront pas dans les conditions actuelles et même dans un avenir prévisible, financer de manière significative le coût des interventions phytosanitaires. Ce sont donc les spéculations agricoles de rente qui peuvent valoriser les traitements phytosanitaires (fruits et légumes, riz, coton, arachide, niébé, etc.).

Les tableaux 4 et 5 qui suivent résument bien cette section «Intervention», de même que les figures 2 et 3.

9.4. Fonction Appui-Conseil-Formation

Cette fonction est un déterminant majeur de toutes les autres fonctions et elle revêt un caractère particulièrement important dans le contexte de désengagement. Aussi l'option retenue est un renforcement de l'action de la DPV à ce niveau couplé avec une certaine participation d'autres partenaires (services agricoles, projets agricoles, opérateurs économiques agréés, ONG, etc.).

Il n'y a donc pas de désengagement de la DPV au niveau de cette sous-fonction.

Au plan de la structure de responsabilités, le maître d'ouvrage reste la DPV sauf pour les tâches qui seront prises en charge par les autres partenaires.

La réalisation sera assurée par la DPV, la DA et les autres partenaires.

Figure 2
Ministère de l'Agriculture et de l'Élevage
Direction de la Protection des Végétaux
Évolution de l'implication de la DPV dans la réalisation des interventions

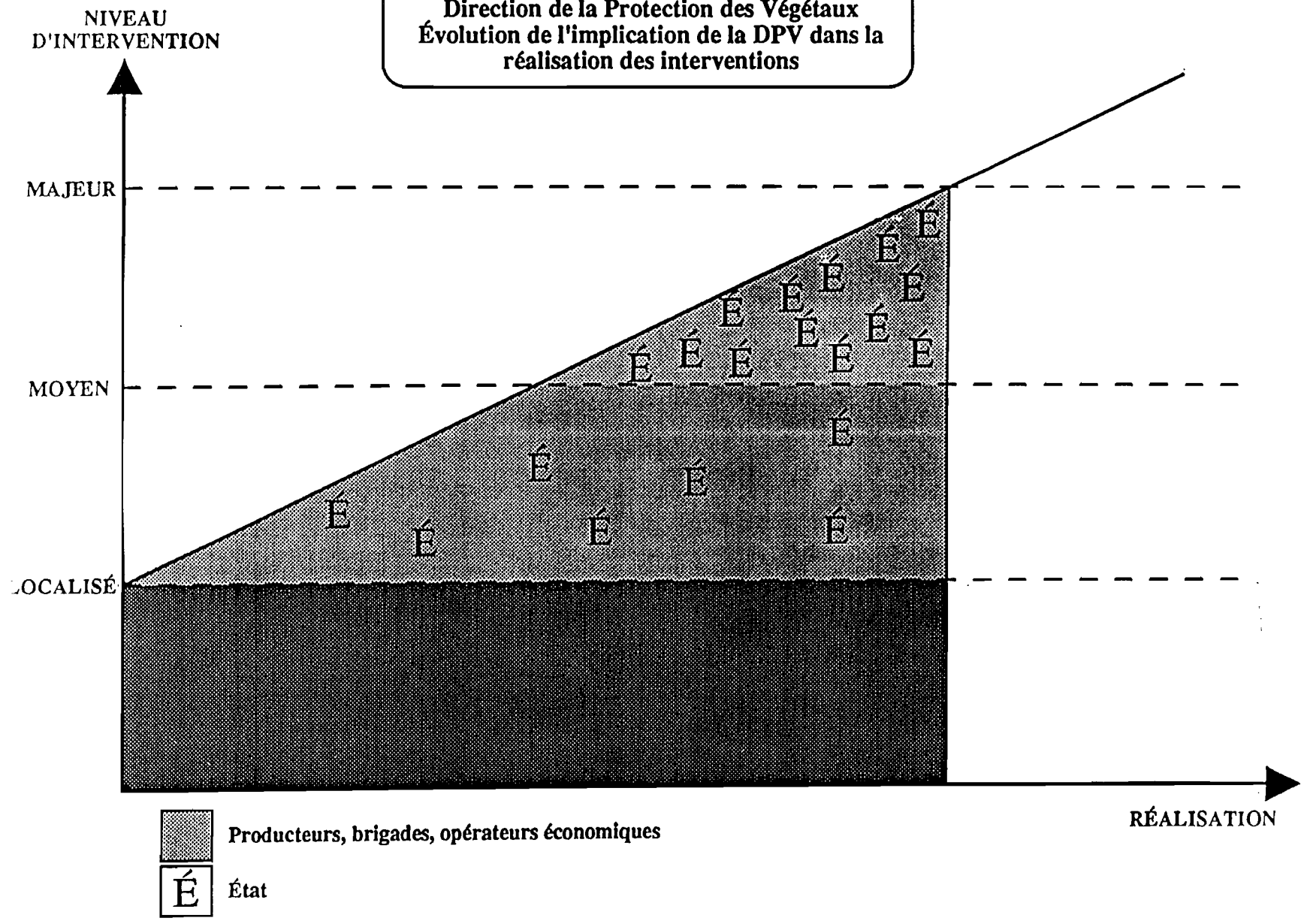

Figure 3
Ministère de l'Agriculture et de l'Élevage
Direction de la Protection des Végétaux
Responsabilité de financement des interventions

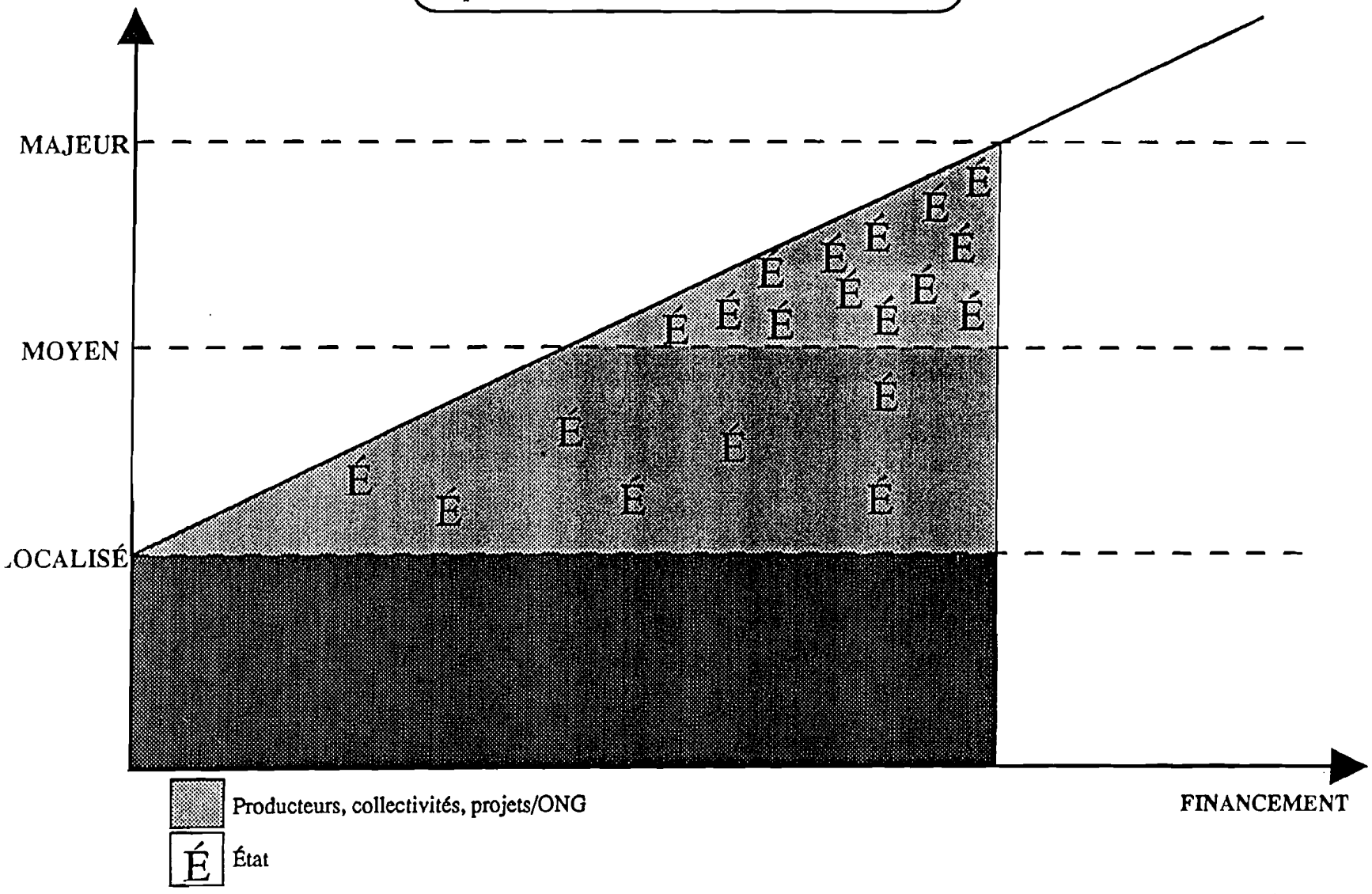

TABLEAU 4

SYNTHÈSE

FONCTION INTERVENTION

SOUS-FONCTION	1994	1995	1996	1997
INTERVENTIONS MAJEURES	Maintien à la DPV →			∞
INTERVENTIONS MOYENNES	Désengagement progressif →			PAS TOTAL
INTERVENTIONS LOCALISÉES	Désengagement total →			TOTAL

TABLEAU 5

SYNTHÈSE

STRUCTURE DES RESPONSABILITÉS
FONCTION INTERVENTION

SOUS-FONCTION	STRUCTURE	RÉALISATION	FINANCEMENT
INTERVENTIONS MAJEURES	Direction P.V.	DPV Niveau National-DDA et/ou - Privés - Producteurs - Prestataires externes - Brigades - Autres	ÉTAT { Fonds propres / Bailleurs de fonds COLLECTIVITÉS PRODUCTEURS
INTERVENTIONS MOYENNES	DDA	DDA et/ou Brigades, Opérateurs privés Producteurs	P.V. Collectivités Producteurs Projets / ONG
INTERVENTIONS LOCALISÉES	Producteurs	Producteurs Brigades Opérateurs privés	Producteurs

Le financement est assuré pour l'essentiel par l'État (comprenant dans cette étude les Projets & ONG), avec une certaine contribution des collectivités locales et des producteurs.

9.5. Fonction Approvisionnement-Distribution

Elle comporte quatre sous-fonctions qui sont :

- les Stocks de sécurité;
- la Distribution-vente;
- les Conseils–appui;
- la Réglementation et le Contrôle.

- S'agissant des Stocks de sécurité il y a deux niveaux de responsabilité à considérer et qui sont :

  ◊ Le **niveau national,** qui reste sous la responsabilité totale de la DPV. Il n'y a donc pas de désengagement à ce niveau.

  ◊ Le **niveau régional**. Dans ce cas, il est prévu un désengagement progressif de la PV, couplé à un rôle de plus en plus accru des collectivités locales et projets régionaux.

  La maîtrise d'ouvrage est assurée par la DPV pour le niveau national et les DDA pour le niveau régional.

  Les structures de réalisation sont constituées par la DPV pour le niveau national et la DDA pour le niveau régional.

  Enfin le financement sera assuré par l'État au niveau national et par les Collectivités, les projets et la PV pour le niveau régional.

- Pour la sous-fonction Distribution, l'option retenue est le désengagement total de la DPV du créneau au profit d'autres partenaires (opérateurs économiques agréés, coopératives de producteurs et autres organisations rurales). Ainsi donc, la DPV se désengagera totalement de cette filière aussi rapidement qu'il sera mis en place un système fiable d'approvisionnement en pesticides et matériel de traitement phytosanitaire.

- En ce qui concerne la sous-fonction Conseil-appui, elle n'est que l'application de la fonction «Appui-Conseil-Formation» à la fonction «Approvisionnement-Distribution». Elle est traitée plus loin.

- De même la sous-fonction Réglementation-Contrôle est traitée au sein de la fonction «Législation-Contrôle».

Les tableaux 6 et 7 suivants présentent le tout sous forme de synthèse.

TABLEAU 6

SYNTHÈSE

FONCTION APPROVISIONNEMENT / DISTRIBUTION

SOUS-FONCTION	1994	1995	1996	1997
STOCK DE SÉCURITÉ	National DPV	Maintien à la DPV →		Maintien total
	Régional DPV	Rôle accru des Collectivités Régionales		
		Désengagement →		jamais total
DISTRIBUTION	DPV + Opérateur Écon.	Désengagement progressif →		total
CONSEILS- APPUI	Désengagement Partiel et Progressif	Rôle croissant des opérateurs économiques autorisés →		jamais total
RÉGLEMENTATION	- DPV	→		maintien
CONTRÔLE	- DPV	→		
		Renforcement		maintien +

TABLEAU 7

SYNTHÈSE

STRUCTURE DES RESPONSABILITÉS FONCTION APPROVISIONNEMENT / DISTRIBUTION

SOUS-FONCTION	STRUCTURE	RÉALISATION	FINANCEMENT
STOCK DE SÉCURITÉ	National : DPV Régional : DDA - DPV Collectivités	DPV DDA - DPV	État (DPV) Collectivités Projets
DISTRIBUTION	DPV Privé { - Opérateurs économiques autorisés - Coopératives	DPV PRIVÉ	DPV (dégressif) Collectivités Producteurs Projets/ONG
CONSEILS APPUI	DPV / DA Opérateurs économiques autorisés	DPV DA Opérateurs économiques Autorisés	État Collectivités Producteurs Projets / ONG
RÉGLEMENTATION CONTRÔLE	DPV	DPV; Min. Plan (Douanes) ; Min. de la Santé Pub. ; Min. de l'Hyd.+Envir. Direct. Envir. ; Min. de l'Intérieur.	État

9.6. Fonction Liaison / Recherche / Vulgarisation

Cette fonction correspond à l'actuel service «Études Biologiques» de la DPV. Elle comporte trois sous-fonctions :

- Identification des problèmes phytosanitaires
- Mise au point technologique
- Transfert des technologies

Par rapport à l'organisation actuelle du Service «Études Biologiques», cette fonction introduit une nouvelle conception de ses activités et de son organisation interne. C'est ainsi que même l'appellation Études Biologiques disparaît au profit de «Liaison-Recherche-Vulgarisation» qui est censée mieux correspondre à la nouvelle mission de la DPV induite par les alternatives de fonctionnement et de financement. (cf. tableau 8)

Au niveau de cette fonction, il n'y a pas, à terme, de désengagement de la DPV. Bien plus, il y a un renforcement de son action mais en étroite collaboration avec d'autres partenaires tels l'INRAN, la Direction de l'Agriculture et le Système Nationale de Recherche Agronomique (SNRA).

Une autre caractéristique de la fonction réside dans le niveau élevé de collaboration entre les différents partenaires identifiés notamment au niveau de la réalisation.

Au plan du financement, les charges incombent entièrement à l'État.

9.7. Fonction Information-Statistique

Il n'est pas prévu de désengagement de la DPV au niveau de cette fonction qui sera également renforcée tout en favorisant la participation d'autres partenaires mieux qu'avant au niveau de la réalisation.

Le financement relève bien entendu de l'État.

Bien entendu, la mise en œuvre des options proposées requiert un certain nombre de mesures d'accompagnement décrites dans le chapitre qui suit.

TABLEAU 8

SYNTHÈSE

STRUCTURE DES RESPONSABILITÉS

FONCTION LIAISON•RECHERCHE•VULGARISATION

SOUS-FONCTION	STRUCTURE RESPONSABLE	RÉALISATION	FINANCEMENT
IDENTIFICATION DES PROBLÈMES PHYTOSANITAIRES	DPV	DPV - INRAN	État
MISE AU POINT TECHNOLOGIQUE	INRAN	Système National de Recherche Agronomique (SNRA)	État
TRANSFERTS TECHNOLOGIQUES	DPV	DPV - INRAN	État

APPENDIX 14

Administrative Abstract

Source: PNC. 1994. Alternatives De Fonctionnement et De Financement De La "PV" au Niger. CIDA, Niamey, Niger.

1. ADMINISTRATIVE ABSTRACT

1.1. INTRODUCTION

The Canadian Agency For International Development, through the Niger-Canada project for plant-life protection (PNC) has been, for over than two decades, backing up plant-life protection (PV) in Niger. This joint project must end up by the end of December 1994. To that effect, a disengagement plan had been worked out. A reseach had been done on the alternatives of financing and running that project between Niger and Canada, with the aim of ensuring plant-life protection continuity. This reseach, which is the purpose for this report, is intended to let the Nigerien decision makers think about their orientation with regard to plant-life protection , and set up the appropriate structures, in view of the scarcity of financial ressources as a result of the Candian aid withdrawal.

1.2 THE CONTEXT

Over the past thirty years, the rural sector had continuously taken up an essential place prior to the development policy of Niger. Within this development process, which is ultimately and eventually directed at the majority of the population of the country, plant-life protection is of paramount importance. The long standing commitment of the Canadian,German, japanese, American and other sponsors is evidence for support of this specific sector.

Farming in niger had unfortunately been proned to high yields variability relating to recurrent droughts and to almost permanent parasitic pressure. The Canadian Agency for International Development (ACDI), through PNC, was one of the outstanding plant-life protection sponsors.

PNC had, following its successive phases, equipped Niger with infrastructures necessary for the running of pant-life protection service. PNC has also provided technical aid, vehicles, spraying devices and insecticides to fight against insects. On of the very important roles the project played was, by means of training, to amke farmers partly responsible for lands under cultivation, notably by setting up 7,000 brigades comprising 33,000 agents scattered nationwide.

The new trend relating to the gradual state disengagement from a series of economic activities, privatisation/the

restructuring sought after for certain dismemberings of the state, and now the devaluation of the CFA franc that affects the franc area states have all made the sponsors rethink their approach to financial and technical aid.

In fact, with the devaluation of the CFA franc, which happened within past January, the problem producers are faced with is getting much more complex. They will have to meet the rising costs of agricultural fertilizers, sprays and equipment. Given this explosionon prices doubled by a purchasing power decrease with respect to the needed goods whose prices are mostly rising, the proposed recommendations of this report are to be dealt with caution.

The farmers-producers have been, of course, asked to be mostly responsible for the treatment of their crops, which cannot be achieved without significant support to the farmers. The sponsors, through their financial and technical aid programs to Pv during the past twenty years, had enabled the state of Niger to possess sound plant-life protection strucutres - both in human power and in logistics. These sponsors must, in disengaging, define clearly the role of the government with regard to plant-life protection.

Prior to this, Canada can take the role of a leader. At the moment, the steps taken by PNC are extremely important , as proven by the many contacts made with various contributors and sponsors. These steps are being observed by many bilateral and multilateral agencies, which are thinking of following the same process with other headoffices, ministries or public organizations. The sponsors shouldn't hurriedly be disengaging under the pretext of budgetary restrictions. This excuse shouldn't happen within the context of the devaluation of the CFA franc. It should be borne in mind that, within ACDI, this devaluation happened during the running period of the Niger-Canada joint project.

As stated by a survey entitled "*Bilan sectoriel des interventions canadiennes en matière de protection des végétaux au Niger*"(1) carried out by C.A.C. International, ACDI, as a government agency, is to consider itself responsible for the success of its disengagement from long lasting projects. ACDI should make sure that the disengagement blueprints are objectively established, on the basis of realistic schedule of repayments and appropriate intervention methodologies.

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(1) "Sector-based assessment of the Canadian interventions in plant-life protection in the Sahel"

This survey is suggesting, within the continuity of this observation, a kind of pilot-project approach that will enable to validate certain recommendations relating to the disengagement of PV from certain economic activities.

ACDI, like the other sponsors, should make sure that the experience acquired in terms of the Canadian technical expertise, and mainly its credibility vis à vis its Sahelian partners is not lost.

The recent economic situation caused by the international partners decision including Canada through its financial aid to international organizations - on the devaluation of the CFA franc constrained the international organizations to think of new aid temporary responsibilities.

For ACDI, an increasing and sudden money supply availability of the CFA franc must be the expression of punctual and growing assets in the PV disengagement process, without, howevr, changing the short term budgetary orientations. The PNC project is in its final phase, but this does not mean that ACDI, beyond this time, wouldn't back up, alone in collaboration with other sponsors, the ongoing and success of this disengagement process. This is why, starting from this year, trial projects that will permit to validate the abilty of the private business operators to mange economic activities relating to phytosanitary interventions, are to start. The PV headquarter is presently concerned about a fourth air base project which is part of its program.

It is advisable ACDI disengage gradually and in a well planned way, from its aid to PV. The coming recommendations will serve as roadsigns for the disengagement process. The key to success relies on this premise.

This is why ***a broad consultation process*** had been led throughout this survey in the view of various interveners who are directly or not involved in plant-life protection. The comments and recommendations herewith derive from the milieu which is likely to see tangible actions to be taken within the coming years.

This is why it is recommended that the ACDI authorities implement, before the end of the PNC project, the disengagement actions, with the contribution of local expertise. It is strongly recommended to make use, beyond the PNC project and within the first half of the year 1995, of the present Canadian expertise of the PNC project, jointly with the local expertise involved in the implementation. This is in order to ensure smooth progress of the activities undertaken in 1994 (pilot project for instance) and durability to the new 1995 agricultural work

actions, and even beyong 1995.

1.3. GENERAL RECOMMENDATIONS

The survey on the alternatives of PV running and financing in a disengageement context makes proposals of solutions to be implemented as for this year over a middle term horizon (1994-1997), in order to evaluate the process, for the durability of the results.

In order to make profit of the coming agricultural campaign - including off-season gardening -, it is necessary the three (3) agricultural pilot projects concerning different regions be on their way, because of the nature of the cultivation practiced and the regional economic context specific to every region. The experience will allow the atomization of the results among other agricultural sectors and will serve as a guide to the 1995-1996 campaign.

The fourth pilot project (air base) should start this year with a market reseach. According to the results, the project should run over a period of three (3) years, considering the marketing of potential services in addition to the responsibilities to ensure coverage of phytosanitary treatments. This project will enable to evaluate the profitability of the assets of the air base.

In parallel to these pilot projects, recommendations are made with a view to reinforcing certain PV functions, with the help of the state and sponsors through existing projects/program aid.

Other ecommendations advocate a withdrawal of the state from certain PV activities, partly or totally. In fact, one important role of the business operators and the care of phytosanitary operations by the producers will appeal for adjustment and punctual aid on the part of the sponsors interested in phytosanitary struggle.

In this way, the following recommendations common to Pv dynamics can be set forth:

- DPV must remain a headoffice of the Ministry of Agriculture and Livestock (MAG/EL), by disengaging from operations and by reinforcing its role of working out strategy policy, monitoring, training and popularization. The state has gotten a national responsibility concerning plant-life protection.

- The recommendations of this reseach must be taken into account and be complementary to the updating work of PV strategy to be done by the interdepartmental committee ,

and also be complementry to the survey on the processing of the farmers' ability to care for PV activities.

- The Ministry of Finance and Planning must encourage - facilitate - PV communities fund raising.

- A formal request from the Ministry of Agriculture and Livestock must be made for the Ministry of Finance and Planning in order to get provisional authorization so as to undertake commercial transactions at the air base over three years of the pilot project. Similar authorizations arrangements must be given/made to DPV in order to have the foreign pesticides supplies donations.

1.4. SPECIFIC RECOMMENDATIONS

The recommendations contained in this research are oriented toward the main function (activities) (1) where reinforcement/disengagement from the state is perceptible according to the interveners.

1.4.1 Function Conception - Elaboration and implementation of national policy on PV

This function is an intrinsic part of the PV mission and must be reinforced/stregthened starting from this year, in terms of information broadcasting ang getting in touch with the regional/village base. An interdepartmental committee recently busied itself updating PV global strategies. The expenditures made on this function is the concern of the state and DPV is the strucutre accountable for this function.

1.4.2 Function Legislation - Regulation - Monitoring.

This function, deriving from the statutory mission of Pv, must be reinforced as soon as the new legislative and statutory provisions relating to plant-life protection are approved of and implemented this year. The reinforcement will take the form of growing monitoring of the import and transport of pesticides to various control points in close collaboration with the customs officers. The reinforcement will also give way to the crediting of business operators and

(1) For better comprehension of PV functions, refer to figure 1, chapter 9.

increasing knowledge of legislation by all the

interveners.

The normal expenses are to be made by the state, expenses to which World Bank/GTZ Punctual Financial Aid (PRSAA) is added.

A GTZ representative reported that there were actually PV funds left due to inability to operate at Agadez antiacridian center. It is strongly recommended that the Ministry of Agriculture and Livestock make a formal financial request to GTZ. Such financial aid could, however, serve to:

* make ill-equipped monitoring points functional

* renovate regional entrepots which will be used to stock regional security pesticides.

1.4.3. Intervention Function

This function which represents a very high percentage of the activities and costs of PV is the one in which much of change occurs.

Concerning major interventions, the state does not disengage from them, but it is desrable to have more participants such as private business operators, producers, brigades, etc... This growing participation of the milieu could somewhat reduce the state expenses but, however, not much significantly.

As for moderate interventions, the state should gradually disengage form them, as soon as the business operators set up an effective stock/distribution of phytosanitary products and equipment. At the same time, the producers will get organized to facilitate their access to credit from organizations such as Care International and/or popular savings banks (CPEC). The communities will as well be responsible for the "community PV funds" (different from regional funds).

The state will totally free itself from local

interventions, thus making the producers fully responsible for the phytosanitary care of their crops. Support pilot projects (chapter 11) shpuld be run starting from this year in order to facilitate the transition from public responsibility to support by the private sector. The brigades' important role as sulliers for remunerated services must be considered, if not encouraged.

Concerning the interventions, it is strongly recommended that a greater utilization of the PV air base assets be sought after. PV has gotten human and physical quality resources which could render commercial services (including treatments in Niger). Suggestion is made for a pilote project that will be run over a little more than three years in order to achieve the following:

1. Market research;

2. Agreement with the Ministry of Finance and Planning in oder to enable the base to offer commercial services and use the proceeds to run it under the responsibility of DPV;

3. Assessment of the alternatives for organizational structure to be considered by the air base, due to the commercial services it could offer in an inevitable context in which should ensure the state availablity of its phytosanitary care capabilities. The structure that is considered must take the latter factor into account and ensure DPV an autonomous source of income it will manage in favor of its PV activities.

4. Assessment of the base functioning with a view to privitazing it totally at the end of the project, in case this is decided by the conclusions of the pilot project.

1.4.5. Support - Council - Training.

PV, in collaboration with the business operators, will take an important responsibilty with regard to this function. It will reinforce its raining

role and count on World Bank Support Service Reinforcement Program (PRSAA). This program provides for financial and logistics support to the training of technical fiels workers.

1.4.5. Stocking/Distribution.

Beyond the reinforcement of the phytosanitary monitoring which is targetted towards private business operators, the stocking/distribution function should, in the short run, become a commercial activity which will almost exclusively be related to the private sector.

The stocking group must possess the appropriate juridical strucuture in order to serve its members (the cooperatives). It should never be the privileged tool of the state by distibuting pesticides and equipment which had been donated to the Niger state.

The business operators must be accredited by the state in order to operate within this sector of activities. They must orgaize themselves in professional associations so as to ensure durability of a reliable national stocking/distribution network. It is clear they need support in entrepreneurship to get the network moving.

Concerning such a network, it is strongly recommended the Niger Canada joint project set up, possibly, a strategy for the implementation of this disengagement of PV within the appropriate stocking /distribution activities. This strategy could comprise the following elements:

- thinking , with the private operators, about the dynamics for the running of such a network in a national and regional scope,

- organize workshops and seminars,

- caryy out feasibility study,
- implement support activities (promotion, access to credit, etc)

Under the heading of the investments laws, tax systems, (customs) and the role of the state, precise investments laws must be taken into account.

The business operators regard the state of Niger as a privileged supplying source, due to the pesticides ans equipment it is donating. Thus, the state implements its contractual obligations with the sponsors, makes sure part of the income is used for PV purposes (PV community funds for instance) and allows for better security stocks management).

1.4.6. Liaison - Research - Popularization.

Suggestion is made to change the name of the present service entitled: *"Etudes Biologiques"* in order to better visualize the activities under the heading *Liaison - Research - Popularization*.

Concerning this new terminology, there is rally no talking about the disengagement of DPV. The concern is rather about reinforcing three sub-activities: identification of phytosanitary concerns, technological focus and tecnology transfer, in close collaboration with other partners such as INRAN, la Direction de l'Agriculture and le Système National de Recherche Agronomique (SNRA).

This activity is funded by the stade.

1.4.7. Information - Statistics.

This function must be reinforced within DPV over the coming years, in so far as the regulation is being applied, the effective stocking/distribution network is organized, and the care of the crops is being ensured by the producers.

However, the collaboration of the various interveners is required within the normal ongoing of their operations, so as to let DPV possess reliable statistical data on the different aspects and costs of the phytosanitary interventions in Niger.

That's all agreed that financing is the business of the state.

APPENDIX 15

Projets -Pilote

Source: PNC. 1994. Alternatives De Fonctionnement et De Financement De La "PV" au Niger. CIDA, Niamey, Niger.

11. PROJETS-PILOTE

En cours d'intervention et plus particulièrement lors des ateliers, des intervenants ont souligné l'importance de tester le concept de désengagement de la PV. C'est pourquoi, après consultation avec différents intervenants, le concept de projet-pilote a été retenu.

Quatre (4) projets-pilote ont été identifiés. Il s'agit de :

- Projet Base aérienne
- Projet Tillabéri
- Projet Birni
- Projet Madaoua

Exception faite du projet «Base aérienne», les trois (3) autres projets-pilote s'adresseraient à des brigades phytosanitaires se retrouvant au niveau de différentes zones agro-écologiques. Le but de ces projets-pilote est de démontrer la faisabilité du désengagement de la DPV des interventions localisées, représentant à elles seules plus de soixante-dix (70%) pour cent des activités d'intervention de la PV.

Une fiche de projet a été conçue à cet effet. Elle est présentée dans les pages qui suivent.

11.1. Fiche de Projet-Pilote

1. Intitulé du projet

   Dans le cas de la base aérienne, il s'agit d'un projet pour démontrer la viabilité de la commercialisation des services de la base alors que dans le cas des autres projets il sera plutôt question de désengagement de la DPV des interventions phytosanitaires localisées et dans une moindre mesure des interventions de niveau moyen.

2. Région

   Le choix des régions a été fait en consultation, de façon à tenir compte des particularités régionales (cultures fluviales, de rentes) et aussi de la facilité de la mise en œuvre et du suivi des projets-pilote.

3. Secteur d'intervention

   Dans un cas, il s'agit de la commercialisation de services aériens et dans les autres de développement agricole.

4. Ministère (s) et Direction (s) responsables

Dans tous les cas, le Ministère de l'Agriculture et de l'Élevage et la Direction de la Protection des Végétaux sont les grands responsables. D'autres ministères et directions pourront selon le cas, avoir un rôle à jouer.

5. Maître d'œuvre

Dans tous les cas, ce sera la DPV assistée du Projet nigéro-canadien (PNC) dans le cadre de son mandat et/ou d'autres bailleurs de fonds.

6. Coût total du projet

Il s'agit d'une estimation sommaire des coûts portant sur :

- les honoraires du consultant local chargé de la mise en œuvre et du suivi et des Consultants extérieurs au besoin
- le coût des intrants agricoles
- les coûts de la logistique

7. Année de l'estimation (suivi-évaluation)

C'est la période réaliste de durée du Projet devant mener à une évaluation qui permette des recommandations de prolongation de la période d'essai ou de la mise en œuvre (atomisation) des enseignements retenus.

8. Financement extérieur demandé

Cette rubrique indiquera les contributions ponctuelles qui pourraient être demandées (aides extérieures) en sus de l'appui de la DPV.

9. Études disponibles/historique du projet

Pour chacun des projets-pilote devant être mis en œuvre, il faudra connaître les études qui auraient pu être faites dans le domaine ou les autres projets ou appui en matière de PV dans le village.

Il pourrait être intéressant, le cas échéant, d'avoir les informations suivantes sur l'environnement :

- la nature des traitements antérieurs
- les intervenants lors de ces traitements (brigades, producteurs, autres)
- qui a financé ?
- le matériel utilisé et son propriétaire
- la nature des pesticides utilisés et quand

- les cultures et les superficies traitées
- les prédateurs nuisibles concernés
- les sources d'approvisionnement et les coûts des produits et équipements
- l'appréciation des interventions réalisées, si possible.

10. Date de démarrage souhaitée

Il s'agit de la date la plus proche pour tenir compte de la campagne agricole de 1994 et des cultures de contre-saison qui suivront.

11. Durée du projet

En principe, les projets-pilote auront une durée moyenne d'une année sauf dans le cas de la base aérienne, dont la durée prévisible est d'au moins trois ans.

12. Financement (sources-montant)

L'utilisation d'un système de crédit rural opérationnel genre Care et/ou Caisse Populaire d'Épargne et de Crédit (CPEC) devrait être fortement encouragé et utilisé. Il s'agit donc ici d'estimer les besoins en crédit pour l'achat de pesticides (et/ou autres intrants agricoles) et équipement.

13. Justification du projet-pilote

Les termes de référence de la présente étude sont clairs sur le désengagement de la PV. Implicitement ceci suppose la prise en charge de certaines activités par les paysans d'où la nécessité de tester quelques alternatives de fonctionnement et de financement.

14. But du projet

Pour démontrer la faisabilité du désengagement de la DPV (des interventions localisées et moyennes) au travers d'un système intégré de prise en charge de toute la chaîne de la défense des cultures et denrées stockées dans tous ses aspects.

15. Objectifs spécifiques

Faire voir les objectifs reliés aux produits et équipements et à leur usage et entretien.

16. Description sommaire du projet

En quoi consiste le projet, les intervenants, les types de cultures, le suivi, etc.

17. Autres aspects importants du projet

Tout autre aspect important d'ordre technique, géographique, politique, légal, social, environnemental, organisationnel, financier, économique qui n'aurait pas été couvert devant l'une ou l'autre des rubriques précédentes.

Sans oublier l'impact du projet-pilote sur la prise en charge, la création d'autres activités commerciales pour assurer une certaine pérennité (contre-cultures, élevage, épargne, etc.).

APPENDIX 16

Other Pests

OTHER PESTS

Inquiries made on other pests in addition to locusts and grasshoppers produce a fairly consistent pattern of responses:

Quelea birds:

Quelea birds are extremely important in Niger, but bird control is not in AELGA's mandate. Bird control is a conspicuous feature of the overall pest control scene in Niger, and has important public health and environmental ramifications. In Tillabery, for example, fenthion has been applied by ground and air for control of quelea birds on the rice croplands close to the Niger River. There is no apparent attempt to avoid surrounding wetlands, and the birds themselves are popular as food among the local population.

Rodents:

Rodents of different species feed on seeds during planting season and on a variety of crops at harvest. They are a great problem throughout the agricultural region of Niger, but are particularly serious pests in the eastern areas around Zinder. Warfarin baits are used for control, but cereal grains are the attractant, and the baits are expensive. Some of the rainy season species(e.g., gerbils) are not easily controllable even with the usual rodenticide baits.

Traditional methods are used for rodent control in some areas. These range from clubbing the rodents at night to constructing pit traps from buckets buried in the soil. The buckets are filled with water, plant root extract and pepper. They can be baited with anything that the rodents eat. Pit traps are especially effective in the Zinder area because of a lack of other food for the rodents. The traps require frequent emptying and refilling, and there is some reluctance to use them because of the amount of effort involved.

Bean aphids:

Bean aphids are pests on Niebe beans throughout the agricultural zone. As Niebe beans are primarily a cash crop, donors have less interest in intervening.

Tree locusts:

Tree locusts were causing some concern in Tehoua. The feeding behavior appears to have shifted somewhat, and adults and larvae have been feeding on millet.

APPENDIX 17

Niger Warehouse/Pesticide Distribution

WAREHOUSE/PESTICIDE DISTRIBUTION

Warehouse inventory system:

Niamey has 2 warehouses, one for pesticides and one for trucks and parts. With Canadian funds, DCP are completing a 600 square meter warehouse, located about 15 kilometers from the city. The warehouse has not yet been equip it with pallets, carts, etc. and a hangar to house the tanks for the airplanes must be constructed.

In the field there are approximately 470 storehouses in villages, 235 in arrondissements (there are 37 total, 25 of which have warehouses), and each of the 8 departements has a 200 ton warehouse.

The Canadians helped the DCP develop an excellent inventory and tracking system. It is complete with delivery receipts, inventory computer data base, warehouse storage training, computer processing training, etc. There is now a computer specialist who tracks all the inventory at the main warehouse.

The normal pre-campaign pesticide distribution occurs between March and June. A DCP office develops the distribution plan, primarily based on last year's pesticide needs, considering the leftovers still in the warehouses in the field. The warehousemen simply execute the plan and claim no responsibility for deciding who gets what. The four trucks (3 10-ton trucks and one 20-ton truck) carry the incoming pesticides to the departement level who then distribute it to the arrondissement, and on to the districts. A certain amount is reserved for emergency outbreaks.

The donated pesticides arrive in Niamey just before distribution via truck from the ports in Cotonou and Logo. Their policy is to distribute it to the districts as soon as possible after receipt. They are aware of AID regulations not to mix AID approved and non-approved products on the same trucks using AID funding for fuel.

Each fall the warehousemen tour the various storage facilities in the departements and assesses the quantity and quality of leftover pesticides, doing chemical tests for effectiveness. A Canadian chemist spent 3 months here training the team in how to monitor effectiveness.It is supposed to correspond with their records or usage sent to them by department DCP officials.

At this point, each departement is responsible for the disposal of empty pesticide drums, although they are considering building a depository at the new warehouse site in Niamey.

APPENDIX 18

List of People Contacted

LIST OF PEOPLE CONTACTED FOR THIS EVALUATION

USAID/Niger

Helen E. Soos	Chief GDO
Michael Sullivan	GDO/SPO AELGA Project Officer
Christy T. Collins	DRU/DPM Manager
Kondo Mahaman Sani	AELGA Project Assistant

USAID/AELGA Washington

Allan Showler	Technical Advisor
Yene Belayneh	Assistant Technical Advisor
Alan Schroeder	Entomologist

USAID/Africa Bureau

Walter Knausenberger	Environmental Analyst and Advisor

DPM

Roger Guichard	RONCO Team Chief of Mission
Loel Callahan	Disaster Operations Specialist
Patrick Thomas	Data Collection & Analysis Specialist
Adam Koons	Program Development Specialist

Directorate of Crop Protection Niger (DCP)

Kabo Ousscini	Director DCP
Gambo Ibrahim	Aerial Unit Technical Director
Sani Adam	Chief, Environment Unit
Ibrahim Baoua	Chief, Intervention & Training Unit
Ganbobo Salissou	Chief, Biological Research Unit
Lazoumar Hamidou	Chief, Legislation & Regulation Unit
Said Zitoune	SYSAPEC Technical Advisor

SAP (Niger Early Warning System Prime Minister Office)

Mme Maimouna Mamadou	Acting Secretary
Adamou Nafoga	Statistician
Abdou Danguiwa	Aropastoralist

AGRHYMET

Jorge Oliveira	Director General
Rianodji MBaihasra	Locust Specialist
I'Sifu Alfarri	Greeness Map

DFPV

Combari Abdoulaye	Director
Christiaan Kooyman	Insectpathologist Specialist

FAO

Leopold Wantisse Siry	FAO/Niger Representative
Zakary Abdoulaye	Program Assistant

Niger-Canada Project for Plant Life Protection (CIDA)

Alain Grimard	Chief of Mission

CARE

Amadou Alassane	Director, in Maradi

Crop Protection Services

Donllaye Ali	DDA/ADJ, Maradi
Alio Dan Karami	Chief, Maradi
Harouna Ibrahim	Observation Post, Tessaoua
Chaibou Abaou	Chief, Zinder
Boubacar Gaoh Nouhou	Chief, Tahoua
Lamil Moumu	Dosso
Ali Tahirou	Tillabery

Ministry of Health

Doula Hassoumi	in Maradi

Department of Agriculture

Abba Mohamed	in Zinder