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COMITE INTERETATS DE LUTTE CONTRE LA SECHERESSE DANS LE SAHEL
CILSS

PROTECTION DES VEGETAUX
(1988 - 1991)

CILSS
DOCUMENTATION

DOCUMENT DE PROJET

GAMBIA

NOVEMBRE 1986

CONTENTS

CILSS - DOCUMENTATION

I. BACKGROUND

In order to prevent the important losses caused by these posts, CILSS at a meeting in Banjul in December 1974, recommended to reinforce the crop protection services and the regional institutions for migratory pests control, to develop research and training in crop protection.

The CILSS/OCLALAV meeting held in Ouagadougou in September 1975 on problems related to food crop protection gave priority to the reinforcement of national and regional crop protection, and recognized the need for a good coordination of research and training.

In December 1976 FAO organized a consultation of donors and Sahelian countries on the latter's crop and plant protection needs.

The donors proposed to send an important design mission in the field in February 1977 to design a global program made of projects.

Designed in Dakar, in March 1977, this program was presented to the Club du Sahel in May 1977 and adopted by the CILSS Council of Ministers in April 1977. CILSS Council of Ministers and the Club du Sahel requested the Sahelian organization to manage this program.

The program components are :

- Reinforcement of national crop protection services (Annexe A)
- Research on Integrated Pest Management for food crops (Annexe B)
- Research on Migratory pest control
  1. Locust (Annexe C)
  2. Grain eating birds (Annexe D)
- Research on imposed post-harvest crop protection (Annexe E)
- Research on improved rodent control (Annexe F)
- Training and information in crop protection (Annexe G1 and G2).

I.1. Phase I achievements (Substructure, Training, Information).

Briefly, the achievements of Annexe A, B and G of this program are as follows :

Annexe A

Training 2 crop protection professionals
+ 2 technicians

Annexe B

1 laboratory
5 observation posts (+ one unequiped, Sapu)
3 generator sheds
1 researcher house
Training of 7 technicians
Training of 2 professionals (1 entomologist, 1 pathologist)
2 insectarium, 1 greenhouse, 1 20,000 l tank.

Annexe G2

Training of 8 technicians

Annexe G1

Technical fact sheets

1.2. Some components of this program not being functional and the phytosanitary situation continuing to be worisome, the idea of a common new strategy in crop protection was confirmed to be necessary, as it was however planned in the design of the 1977 program.

The Directors of Crop Protection Services and the Directors of IPM Project National components met in Ouagadougou 6 to 10 January 1986 and developped the elements of a common strategy to continue the efforts in crop protection - (Crop Protection - Common Strategy - Program 1987-1990 ; CILSS, January 1986). This strategy was accepted by the Heads of member states of CILSS.

II. GENERAL CONSIDERATIONS

A. The environment

1) Geography and climate

Situated between latitude 13 and 14 degrees North and longitude 13°45' and 16°45' West, The Gambia is a country entirely surrounded by the territory of the Republic of Senegal, except for its Atlantic coast. It is a flat country and The Gambia River flows lenghtwise through it.

The climate is mainly of the Sudanese type (900 to 1 300 millimetres of rain) ; the southern part is humid, like neighbouring Casamance. However, rainfall varies greatly from year to year.

2) Soils

The soils of The Gambia are an association of different types which may be classified in two groups :

i) higher-lying soils bordering The Gambia River basin mostly belong to the tropical ferralic and ferruginous soils, together with sandy soils ;

ii) low-lying or hydromorphic soils in the river basin are alluvial with variable organic-matter content ; toward the river estuary, there is a fair area of saline and sulfureous soils covered with mangrove.

3) Population

The population total was estimated in 1985 to be 676,000, mainly farmers. Some 85 to 90 percent of them are engaged in agriculture.

Life expectancy is 38 to 40 years. The literacy rate ranges from 5 to 10 percent.

4) Agriculture

The economy is strongly based on agriculture ; the share of the agricultural sector in GNP is, in fact, 50 percent. Groundnuts account for about one-third of GNP per capita which was $ 260 US in 1984.

Such high specialization in groundnut production has been at the expense of other crops, mainly cereals. As a result, The Gambia generally depends on foreign sources for more than one third of its annual grain requirements (105.000 tons).

The main crops are :

- Groundnuts in shell : 130 000 T
- Maize : 12 000 T
- Rice : 33 000 T
- Cassava : 7 000 T
- Millet and sorghum : 38 000 T
- Roots and tubers : 7 000 T
- Maize on 5 000 hectares, producing 10,000 tons (14 percent of grain production).
- Seed cotton : 2 000 T

Pests of cereals crops

Losses due to pests hamper increases in agricultural production. Grain-eating birds, grasshoppers and pests of stored commodities are not listed, only the principal cereal pests in the field.

Destructive species which had been of minor economic significance have increased in the past three years. Losses due to field infestation by destructive pests are estimated to be as high as 40 percent.

a) Insects

Millet : Raghuva albipunctella,
Acigona ignefusalis
Blister beetles, Psalydolytta fusca
Mylabris holoserica.

All are studied in detail ; damage estimates in relation to variety, biology in general, abundance and economic thresholds.

Sorghum : Same insects plus Contarinia sorghicola

Maize : Spodoptera, Chilo, Busseola, Heliothis are studied on the same lines as millet pests.

Rice : Chilo, Sesamia and Orseaolia oryzae are studied as above.

Groundnut : Termites and millipedes

Cowpea : Bruchids, Thrips Maruca.

In general, studies are conducted on damage and distribution of attack, population dynamics, and chemical controls.

b) Diseases

Millet : Mildiou - distribution and importance of smut, and damage, resistance and chemical controls

Sorghum : Smut - importance in Western division

Rice : Pyriculosis - importance and damage evaluation of resistant varieties

Maize : Streak virus (?) - not reported

c) Weeds (genl) Striga, incidence and chemical and cultural control, resistant varieties.

Other weed species - identification, incidence and control.

Digitaria, Dactyloctenium Brachiasi, Setaria are common, Cyperus sp. in irrigated rice.

Institutional framework

The Government accords a great importance to the plant protection service, which occupies a position equivalent to that of agricultural productior within the Ministry of Agriculture. Although still incomplete, the existing structure and organization allow for national plant protection.

The Crop Protection Service is embedded in the Ministry of Agriculture with the head office located in Yundum which at present includes two main divisions :

- Intervention
- Applied research.

The monitoring and operations service has six bases ; one base in each province and with surveillance posts. There are seldom any plant protection teams directly linked to local development structures with exception of research conducted under Annex B.

There have been few experimental plots for adaptive trials, and no fields to demonstrate control methods to farmers. The latter problem was somewhat alleviated in 1984 by the addition of a Pilot Program established under Annex B which began on farm trials of potentially useful treatments.

As regard resources, the service's operational budget after 1985 was limited. The buildings occupied by the service, both in Yundum and in the provincial bases, are dilapidated. Most of the rooms are too small, and many are unfit for alteration into offices, laboratories, and meetings rooms. Means of communication and transport can be improved.

The centralization of information and forecasting can be improved, and can become really operational when the country has well distributed monitoring network, permanently linked by communications networks to the secondary operational teams.

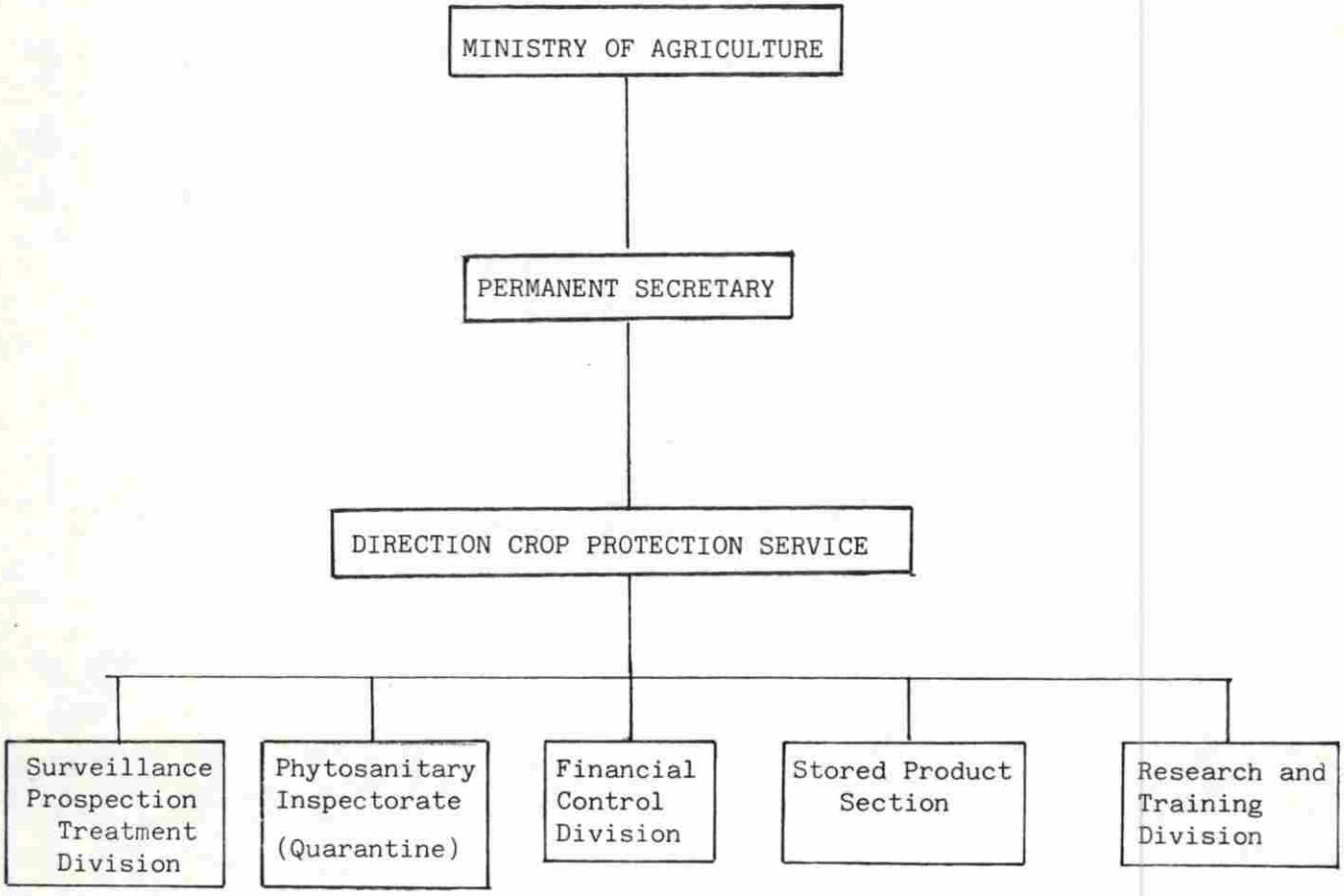
Dissemination of information is good, but can be strengthened at farm level. Additional assistance with bulletins, illustrated extension leaflets, warnings, advice, and wider dissemination at the farmer level of agricultural information by all the media, will improve the system.

Research has been conducted under Annex B, Integrated Pest Management Project and centred in Yundum. Progress has been good and information has been developped in the short history of the project.

For the purpose, it would be advisable to take action at all levels to further develop structures which would ensure :

- good coordination among all the sections of the service ;
- continuous liaison with agricultural research and with all the agricultural development organizations working in the country ;
- liaison with the regional organizations CILSS.

The programm presented for Phase II Crop Protection as a general scheme for the development of crop protection service offers the strategy by which an effective service may be created. Variety of existing staff, as well as newly trained members offers a strong potential to develop a well functioning, competent organization.


MINISTRY OF AGRICULTURE
PERMANENT SECRETARY
DIRECTION CROP PROTECTION SERVICE
Surveillance Prospection Treatment Division
Phytosanitary Inspectorate (Quarantine)
Financial Control Division
Stored Product Section
Research and Training Division

III. OBJECTIVES OF THE PROJECT

The general theme of the Project during the next four years will be the adequate protection of subsistence agricultural production, with the following objectives :

- at the subsistence farmer's level: increased production, with subsequent increase in revenues.
- at the national level : increase in the level of food self sufficiency.

It is stressed that these objectives are linked to the condition outside of the proposed program ie. an alleviation of marketing constraints on a national and regional level which will allow subsistence farmers to market their surplus products at a profit.

The immediate objectives of the program are as follows :

- adequate crop protection missions for the subsistence farmer through a system of demonstration and diffusion of integrated technicians in subsistence farming systems.

- increase ability of crop protection services for control of large scale pest outbreaks.

The principal outputs of the program will be :

- the training of functional extension teams composed of crop protection agents and of farmers ;

- to put in place decentralized structure of surveillance and intervention in the heart of the CB ;

- relevant techniques of IPM.

IV. STRATEGIES OF THE CROP PROTECTION PROJECT

Because of the fragile sahelian ecosystem and the necessity to maintain its equilibrium, protection of subsistence agriculture and crops will be conducted utilizing an IPM philosophy.

Since the producer is the person responsible for protection of his crops it will be necessary for him to execute crop surveillance and a large part of the control of pests. He therefore must be ready to take necessary precautions to safeguard the environment in general and to protect the useful farm in particular.

The best means through which this awareness can be transferred to the farmer is by an active extension system.

In cases of certain pest outbreaks which are largely beyond the capacity of the individual farmer to contain, there must be adequate organization to take charge of pest surveillance and subsequent control.

A decentralized surveillance network provides an efficient communication system to permit a rapid alert to pest problems and implementation of control in those cases of real need.

A formalized phytosanitary organization which includes plant quarantine, must be created to allow the control of introduced plant materials.

Research into the technogies of IPM must be continued, which special emphasis on methods of prediction of outbreaks and tradional control methods, and use of ecological new-description pesticides.

The needs for training of personnel and the means of information transfer will be established.

Training will include staff at different levels, and particularly the subsistence farmers.

Information transfer will be directed particularly toward the farmers.

The extent and the complexities of the program will require a high quality regional coordination staff. Among the many tasks specified this coordination unit must take the initiative in the development of legislation dealing with plant protection which is acceptable to the countries of the Sahel, notably in order that mutual agreement of the use of pesticides may be reached by the countries of the Sahel.

V. GENERAL STRUCTURE OF THE PROJECT

Given that production is the immediate beneficiary of the program and equally responsible for the executive of the principal crop protection management problems, it seems logical that in the development of the program the farmer is placed in the center of the extension structures. It is through these structures that the ultimate objectives of the program must be realized ; the farmer profiting from the technologies produced

by the reinforcement of crop protection services, research and training, information all in cooperation with the agricultural information service.

VI. EXTENSION

The structure envisaged proposed that the stream of information passes from the team monitor (agent of CPS) to the encadreurs (agent of agricultural information service) to the farmers by use of intermediary group of "brigadiers" who will be formed at the village level.

It is understood of course, that within the project, one will not, nor will one attempt, to reach all by the farmers in the total area of subsistence farming, nor establish "brigadiers" everywhere. In the next project it is anticipated that limited numbers of strong and functional staff will be created.

Two types of actions in the farmers complex system must be defined :

1. Research pilot programs (on farm trials)
2. Diffusion integrated techniques through extension channel.

The first representes the final research phase and is indispensable in testing the relevance of a combination of tactics as a new technology in the farmers production system. Such on farm research trials have considerable potential as demonstrations of a new technology to other farmers.

The pilot programs should be utilized to this end in the process of diffusion of the new relevant technology.

The extension of integrated techniques addressed to a number of farmers are demonstration on farmers fields without the rigor and precision as required in researcher managed point program (on farm trials).

The major distinction between the two is :

1. Tests to establish relevant technology
2. Direct extension of relevant technology developed by research.

VII. REINFORCEMENT OF THE CROP PROTECTION SERVICE

Within the program concept, the reinforcement of the crop protection service involves two aspects :

1. the creation of a decentralized structure permitting the CPS to effectively diffuse relevant technology to the farmers ;

2. the creation of an effective group to conduct surveillance and intervention, when necessary, on pest outbreak which are beyond the control capabilities of the farmer.

A decentralized structure presuposses the existence of a central base the structure of which is considered below.

7.1. Central Crop Protection Service Base

The central base, situated in the capital, in the general presented here has a direction and 3 sections performing the following tasks.

7.1.1. Direction

- Administration of the service
- Internal coordination
- Liaison between research and information specialists already in place (service d'encadrement agricole). Within the context of the project, the direction will participate in the coordination committee to be created for the Project.

- Responsibility to put in place a national strategy in crop protection, ie. those things which can be prepared by a unified national coordination committee, and which can be adopted by CPS, as available ;

Adapting of a national strategy within the specific regional conditions of the countries ; this strategy will express in concrete terme the techniques of detection, surveillance and warning systems and the integration of the techniques into the agricultural system ;

- Preparation of crop protection legislation, adapting the general model, as prepared by the office of regional coordination, to the assemblage of Sahelian states ;

- Liaison with regional crop protection organizations, such as the unified regional coordination and organizations of surveillance and intervention directed toward large scale pest outbreaks.

7.1.2. Detection, Surveillance, Warning and Extension

- Support of the direction, in matters concerning the adapting of the techniques of detection, surveillance and integrated cultural techniques and put in place a pest warning system meant for endemic, for crops and on the other, special pests outbreaks.

- To put in place and coordinate a system of detection, surveillance, warning and extension ;

- Production - adaptation of documents (technical brochure, etc) supporting extension activities by the decentralized crop protection services ;

- Liaison between research and the decentralized system concerning the collection and transfer of necessary observations for research ;

- Put in place an intra and inter-service of instruction and training in IPM.

7.1.3. Intervention Section

- Support of the administration in establishing IPM strategies ;

- Contribution to the preparation and production to the preparation and production of the document mentioned below ;

- Acquisition and maintenance of pesticide application equipment and coordinate region tasks ;

- Develop a structure by which pesticides (which must be utilized in the ways indicated by IPM) and equipment for their application can be put in the hands of farmers ; however, the price paid by farmers for pesticides must reflect their real costs (as already stressed by the USAID Evaluation Report of 1984).

- Training and diffusion of information concerning the safe use of pesticides.

7.1.4. Phytosanitation Section

- Put in place a functioning system to control importance and support of plant materials (quarantine, treatment, etc) suited to the legislation to be adopted.

7.2. Decentralized Crop Protection Services

The general scheme of a decentralized CPS is as follow.

The Phytosanitary bases instituted at the regional level will be charged with the following responsibilities.

- Put in place a functioning system of detection, surveillance and warning.

- Put in place the means for intervention, either by the services themselves or in supporting the farmers.

- Collect and control the observation and transfer to the central base

- Training extension at the level of the agents and the farmers.

- Diffusion of integrated techniques among the farmers.

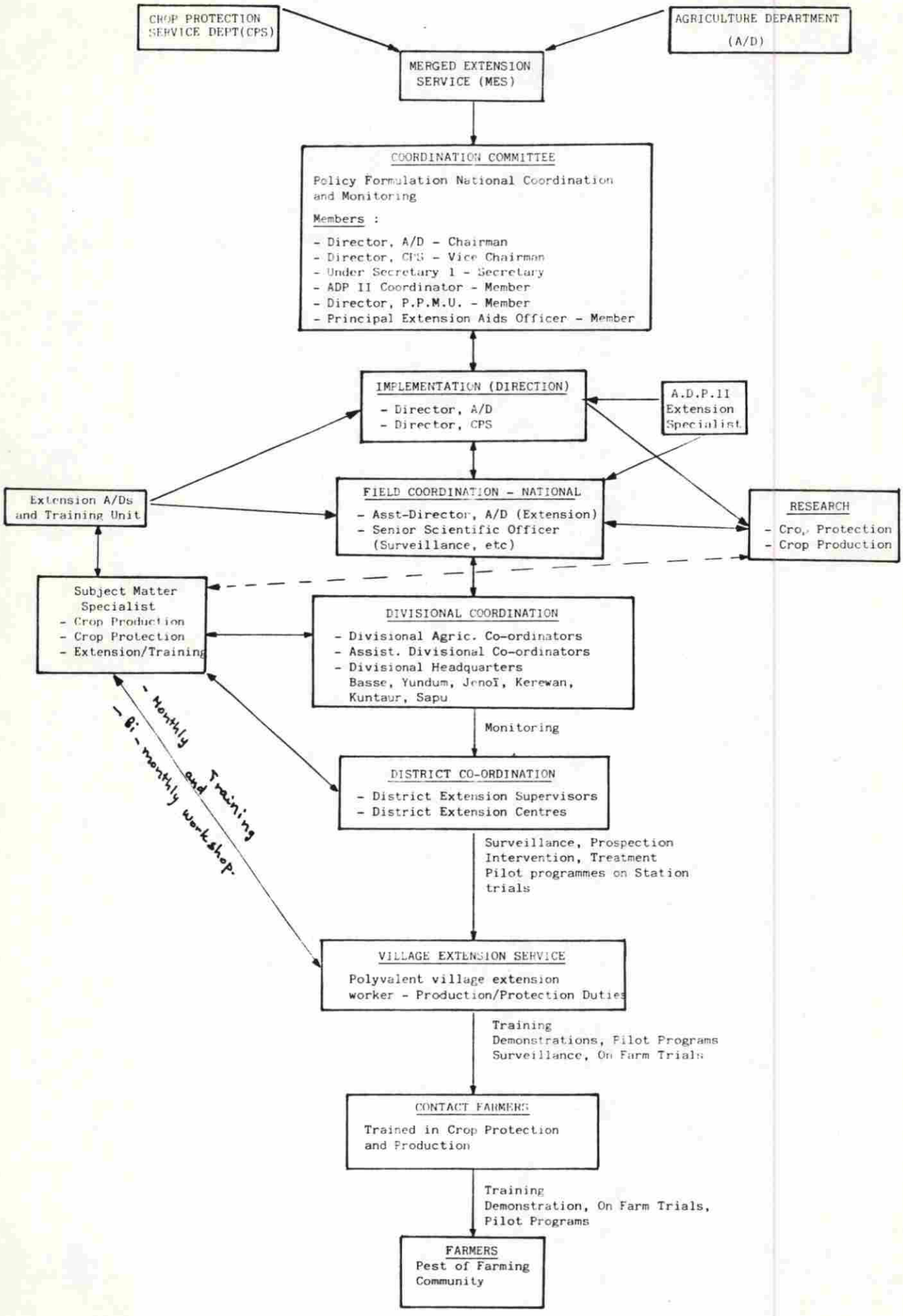
- Liaise the research and the decentralized system in the collection and transfer of verified information/observations for research.

It will be necessary that the phytosanitary bases be able to contact the crop protection service by radio.

From the point of view of personnel, the following scheme is proposed :

1 Chief (cadre superior or ITA) agronomist versed in crop protection
1 Assistants (ITA) one who will do detection, surveillance and warning work as well as extension and the other who will be involved with intervention.
1 or 2 Technicians - monitors for surveillance, research demonstration tasks and warning.
1 Secretary
Chauffers (5).

ORGANOGRAM OF THE GAMBIA MERGED EXTENSION SERVICE



7.3. Results

The results to be generated from the Section Reinforcement of CPS are summarized as follows :

3 regional phytosanitary bases

1 Mini-quarantine

. Diffusion of integrated techniques locally by radio, bulletins and field demonstrations.

. Correct transmission of acquired data by research

. Justified intervention based upon the surveillance of the pests.

VIII. TRAINING

The immediate objective of training portion of the program is to put in place in each country and on each level a minimum force of crop protection personnel/farmer, representing the skeleton of structures necessary for execution of plant production along the lines described.

This is envisaged at three levels : the farmers, the mid-level technical assistants, and the monitors ;

8.1. Training of farmers

The farmers must be trained technically in order to enable them to take charge of the protection of their own crops.

The International Seminar of the CILSS IPM Project (Niamey, December 6 - 13, 1984) found that one of the constraints to implementation of IPM is illiteracy with the majority of the farmers.

In phase II, the training of the farmers will be as follows.

The CPS network, consisting of crop protection bases and phytosanitary base will be used.

Each phytosanitary base, supported by the Agricultural Information Service and the local administrative authority, will select 10 "elite" farmers for each base who will receive training or near the office of the crop protection base.

The training will be given by staff of the Crop Protection Service and the Agricultural Information Service, or by staff of School of agriculture specialized in crop protection ;

Training of the elite farmers will be for 2 weeks (14 days) before the beginning of the farming season.

After this, they will be free to do their field work. They will then have the opportunity to test the lessons learned.

After harvest, the same "elite" farmers will return to the CPS base for another 2 weeks training session, during which additional training will be given.

The trained farmers will return to their villages. They will receive continued support from CPS - personnel and be themselves trainers of other "ordinary" farmers.

At the end of the season, the results obtained by the "elite" farmers will be evaluated by CPS personnel.

In this way , 80 "elite" farmers will be trained per year.

Assuming a diffusion coefficient of 5 ("elite" "normal" farmers), 400 farmers will be made aware of crop protection methods and techniques.

Support of "elite" farmers in implementation of IPM in their fields, by CPS and information service personnel, will continue in the following years.

8.2. Training of mid-level technical staff

Technicians will be trained by the Project "Training in Crop Protection' financed by the Netherlands.

The capacity for teaching crop protection in national schools for technicians in agriculture must be strengthened.

Seminars and refresher courses for technicians will be organized by the Project.

8.3. Training of academic staff

A number of academic staff have received training under the auspices of the CILSS-IPM Project. Grants enabling to continue this kind of training are anticipated. Seminars for academic staff will be organized by the Regional Technical Coordination Unit (CILSS).

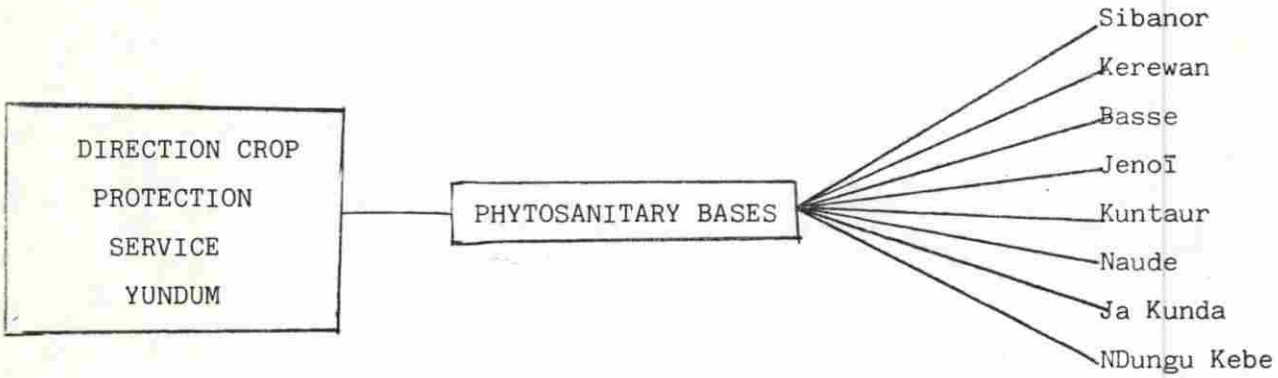
IX. INFORMATION

9.1. Objective

Production of documents and other means of summarizing information acquired by research adapted to the needs of diverse categories of beneficiaries (farmers, technical resistants and CPS agents).

9.2. Outputs

- CP-bulletin ; translated into national language for literate farmers if possible.
- Radio broadcasts
- Technical sheets and booklets
- Posters (special emphasis will be put on these as being most appropriate to convey the message to farmers)
- Movies and slide shows using public screens existing in the bigger villages
- Good quality scientific publications aimed at presenting the sahelian contribution to plant protection at the international scientific level


DIRECTION CROP PROTECTION SERVICE YUNDUM
PHYTOSANITARY BASES
Sibanor
Kerewan
Basse
Jenoï
Kuntaur
Naude
Ja Kunda
NDungu Kebe

X. RESEARCH

10.1. Achievements

Millet :

Raghuva :.Knowledge on the distribution of attacks and losses

- . Studies on the population dynamics of the eggs and larva
- . Good correlation between laying incidence and attacked heads incidence.

Meloids :

- . Knowledge on the distribution and identification of species
- . Studies on the population dynamics (observation of 2 picks) resulting on the interest of late millet
- . Studies on sampling methods establishment of damage threshold : 5 % with 1 meloid per 25 heads during 15 days.
- . Traditional control : interest of the repulsive action of the smoke and the attractive effect of baobak fruit
- . Efficiency of Carbaryl
- . Identification of host plants.

Mildiou and smut

- . Knowledge on distribution, importance of smut (8 % losses)
- . Resistance of 3/4 M12 to smut
- . Soaking and matalaxyl increase yield without reducing significantly the attacks

Striga and nocious weeds

- . Control techniques for weeds
- . Improving weeding
- . Positive effect of Paraquat

Pilot action

Sorghum

- . Insects and diseases
- . Inventory of insect pests, importance of Dysdercus volkeri and Heliothis armigera
- . Importance of long smut in the Western Division

Noxious weeds

. Knowledge on the losses caused by Striga in relation to emergence date
. Identification of good resistence levels
. Cultural control by mixing

Rice

Stem borers

. The most abundant species belong to the type Chilo

Blast

. Knowledge of the importance and loss assessment (sometime up to 10 %)
. Knowledge of the effect of netrogenous manure
. Identification resistant varieties

Noxious weeds

. Identification of the rice field adventicious flora
. Design of control techniques : interest of weeding on time, interest of the use of Propanil + Thibencarb.

Maize

Insects

. Identification of insect pests and importance of Busseola fusca in the Western Region
. Effect of mixed farming on insect population

Noxious weeds

. Identification of resistant varieties
. Chemical control in comparison with normal weeding

Cowpea

Insects

. Importance of Maruca testulalis

Diseases

. Importance of viral diseases (CYMV and CSMV)

10.2. Future program

Research subjects

1. Pearl millet

1.1. Entomology

1.1.1. Raghuva

- Loss assessment
- Biological control (Increasing population of Bracon hebetor)
- Chemical control (both Raghuva and Blister beetles)
- Evaluation of cultivars

1.1.2. Blister beetles

- Loss assessment
- Chemical control in some cases, both Raghuva and Blister beetles
- Resistant varieties

1.1.3. Stem borer (Acigona)

- Resistant varieties (in connection with Raghuva)
- Economic thresholds
- Chemical control
- Biology
- Traditional control

1.1.4. Grasshoppers (Oedaleus nigeriensis) and other species (Kraussavia, Krawella, Hienglyphus, etc)

- Bio-ecology
- Monitoring and control

1.2. Plant pathology

1.2.1. Downy mildew

- Evaluation of cultivars
- Epidemiological studies

1.2.2. Smut

- Evaluation and screening of seed treatment chemicals

1.3. Weed science

1.3.1. Weeds

- Cultural control
- Chemical control

1.3.2. Striga

- Cultural control (intercropping trials, etc)
- Chemical control
- Resistant varieties

2. Sorghum

2.1. Entomology

2.1.1. Panicles pests (Dysdercus volkeri, Heliothis armigera)

- Loss assessment
- Economic thresholds
- Resistant varieties
- Chemical and biological controls

2.2. Plant pathology

2.2.1. Long smut

- Evaluation of cultivars for resistance screening

2.3. Weed science

2.3.1. Weeds

- Chemical control
- Cultural control

2.3.2. Striga

- Chemical control
- Cultural control
- Resistant varieties

3. Rice

3.1. Entomology

3.1.1. Panicle pests

- Economic importance/pest status of different species of panicle bugs
- Loss assessment + economic thresholds
- Screening of various insecticides

3.2. Plant pathology

3.2.1. Rice blast

- Resistance varieties
- Chemical control

3.3. Weed science

- Cultural control
- Chemical control

4. Maize

4.1. Entomology

4.1.1. Borers

- Cultural control and use of resistant varieties
- Loss assessments
- Economic thresholds
- BIological and chemical controls

4.1.2. Cob pests (Heliothis, Busseola)

- Loss assessment

4.2. Weed science

- Chemical control
- Cultural control

5. Cowpea

5.1. Entomology

5.1.1. Aphids

- Resistant varieties

5.1.2. Pests of flowers and pods

- Loss assessment
- Chemical control (minimum)
- Resistant varieties

5.2. Plant pathology

5.2.1. Virus

- Identification
- Loss assessment
- Evaluation of cultivars

5.3. Weed science

- Cultural control

6. Groundnuts

6.1. Entomology

- Pest status and biological control of Aphis craccivora
- Cultural and chemical control of millipedes
- Assessment of losses due to millipedes

6.2. Plant pathology

- Epidemiology and chemical control of Cercospora

6.3. Weed science

- Chemical and cultural control of weeds

7. Vegetables

7.1. Entomology

- Inventory of major vegetable pests and identification of important species
- Cultural and chemical control of important species

7.2. Plant pathology

- Cultural controls
- Chemical controls and use of resistant varieties

8. Storage pests

- Documentation and studies on efficacy of traditional storage
- Improvement (structural and otherwise) of traditional storage structure
- Assessment of importance and losses due to the various economically important storage pests
- Evaluation of various storage chemical on selected pests species
- Testing of various cereal varieties (maize, millet, sorghum and rice) for resistance against storages pests.


U D G E T

BUDGET - STRENGTHENING OF CROP PROTECTION SERVICES

SCHEDULE OF REQUIREMENTS

1 Director
5 Divisional chiefs (section heads)
8 Phytosanitary bases chiefs (team leaders)
16 Deputy phytosanitary bases chiefs (Asst. T/L)

- EXPATRIATE

Consultant - 2 months/year.

B. INFRASTRUCTURE

- Direction CPS

- 1 Mini quarantine (for inspection of intercepted plants and plant-products for exotic insect pests, diseases, seeds of noxious weeds ; also as intermediate quarantine - post for new plant-types destined for other countries).

- 3 Compartmentalized multi-purpose field stores
(To be sited at Kerewan, North Bank Division, Diabugu upper river Division (North) and Wellingara - Western Division
- To be used for storage of seeds, fertilisers, etc for research investigation)

Demonstrations especially for the expanded pilot programme, farming systems research

- Pesticides for research, demonstrations and intervention
- Spray application equipment protective clothings, equipment and first aid materials for pesticides poisoning. (Thress pesticides stores are already in place in JenoI, Sapu and Kuntaur).

- Phytosanitary Bases (3)

- 2 to be sited at Ja Kunda and NDungu Kebbeh
- 1 presently temporal buildings at Naude, Sandou District to be constructed and permanent structures provided.
- 3 Buildings - Manipulation Rooms/Offices (1 Building/Base)
- 3 Warehouses - for safe-keeping of equipment and materials destined for use in the Bases (1 Warehouse/Base).

- Purpose is to ensure that the decentralized services reach all rural areas and benefit most of the farmers and control activities beyond capabilities of the farmers are effectively and efficiently taken care of in good time before it gets out of hand. Train farmers through participation to do their own pest control and also teach others.
- Supervision of on farm trials (pilot program)
- Enhance active participation in extension.

Equipment

Head Office

1 Utility car

- For commuting between CPS headquarters, Yundum and Banjul on official duties (ie. meetings, collection of stores, mails, etc)
- Collecting official guests from ferry terminal, seaport and airport
- Emergency treks to Phytosanitary Bases
- Monitoring programmes from the Head Office

2 four wheeled drived vehicles

- For provincial trekking by divisional chiefs for supervision/monitoring of on-going programmes in their various disciplines
- Also supplement truck in the transportation/distribution of stores
- To be used by intervention at the Direction in assisting bases requiring help in containing serious pest outbreaks
- To be used by stores officer of the Direction in execution of his/her responsibilities.

1 Truck

- For transportation/distribution of stores
- Used for control activities during period of emergencies
- Any other functions assigned by the Head Office.

4 Motorcycles (for years 1 & 3).

Phytosanitary Bases

3 Unimogs (Sibanor, Jenoī, Basse)

6 Giant ULV Sprayers for 6 Unimogs (3 every two years)

8 vehicles 4WD (1 vehicle/Base)

16 Giant motor Duster (8 GMD every 2 years)

13 Motorcycles (for year 1 & 3)

300 Manual treatment equipment yearly for 4 years.

1 000 Knapsacks for 4 years

Small numbers of laboratory equipment for year one

Small numbers of office equipment for year one.

36 Motorcycles (for years 1 & 3) 2/Base.

Purposes :

- To ensure an efficient and effective rapid deployment force during periods of pests outbreaks
- Provide means of institutionalising an efficient and effective early waring system to tackle any pests outbreaks
- To ensure frequent contacts physically with agents and farmers away from the Bases in most parts of the country
- Rapidly close the borders in case of exotic invasions by migratory pests
- Active participation in extension
- Execution of pilot programmes
- Collaboration with other organizations involved in research and development.

1 Mini (personal) computer (CPS Direction)

- Analyse collected data
- Store important information and data about staff, programmes, equipment, stores
- Analyse survey data, research data (farm trials), socio-economic surveys data, consultancy reports, current crop protection/production advances, etc.

8 Trans-receiver radios (1 per Base)

- Contact Direction to report prevailing situation make urgent requests and deliver messages to collaborating institutions and organisations.

- To alert all concerned during Divisional and National emergencies and to rapidly co-ordinate the converging of intervention teams to the actual areas concerned with the right equipment and control materials.

Small laboratory equipment

To complete laboratory needs of existing Bases and to provide adequately for the new ones.

Small office equipment

To provide essential furniture (eg. desks chairs, cupboard, notice board, typewriters, etc) required of modest type field office.

BUDGET CPS STRENGTHENING

I T E M S	I	II	III	IV	TOTAL
I. PERSONNEL					
National	32,435	32,435	32,435	32,435	129,740
Allowances					
Consultants (2 months/year)	13,680	15,048	16,552	18,207	63,487
Sub total	46,115	47,483	48,987	50,647	193,232
II. CONSTRUCTION					
3 Phytosanitary bases (Naude, Ja Kunda, Ndungu)	165,000				165,000
3 Multipurpose stores (Kerewan, Diabugu, Wellengara)	90,000				90,000
1 Mini-Quarantine (Yundum)	145,000				145,000
Sub total	400,000	-	-	-	400,000
III. EQUIPMENT					
1 Utility car	16,000				16,000
1 truck	50,000				50,000
3 Unimogs	150,000				150,000
10 4WD vehicles	160,000				160,000
Year 1					
5 Bases already built					
Year 2 (the 3 new bases)		60,000			60,000

I T E M S	I	II	III	IV	TOTAL
16 Giant Sprayer ULV (for years 1 & 3)	30,000		36,300		66,300
20 Giant motor dusters (for year 1 & 3)	24,000		29,040		53,040
300 Manual treatment Mach.	30,000	33,000	36,300	39,930	139,230
4000 Knapsacks (1000/year)	3,500	3,850	4,235	4,658	16,243
40 Motorcycles (for years 1 & 3)	32,000		38,400		70,400
1 Mini computer	11,000				11,000
Office equipment	15,000				15,000
Laboratory equipment	20,000				20,000
8 Trans-receiver radios	30,000				30,000
Sub total	571,500	96,850	144,275	44,588	857,213
CONTRIBUTION TO OPERATORS					
Fuel	8,000	8,800	9,680	10,648	37,128
Spare parts	8,500	9,350	10,285	11,310	39,445
Travel	7,500	8,250	9,075	9,982	34,807
Water-Electricity - Phone	2,000	2,200	2,420	2,662	9,282
Office supplies	2,500	2,750	3,025	3,327	11,602
Sub total	28,500	31,350	34,485	37,929	132,264
Treatment products	60,000	66,000	72,000	79,860	277,860
Contingencies (10 %)	106,862	21,523	17,511	14,714	160,610
TOTAL	1,212,977	263,206	317,258	227,738	2,021,179


R A I N I N G

I T E M S	I	II	III	IV	TOTAL
TRAINING					
Farmers training	30 000	33 000	36 300	39 930	139 230
Technicians training	20 000	22 000	24 200	26 620	92 820
4 Fellowships for 4 years	92 000	92 000	92 000	92 000	368 000
Sub total	142 000	147 000	152 500	158 550	600 050
INFORMATION					
CPS Bulletin (6 issues/year)	10 000	11 000	12 100	13 310	46 410
Documents for farmers	15 000	16 500	18 150	19 965	69 615
Subscription to scientific journals	7 000	7 700	8 470	9 317	32 487
Purchase scientific books	7 500	8 250	9 075	9 982	34 807
Office supplies	6 500	7 150	7 865	8 650	30 165
Equipment	35 000				35 000
Sub total	81 000	50 600	55 660	61 224	248 484
Contingencies (10 %)	22 300	19 760	20 816	21 977.4	84 853.4
TOTAL	245 300	217 360	228 976	241 751.4	933 387.4


ESEARCH

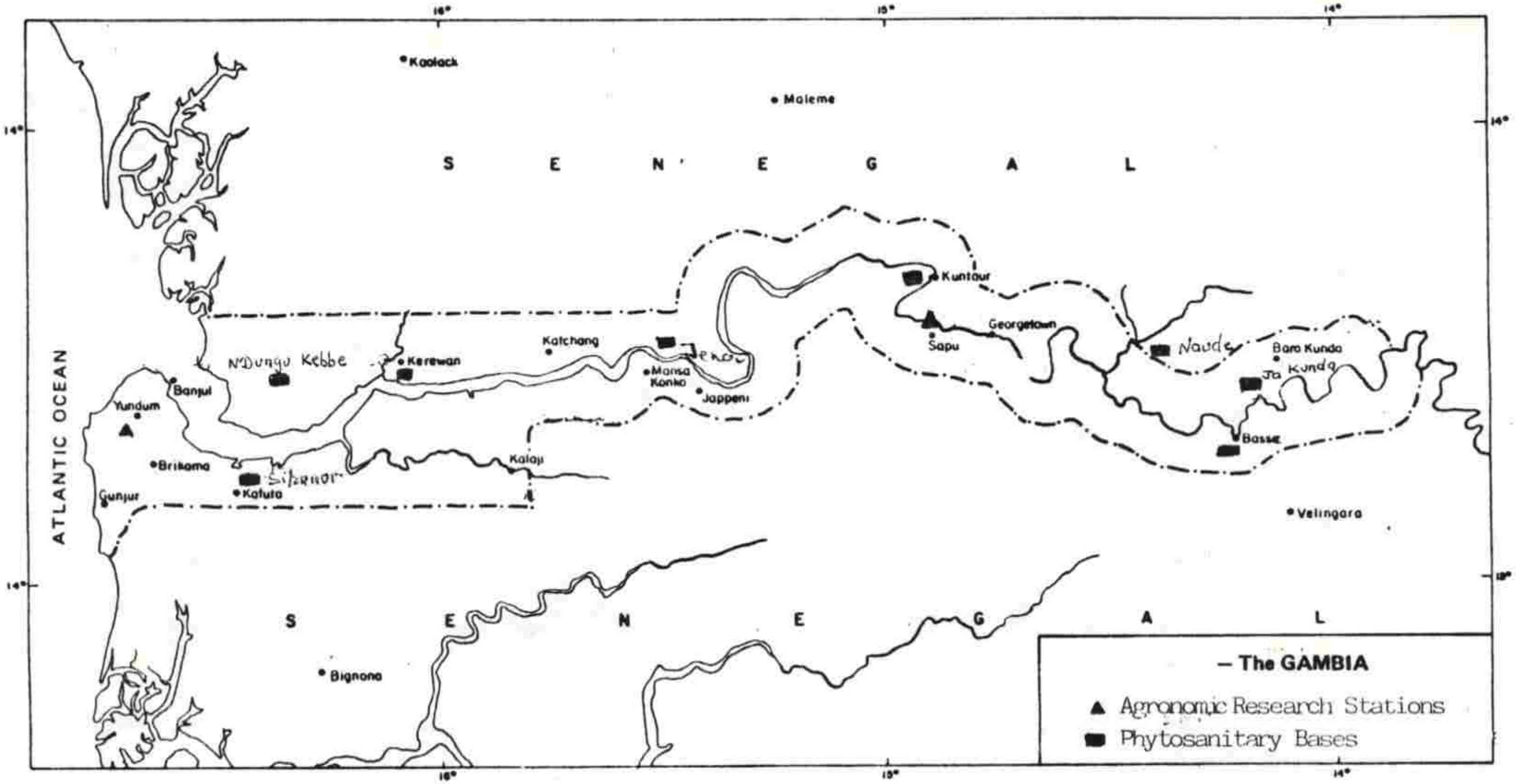
I T E M S	I	II	III	IV
National personnel	75 502	83 052	91 257	100 382
Consultant (2 months/year)	13 680	15 040	16 544	18 198
Travel cost	29 853	32 838	36 122	39 734
Contractual services	6 600	7 260	7 986	8 785
General operating expenses	40 000	44 000	48 400	53 240
Supplies and materials - Documentation	9 130	10 043	11 047	12 152
Equipment		45 000		
Allowances	22 800	22 800	22 800	22 800
Contingencies (10 %)	19 756	26 003	23 415	25 529
TOTAL	217 321	286 036	257 571	280 820

TOTAL RECHERCHE : 1 041 748 $ US

R E C A P I T U L A T I O N

(Dollars US)

Reinforcement National Crop Protection Services	2,021,179
Training	933 387.4
Research	1 041 738
TOTAL	3,996,304.4



ATLANTIC OCEAN
SENEGAL
SENEGAL
Kaolack
Maleme
Banjul
Yundum
Brikama
Gunjur
Kafuta
Kerewan
Katchang
Mansa Konko
Jappeni
Kalaji
Kuntaur
Sapu
Georgetown
Baro Kunda
Basse
Velingara
Bignona
N'Dungu Kebbe
Naude
Ja Kunda
16°
15°
14°
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13°
- The GAMBIA
Agronomic Research Stations
Phytosanitary Bases