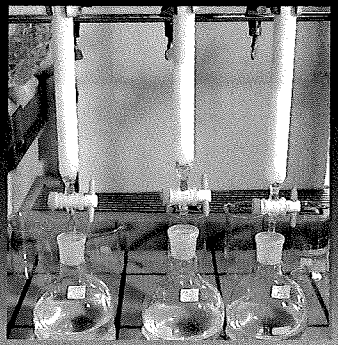
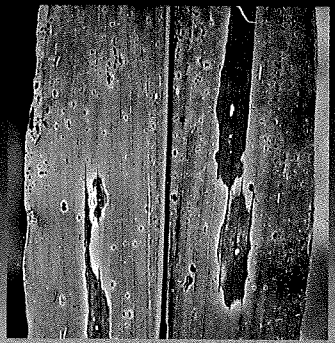
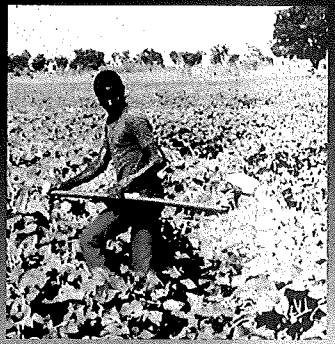
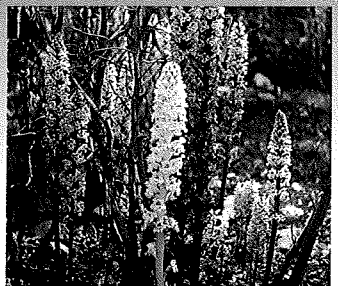
Technical Cooperation in Rural Areas Plant and Post-Harvest Protection

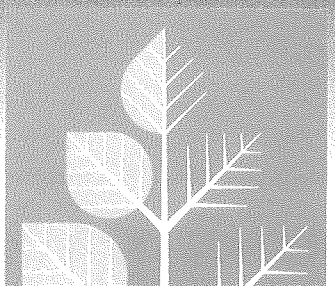
Facts and Figures 1986











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Plant and Post-Harvest Protection

Facts and Figures 1986

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Introduction

Promoting rural areas coupled with conservation of the natural resources in the developing countries is a focal point of German development policy. Safeguarding and improving the population's basic food supply and source of income by means of agricultural production is a prerequisite for any form of further development.

In this context, plant production is of major importance in most countries. Immense worldwide efforts are consequently being made to safeguard and increase harvests.

Although cultivation measures (selection of varieties, tillage, fertilizing etc.) help to safeguard and improve productivity, large amounts of the potential harvest are regularly lost while the crops are still in the fields, as a result of plant diseases, insects, weeds, rodents and other pests. The worldwide losses are estimated at around 30% of the developing countries' potential harvest. Further substantial losses occur during transportation and storage. Plant and post-harvest protection programmes thus play a crucial role in safeguarding plant production.

Technical Cooperation projects in this sector are of particular importance for Third World countries and are much in demand.

The Federal Republic of Germany has been participating in plant protection projects since 1961. GTZ personnel are currently implementing a total of 37 plant and post-harvest protection projects in 28 countries (including six supraregional projects), involving around 70 long-term plant protection experts and an annual budget of around DM 35 million.

Responsibility for these projects is in the hands of "Plant and Post-Harvest Protection" Section 152 of GTZ's "Plant Production, Plant Protection, Forestry" Division 15.

The activities of the Plant and Post-Harvest Protection Section focus on:

- Pesticide residue and formulation control
- Practice-oriented early-warning and surveillance services featuring damage threshold concepts
- Integrated and biological approaches in plant and post-harvest protection
- Control of vertebrate pests
- Post-harvest and storage protection
- Promotion of institutions and advisory services
- Applied research programmes

All plant protection activities are based on the overall concept of integrated plant protection.

Integrated plant protection involves the application of all ecologically and economically appropriate methods of keeping pest occurrence below the economic damage threshold, with particular emphasis placed on the deliberate utilization of natural limiting factors.

Integrated plant protection cannot replace chemical control methods, but must rather incorporate them insofar as this is ecologically appropriate and economically expedient.

The following important aspects play a role in integrated plant protection:

- Natural pest limiting factors, including climatic and locational influences
- Crop rotation measures
- Resistant crop plants
- Economic damage thresholds
- Early-warning systems, including forecasting of pest and disease occurrence

- Selective-action pesticides causing no harm to beneficial animals and insects
- Appropriate combination of control measures, e.g. cultivation measures, physical, biotechnical and biological methods as well as use of chemicals.

Plant protection has always taken many of the above-mentioned aspects into account. However, integrated plant protection focuses greater attention on deliberate preservation and use of natural limiting factors.

In view of the ecological and economic conditions prevailing in developing countries, the integrated approach is of particular significance and is thus an essential component of the projects implemented by the "Plant and Post-Harvest Protection" section. The development and use of biological control methods are of growing importance.

This brochure gives a survey of the projects and publications in the plant and post-harvest protection sector. It is addressed to specialists and institutions dealing with plant and post-harvest protection problems in the Third World, to GTZ personnel and to interested members of the public.

Any enquiries concerning the projects should be addressed to Section 152 "Plant and Post-Harvest Protection".

R. Kaske
Head of Section

J. Friedrichsen
Head of Division

General information for the reader

The projects are arranged in alphabetical order of country. All information relates to the project status as per January 1986 and to the project phase in progress at that time. Any deviations from this general rule are clearly indicated.

Abbreviations:

PN Project number
TC Technical Cooperation

Contents

Promotion of Citrus Cultivation in the Misiones Province

PN: 75.2089.3

GTZ project leader: A. Marmelicz

Counterpart organization: Instituto Nacional de Technologia Agropecuaria

Project location: Montecarlo, Misiones

1. The context

The Argentinian province of Misiones has been deprived of its formerly sound economic basis as a result of a virus disease which has caused the dying-off of sweet oranges. The general income situation is considerably worsened by the fact that smallholder fruit-growing is closely linked with craft and processing enterprises. Climatically, the province of Misiones is ideal for fruit-growing. This labour-intensive type of farming made it possible in the past for families to earn an adequate income despite cultivating relatively small areas.

2. Aim of the project

The aim of the project is to re-create a secure basis for growing citrus and other types of fruit in the Misiones province.

3. Project design/Scheduled results

Investigations into the causes of the virus disease which has caused the dying-off of citrus crops in Misiones are to find ways of controlling the disease and producing virus-free stock. This requires a great deal of experimental and research work. Between 1976 and 1984 a well-staffed and equipped experimental and extension station with 33 hectares of land for experimental purposes was set up in and around Montecarlo and its experimental work is already yielding a number of initial findings. These new findings, together with the extension services provided, have reawakened interest in commercial fruit-growing among the former fruit farmers.

It is hoped that the following additional results will have been achieved by the end of the follow-up assistance phase (1 January 1984 to 31 July 1987):

- Demonstration trials involving various tillage methods will have been evaluated.
- Advice will have been provided on optimizing cultivation methods for citrus and other types of fruit.

- The results of the field trials will have been evaluated and adapted for use in practice-oriented extension work.

- Short-term counterpart upgrading measures will have improved the Argentinian specialists' knowledge and level of training.

- Additional material and equipment will have been provided for the experimental field.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
Assignment of short-term experts and appraisers for up to 7 man-months, supply of technical equipment, seeds and plants for the experiments and trials, short-term upgrading for up to 7 Argentinian specialists, partial assumption of operating costs in special problem situations.

Inputs by project country:
Provision of the necessary specialists, administrative staff and support personnel, continuation of all project programmes started, meeting of operating costs for project facilities, release of specialists for training measures. Implementation of extension programmes.

5. Implementation status

Improvements in the cultivation of citrus and other types of fruit must essentially be viewed on a very long-term basis. The experiments and demonstrations set up in the experimental field are continuously yielding new findings on the cultivation of citrus and other fruits. These findings are to be put into practice and passed on to the growers by the counterpart organization in the course of the follow-up assistance phase.

Support to the Plant Protection Service

PN: 80.2001.8

GTZ project leader: S. Krall

Counterpart organization: Service de la Protection des Végétaux

Project location: Porto Novo

1. The context

Benin possesses few natural resources outside the agricultural sector and the Beninese Government therefore allocates special priority to agricultural production.

The growth of the country's population (around 3 % per year) means that agricultural land is having to be more intensively cultivated and fallow periods shortened; in some places permanent cultivation is becoming necessary on account of the shortage of land. As a result, new crop-growing problems are encountered, the risk of erosion is becoming greater and plant diseases and pests are playing an increasingly important role. The traditional pests have been joined by those which were brought into Africa from other continents and have spread and become established in Benin too. The consequence is that a growing proportion of the country's agricultural production is being destroyed by pests before harvesting or during storage. In addition to the "Defense des Cultures", an institute devoted to research into plant diseases and pests, Benin also has a plant protection service, the "Service Protection des Végétaux", whose task is to put the results of the research into practice and which is thus responsible in particular for demonstration and extension work. Although this 'service' is to play a key role in rural development in Benin, it has been hindered in this role in the past due to a lack of trained staff, experience and resources.

2. Aim of the project

By assisting the Beninese plant protection service, the project aims to promote plant protection extension services throughout the country. Attention is focused on boosting crop production and reducing post-harvest losses.

3. Project design/Scheduled results

The project is to provide material and equipment for the Beninese plant protection service, increase its personnel strength and provide staff upgrading, as well as to develop integrated plant protection programmes that can be implemented at village level. It is intended that the following results should have been achieved by the end of the project:

- The plant protection service will have developed into a qualified advisory institution.
- Pesticides and the necessary equipment will be available to smallholders throughout the country.
- Extension packages covering post-harvest protection, bean treatment, manioc and maize growing, rodent pests and bird-pest control will have been devised, tested, implemented and accepted and applied by the farmers.
- A biological control programme aimed at manioc pests will be in operation.
- The service's quarantine and fumigation centre will be operational.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
1 expert on plant protection extension work for up to 30 man-months, short-term experts for up to 4 man-months, upgrading of two Beninese specialists for up to 3 months each, arrangement of attendance at seminars by 4 counterpart specialists; supply of material and equipment for the plant protection service.

Inputs by project country:
Provision of the necessary specialists, administrative staff and support personnel; meeting of costs for fuel, maintenance, servicing and insurance of official vehicles and other facilities operated by the project, meeting of personnel costs, travelling expenses and cost of board and lodging in connection with staff upgrading.

5. Implementation status

The project is currently in its 2 1/2-year start-up phase. The personnel strength of the plant protection service has been increased, the service given a tighter organizational structure and equipment supplied. Training schemes, demonstrations and extension work are being carried out. In compliance with the decree that quarantine activities must fall within the service's sphere of responsibility, a quarantine and fumigation centre has been set up in the port of Cotonou and has started work.

Studies on the Resistance of Coffee Plants to Coffee Leaf Rust

PN: 79.2186.9

GTZ project leader:	Dr. Moraes
Counterpart organization:	Instituto Biológico Secretaria da Agricultura
Project location:	Sao Paulo

1. The context

Seen in international terms, coffee rust is one of the most dangerous and economically significant plant diseases. The fungus causing the disease has been firmly established in Brazil since 1970 and is jeopardizing the production of coffee, the country's most important export. Chemical control of coffee rust using fungicides is possible but is also expensive. This places a considerable burden on the coffee producers and also has social effects.

Furthermore, the undoubtedly effective treatment using fungicides has already given rise to a number of secondary problems. Disruption of the biological equilibrium has caused more intensive pest attack to the coffee plants, thereby necessitating the use of additional pesticides and increasing the risks for users, consumers and the environment.

Coffee rust can also be combatted in the long term by breeding resistant coffee plant varieties.

2. Aim of the project

Means of inducing resistance in coffee plants are to be further developed as an alternative to chemical control.

3. Project design/Scheduled results

This is a research project intended to assist Brazil and other Latin American countries in their intensive efforts to combat coffee rust.

The project was started in 1981 with initial training measures and improvement of the counterpart organization's technical facilities. The first operational phase, from 1982 to 1984, covered initial research programmes conducted under Brazilian supervision. The German long-term expert and various short-term experts contributed their knowledge of the latest research technologies.

A second operational phase (June 1984 to May 1987) and the planned follow-up assistance phase (June 1987 to September 1989) will serve to further improve the research laboratory, which is also used as a training centre for coffee researchers from other Latin American countries. In the long term, the envisaged results of the project (some of which will not be achieved for a number of years) are as follows:

- The level of knowledge with regard to scientific research will have been improved.

- It will be possible to induce resistance to the coffee rust pathogen in coffee plants through treatment with metabolism products from microorganisms.

- The biosynthesis and concentration of phytoalexins in the coffee plant, as well as the molecular structure of the phytoalexins, will have been analysed.

- Physiological and biochemical methods will be used to investigate the phases of the life cycle of the coffee rust pathogen Hemileia vastatrix.

- Histochemical investigations will be carried out into host-pathogen interaction at cellular level.

- Using serological techniques, it will become possible to distinguish between major physiological strains of the coffee rust pathogen occurring in Brazil.

- Common antigens for early measurement of the resistance level of coffee plants will be in use.

- Biochemical changes following inoculation with the pathogen in the host tissue and in the intercellular spaces of the leaves will have become known.

4. Scheduled inputs (June 1984 to May 1989)

Inputs by the Federal Republic of Germany:
1 expert biochemist for up to 10 man-months, short-term experts and appraisers for up to 13 man-months, long-term scholarships for Brazilian specialists for up to 28 months; laboratory equipment, reagents and other expendable materials; technical literature.

Inputs by the partner organization:
Provision of the necessary specialists, administrative staff and support personnel; meeting of day-to-day operating costs for project facilities; release of scientific specialists for training measures; provision of all necessary equipment and supplies for the project field offices.

Inputs by others:
The Secretariat for International Economic and Technical Cooperation (SUBIN), which is responsible to the Brazilian Ministry of Planning, is providing sizeable grants towards the personnel costs and travelling expenses.

The Brazilian Coffee Institute (I.B.C.) is assisting with the construction of a greenhouse and the development of a special laboratory.

5. Implementation status

Resistance induction which can be reproduced at any time has been achieved in laboratory tests and coffee rust infestation reduced by 90 % by comparison with untreated coffee plants. The tests are now to be continued outdoors on an intensive basis; the 1985 drought in the coffee-growing areas led to this work experiencing a certain amount of delay.

Around 12 counterpart specialists have so far undergone off-project upgrading.

Plant Protection Programme

PN: 82.2089.9

GTZ project leader:	N. von Keyserlingk
Counterpart organization:	Ministry of Agriculture and Forests, Agriculture Corporation
Project location:	Rangoon

1. The context

Agriculture is the most important sector of the Burmese economy. It is being increasingly intensified with government assistance in order to provide food and jobs for the country's growing population and in order to earn foreign exchange through exports. The most important crop is rice.

New high-yield varieties of rice and other crops have already boosted yields to a considerable extent. However, pests and climatic influences pose a permanent threat to the crops, with annual losses valuing around DM 20 million.

The Burmese farmers (mostly smallholders) are unable to cope with the related plant protection problems or to take preventive measures. The lack of understanding for the necessity of plant protection measures, the inadequate knowledge and the users' lack of problem-awareness as regards appropriate plant protection can be ascribed to the inadequate or non-existent extension activities by a plant protection service which is not yet fully operational. Efficient agricultural research and training facilities are likewise lacking.

2. Aim of the project

The intention is to establish an operative, efficient plant protection service, capable of developing appropriate plant protection measures and strategies and of appropriately advising the farmers.

3. Project design/Scheduled results

The project's 3 1/2-year start-up phase involves the provision of initial broad-based technical and organizational support for the Burmese plant protection service now being established. The next phase is to concentrate on the setting-up of an infestation-dependent control system in rice growing. It is envisaged that the following results will be achieved by the end of the project's initial phase:

- A plant protection, diagnosis and extension station will have been set up in each of the six most important crop-growing areas.

- The plant protection service personnel will have become qualified for their work as a result of training and upgrading measures.

- Back-up analyses to obtain data relevant to plant protection will have been carried out.

- The organizational and technical basis for setting-up an infestation-dependent control system for rice growing will have been worked out.

- Appropriate methods and strategies for preventive rodent pest control will have been developed.

- Field tests with a view to obtaining and using natural insecticides from the neem tree will have been carried out and corresponding recommendations drawn up.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
Assignment of 4 long-term experts for up to 116 man-months and short-term experts for up to 24 man-months; implementation of off-project training and upgrading measures for Burmese specialists (112 months of training under long-term programmes and 18 months under short-term programmes); contribution to the setting-up and equipping of 6 plant clinics; supply of equipment and means of transport.

Inputs by project country:
Provision of specialist and support personnel; provision of buildings, premises and facilities; provision of fields for trials and demonstration purposes; procurement of adequate quantities of neem stock; meeting of running costs; implementation of the results of the work.

5. Implementation status

The project started in August 1985. The operational planning will be carried out on site in February 1986. At present, only the team leader is already in Burma. The other experts will follow in the spring of 1986.

Integrated Plant Protection

PN: 77.2144.2

GTZ project leader:	Dr. A. Viereck
Counterpart organization:	Ministerio do Desenvolmento Rural
Project location:	Praia / Sao Jorge

1. The context

In addition to the problem of often inadequate rainfall, crop yields from both dryland farming (approx. 35 000 hectares) and irrigated agriculture (approx. 2000 hectares) in the Cape Verde Islands are limited by pests (mainly insects). Despite the low degree of self-sufficiency (often below 20 %), the safeguarding of agricultural production is one of the major objectives in Cape Verde's development plan.

In general, the major pests in the Cape Verde Islands are locusts, harmful butterfly larvae, beetles, fruit flies, scale lice and virus-transmitting insects, all of which occur in vast numbers. On the island of Santo Antao a species of millipede causes immense damage to sweet potatoes in the irrigated farming areas.

The country's island location means that biological pest control methods offer particularly good prospects of success.

2. Aim of the project

The aim of the project is to develop and introduce integrated and biological methods designed to ensure appropriate pest control in the Cape Verde Islands.

3. Project design/Scheduled results

The project's activities are focused on the development and application of an integrated plant protection concept as well as on the provision of support to the agricultural extension service in the plant protection sector, accompanied by upgrading programmes and the supply of equipment. It is envisaged that the following results will have been achieved by the time the project ends:

- An integrated plant protection concept for dryland farming and irrigated farming will have been developed and will be in use on all the islands.

- An efficient extension service will have been set up, taking particular account of the archipelago's phytosanitary problems. Extension aids will be developed and used in a practice-oriented manner.

- Specialists, technicians and extension officers from the counterpart organization will have undergone training in the Federal Republic of Germany or in other countries, or will have acquired the necessary qualifications through short regional programmes (phytomedicine).

- The national basis for the plant protection service and the study centre will have been expanded. The counterpart organization will have been adequately provided with equipment and expendable materials for use in laboratory experiments, field trials and extension work.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
2 GTZ experts (agronomy/plant protection) for up to 179 man-months, short-term experts for up to 21 man-months, scientific assistant for up to 30 man-months; supply of equipment for the extension and training centre, financing of construction measures; various vehicles; laboratory and office equipment and expendable materials; diesel fuel for central electricity generating unit; wage costs for support personnel; travelling expenses and training costs.

Inputs by project country:
Provision of qualified counterparts as well as administrative staff and support personnel; provision of land for field trials, sites, buildings, furnishings and workshop; gradual assumption of responsibility for diesel-fuel costs; release of agricultural extension officers for upgrading courses.

5. Implementation status

The project, which started in 1977, is currently in its second operational phase (1984 - 1986). Good results have been achieved so far in the area of integrated plant protection, particularly as regards biological pest control. The project is well-equipped. The extension component exhibits a number of shortcomings, as it took years to create the extension service. Quarantine measures, which are particularly important for this island state, could not be started until 1984. Preparations are currently being made for prolongation of the project.

Biological Control of Pests in Forests

PN: 82.2134.3

GTZ project leader:	Mr. Yu, Chang-Yi, Chinese project manager
Counterpart organization:	Ministry of Forestry
Project location:	Shenyang

1. The context

In the People's Republic of China the natural forests have been largely destroyed as a result of centuries of ruthless exploitation and permanent over-use. This leads, among other things, to forest devastation, erosion by wind and water, flooding and wood shortages. Since 1949 the country has been endeavouring to extend the forested areas once again by means of large-scale afforestation schemes. Particular importance is attached to protecting the afforested areas. Alongside forest fires and uncontrolled tree felling by the population, it is insects, pathogens, parasitic plants and mice which represent the greatest dangers for the forests.

The use of integrated and biological pest control methods has a long tradition in Chinese agriculture. Endeavours are being made to apply similar methods for the forests; however, the development of biological pest control in this area is hindered by bottlenecks and deficits in the scientific, research and training sectors.

2. Aim of the project

A research institute for integrated biological control of forest pests (responsible for Northern China) is to be established and developed.

3. Project design/Scheduled results

The Chinese counterpart organization is being advised on construction and organizational aspects in the establishment and development of the research institute. The institute's equipment is being supplied by the Federal Republic of Germany. The institute's personnel are to undergo training to qualify them for their tasks. Following a start-up phase scheduled to last three years, practice-oriented basic research is to be started. It is planned that the following results will have been achieved by the end of the project's initial phase:

- The details of the research institute's organizational integration into the forest administration and its internal structure will have been laid down.

- The research institute building will have been constructed and equipped.

- The institute's scientific and technical specialists and administrative staff will have acquired the necessary qualifications for their work.

- A documentation centre for integrated biological pest control will have been set up at the research institute.

- A practice-oriented medium-term programme for the institute's research work will have been drawn up.

- Project management will have been carried out.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
Short-term experts for up to 15 man-months; laboratory equipment, apparatus and facilities for experimental purposes, audiovisual equipment and aids, office equipment and furnishings; training of specialists (48 months under long-term programmes and 20 months under short-term programmes).

Inputs by project country:
Provision of specialists, administrative staff and support personnel; construction of a building for the research institute, provision of the necessary buildings, facilities and vehicles, meeting of running costs; release of specialists for training.

5. Implementation status

Joint operational planning was carried out on site in June 1985; this simultaneously marked the beginning of the project. The agreed three-year project duration will thus run from June 1985 to May 1988.

The Chinese counterpart organization started the construction work for the research institute in the autumn of 1985. It is agreed that the building will be completed by June 1987 at the latest.

Two Chinese specialists, who are currently learning German, will start their six-month upgrading programme in the Federal Republic of Germany in May 1986.

A project progress control by the GTZ is scheduled for the second half of 1986.

Plant Protection Training and Advisory Services

PN: 80.2054.7

GTZ project leader:	Dr. G. Jürgens
Counterpart organization:	Dirección de Sanidad Vegetal Ministerio de Agricultura y Ganaderia
Project location:	San José

1. The context

The government plant protection service, attached to the Ministry of Agriculture, is of major economic significance in Costa Rica. However, the government agencies are unable to implement on their own campaigns of the necessary scale to control economically important pests and diseases such as coffee rust. Pests and diseases which have to date not occurred in the country represent a potential danger if they are brought in. There is no diagnostic service permitting fast action to protect the crops and it cannot be guaranteed that import and export goods are free of pests and disease. A number of critical factors hinder the performance of the necessary tasks. The specialists and management personnel lack phytomedical knowledge and appropriate training; facilities and equipment are also inadequate, particularly for plant quarantine, the monitoring of crops and pesticides and in the regional service. The central problems on many farms are the inappropriate use of pesticides and insufficient knowledge of alternative methods.

2. Aim of the project

The project is intended to expand and strengthen the plant protection service while at the same time enabling it to devise solutions to plant protection problems and offer them to the farmers.

3. Project design/Scheduled results

The project's activities concentrate on providing specialist and administrative advice to the Ministry of Agriculture agencies responsible for plant protection; this is backed up by training and upgrading programmes. A major role is also played by the development of new alternative plant protection methods and introducing them to the farmers. It is envisaged that the following results will have been achieved by the end of the project:

- The efficiency of the plant protection service will have been improved.

- The technical procedures and equipment used in plant quarantine will have been improved.

- The monitoring of pesticides will have been expanded and the prerequisites for analyses improved; initial data on pesticide residue and formulation control will be available.

- The phytomedical knowledge of the specialists and management staff will have been improved and will enable them to perform the necessary tasks in the plant protection service.

- Recording of the causes of damage will have been carried out and will be permanently updated.

- The monitoring of crops for pests and diseases will have been started with a view to future forecasting and stepped up with a view to preventing pests and diseases from being brought into the country.

- Integrated plant protection will have become a regular part of the work of the plant protection service.

- Practical application of phytosanitary technology will be guaranteed.

4. Scheduled inputs (mid-1981 to mid-1987)

Inputs by the Federal Republic of Germany:
2 long-term experts (plant protection, phytopathology) for up to 132 man-months, short-term experts and appraisers for up to 27 man-months, scientific staff for up to 72 man-months, personnel under local project contract; laboratory and field equipment, vehicles, production inputs; contributions to running costs; production of extension aids; travelling expenses; up to 15 long-term scholarships, short-term upgrading (courses, seminars).

Inputs by project country:
Provision of qualified counterparts, technical personnel for the regional service and quarantine work, support personnel; buildings, vehicles, expendable materials; meeting of running and maintenance costs; provision of support for project programmes by other institutions involved in plant protection.

5. Implementation status

The project was started in 1981 and is currently in the third year of the four-year main phase (mid-1983 to mid-1987). The fundamentally redesigned organizational structure and tasks of the plant protection service are currently being introduced at both central and regional level. The specialist technical work is focused at present on the creation and expansion of diagnosis possibilities, studies on the epidemiology of black stripe in the plantain, recording and integrated control of coconut pests and diseases and the provision of support for post-entry quarantine. The long-term training of the counterparts in the Federal Republic of Germany and in other countries can be concluded after the commencement of training for three specialists in September 1985 and a further specialist in 1986.

A follow-up assistance phase (mid-1987 to mid-1990) is planned.

Pesticide Formulation Control Laboratory

PN: 79.2037.4

GTZ project leader:	K. Ziller
Counterpart organization:	Department of Agriculture Plant Protection Service
Project location:	Nicosia

1. The context

In 1974 the island of Cyprus was in effect partitioned, as a result of which the Republic of Cyprus lost around 70 % of its agricultural production. It was nevertheless possible to maintain a supply of agricultural produce for the southern part of the country by improving production methods. However, this involved considerable intensification of agricultural production and a sharp increase in the use of pesticides. The necessary agents and their active ingredients are imported from a wide variety of countries and are in part formulated or repackaged on Cyprus itself.

Although Cypriot legislation lays down regulations for the registration, importing, marketing and formulation of pesticides in the country, Cyprus has to date had no facilities for checking the quality of the pesticides used.

2. Aim of the project

The aim of the project is to establish an effective pesticide quality control service.

3. Project design/Scheduled results

The project is intended to enable the counterpart organization to effectively monitor observance of the existing statutory regulations. The project activities are therefore focused on setting-up a pesticide quality control laboratory and training qualified laboratory personnel. These measures are accompanied by continuous advisory services to the registration authority, the pesticide industry and the farmers. It is envisaged that the following results will be achieved by the project:

- A pesticide quality control laboratory will have been set up.
- Highly qualified staff will be available.

- More than 500 quality controls will be carried out each year.

- Standards will have been raised; laws and regulations will have been supplemented.

- Only high-quality pesticides will be available.

- The farmers and the general public will have been informed about the advantages and disadvantages of pesticides, particularly the risks involved, and will act accordingly.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
1 long-term expert (chemist and pesticide analysis expert) for up to 24 man-months, short-term experts for up to 4 man-months, supply of equipment for the quality control laboratory plus expendable materials for the start-up phase, 1 passenger car; meeting of maintenance and repair costs for equipment and vehicle (2 years); wage costs for support personnel; travelling expenses.

Inputs by project country:
Provision of qualified counterparts, staff for running the analytical laboratory, construction of the laboratory building, meeting of laboratory running costs.

5. Implementation status

The project is in the first year of implementation and is designed to have a two-year operational phase. The laboratory building has been completed and the equipment has been installed. The introduction of routine analyses is currently in progress and registration analyses are also being carried out. The inauguration of the laboratory (December 1985) was used as an opportunity to establish initial contacts with consumers' groups, farmers' associations and the pesticide industry.

Control of Coffee Pests and Diseases

PN: 83.2010.1

GTZ project leader:	Dr. C. Klein Koch
Counterpart organization:	Ministry of Agriculture with attached plant protection service
Project location:	Quito and Tumbaco

1. The context

In Ecuador, coffee is grown in 17 of the country's 20 provinces on around 130 000 farms over a total area of some 400 000 hectares. The fact that it is grown by smallholders means that in socio-economic terms coffee plays a role which should not be underestimated. After petroleum, it is the second most important export product yielding foreign exchange. Around 800 000 people of Ecuador's total population of roughly eight million depend on coffee growing and production for their livelihood. As a result of sociocultural factors and the absence of major phytomedical problems, modernization of the coffee plantations has been neglected in Ecuador, as has also been the case in other Andean Pact countries.

In June 1981 the coffee crops in the south of the country were attacked for the first time by the coffee berry beetle (Hypothenemus hampei) and coffee rust (Hemileia vastatrix). This led to considerable yield losses in the poorly tended crops, endangering the livelihood of the small farmers.

2. Aim of the project

The aim of the project is to slow down the advance of the coffee berry beetle and coffee rust by means of quarantine measures and, with the aid of ecologically and economically appropriate pest and disease control, to maintain the profitability of coffee growing in Ecuador, thereby safeguarding and preserving the livelihood of small farmers.

3. Project design/Scheduled results

It is envisaged that the following results will have been achieved by the end of the start-up and operational phases:

- The plant protection service personnel will have been upgraded.

- Quarantine stations will have been set up and will be operational.

- Coffee plants resistant to the strains of coffee rust occurring in Ecuador will have been introduced and processed in propagation programmes.

- Tests concerning the epidemiology and control of coffee rust will have been carried out and initial findings will be available.

- Investigations into the rehabilitation and renovation of the coffee plantations will have been carried out and initial findings will be available.

- A concept for integrated control of coffee pests and diseases will have been developed.

- Natural limiting factors and natural enemies of the coffee berry beetle will have been studied.

- The bio-ecology of the major types of pest will have been investigated.

- Effective plant protection methods acceptable in economic and ecological terms will be in use.

- The surveys regarding zonification of coffee growing will have been completed and the findings applied in practice.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
2 long-term experts as advisors for up to 54 man-months, short-term experts and appraisers for up to 8 man-months; supply of materials, machines, means of transport, laboratory apparatus and meteorological instruments; provision of the necessary funds for counterpart training and upgrading, travelling expenses for the assigned experts for travel in Ecuador and elsewhere.

Inputs by project country:
The counterpart organization provides the necessary qualified counterparts, administrative staff and support personnel to ensure proper implementation of the project, meets the running and maintenance costs for the project facilities as well as the costs relating to fuel, maintenance and servicing for the official vehicles, releases agricultural extension officers to enable them to attend upgrading courses; designates and appoints suitable counterparts for training in the Federal Republic of Germany or in other countries.

5. Implementation status

The project is currently in its first operational phase (1 January 1984 to 30 June 1986). Counterpart training has started. The upgrading of the extension personnel has so far come up to expectations and is in line with the planned schedule. The epidemiological investigations and the tests in connection with the development of an integrated control concept have yielded initial results. The newly introduced coffee varieties have been planted; adaptation-testing plots have been created in various parts of the country and are being appraised. The work on zonification of coffee growing is running on schedule.

Prolongation of the project for a further three years as from 1 July 1986 has been planned and initiated.

Field-Rat Control

PN: 81.2083.4

GTZ project leader:	Dr. H. Burgstaller
Counterpart organization:	Ministry of Agriculture, General Department for Rodent Control
Project location:	Cairo

1. The context

Plagues of rats have always been a common occurrence in Egypt ever since the days of the Pharaohs. The building of the Aswan Dam led to an increase in the damage caused by rats, as permanent agricultural production offers them ideal living and breeding conditions. The fact that there is no annual inundation by the Nile means that there is no longer any natural rat control.

Wheat is particularly severely hit by rat damage; at the beginning of the project, the damage was estimated at 20 to 25 % of the potential harvest. As Egypt imports 70 % of its staple foodstuffs, the damage caused by rats considerably worsens the generally strained economic situation.

2. Aim of the project

The aim of the project is to establish a specialist institution and to develop an effective national field-rat control system. Through these activities the losses caused by rodent pests in rural areas are to be reduced to economically viable dimensions, which will help to save foreign exchange and raise farmers' incomes.

3. Project design/Scheduled results

The project concentrates on training technicians and advising farmers on how to implement ecologically and economically viable preventive rodent-pest control.

Project activities focus on the development of appropriate methods of preventive rodent-pest control, the practical and theoretical training of technicians and farmers and the economic analysis of the measures.

It is envisaged that the following results will have been achieved by the end of the project:

- The organizational structure of the rodent-pest control service will have been designed.

- A rodent-pest control centre will have been established.

- Appropriate methods and guidelines for rodent-pest control will have been formulated.

- Specialist personnel will have been trained throughout the country.

- National control campaigns will have been organized.

- Information campaigns will have been carried out.

- The farmers' knowledge of rodent pests will have been improved and the farmers will have been motivated to implement control measures on their own.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
7 long-term experts for up to 396 man-months and short-term experts for up to 18 man-months. Supply of materials and equipment, particularly vehicles, laboratory and field equipment, rodenticides and bait-production units. Off-project upgrading of up to 28 Egyptian specialists.

Inputs by project country:
Provision of personnel, budget and premises; meeting of running costs.

5. Implementation status

The project started in September 1982 and is currently in the operational phase. The organizational establishment of the rodent-pest control service at regional level is not yet completed. Guidelines on rodent-pest control have been formulated. Specialist staff have been trained. At the beginning of 1986 the premises for the rodent-pest research and control centre were on the point of completion. The Ministry of Agriculture is facilitating the free sale of rodenticides to the farmers via the cooperatives - an essential prerequisite for rodent-pest control measures by the farmers themselves. Intensification of extension measures for the farmers has been started. Two project field posts have been set up and staffed. The department for monitoring and evaluation of rodent-pest activities is currently being set up. Information campaigns have been prepared and are being operationalised. Field and laboratory tests for rodent-pest control have been largely completed. Future tests will concentrate on developing a forecasting system and obtaining data for economic calculations. A national damage-recording system has been established.

Integrated Plant Protection

PN: 84.2135.6

GTZ project leader:	To be designated
Counterpart organization:	Ministry of Agriculture with attached CENTA
Project location:	Santa Tecla

1. The context

Agriculture is the basis of the economy in El Salvador. The principal export crops are coffee and cotton, but their production has declined sharply over the past few years.

In 1980 the Government of El Salvador initiated agrarian reforms under which landless farmers were allocated land of their own. Both national self-sufficiency in staple foodstuffs and increased production of export crops are the aims. Plant protection is of particular importance in this connection. The importing of pesticides swallows up a large proportion of the scarce foreign exchange; consumption on the individual farms is extremely high, particularly for cotton. Falling world-market prices for cotton and rising production costs meant that in the 1984/85 season two-thirds of the cotton farms were no longer able to operate on a break even basis.

The production of staple foodstuffs is hampered by severe pest infestation, with traditional cultivation and storage methods also aggravating the losses.

2. Aim of the project

The project aims to improve the profitability of cotton-growing and increase the availability of staple foodstuffs by means of integrated plant protection measures.

3. Project design/Scheduled results

The Federal Republic of Germany is to improve the project infrastructure and the management of integrated plant protection, and develop integrated plant protection methods. The project is to be established with the CENTA in the areas of "Integrated plant protection for cotton" and "Integrated plant protection for cereals and legumes including post-harvest protection". The integrated plant protection concept is to be transformed into specific appropriate methods directly at the producer level, with intensive exchanges between research institutions, extension services and the target group.

Whereas adequate results are expected in the cotton sector within three to four years, a longer period will be required in the case of cereals and legumes as a number of technical and organizational prerequisites must first of all be created. It is envisaged that the following results will have been achieved by the end of the project:

- Integrated pest control methods for cotton, cereals and legumes, including post-harvest protection, will have been developed.
- Extension aids will have been produced.
- The level of training of research and extension personnel will have been raised.
- Integrated pest control methods for cotton will have been disseminated and components of integrated plant protection, including storage protection, will have become widespread in the case of food crops.
- Pesticide quality and residue controls will have been improved.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
1 expert on integrated plant protection for up to 36 man-months, 2 local experts for up to 72 man-months, scientific assistants for up to 72 man-months, short-term experts for up to 10 man-months, personnel under local project contract; vehicles, laboratory and field equipment; extension aids, expendable materials, working supplies; training and upgrading of counterparts; grant towards financing renovation of project buildings.

Inputs by project country:
Provision of the necessary specialists, administrative staff and support personnel; meeting of costs in connection with operation of project facilities; releasing of specialists for training and upgrading.

Inputs by third parties:
The FAO-UNDP project "Graneros para Pequenos Agricultures" is to supply small farmers with grain storage containers.

5. Implementation status

The project is scheduled to start in mid-1986.

Pesticide-Residue Laboratory

PN: 80.2100.8

GTZ project leader:	To be designated
Counterpart organization:	Ministry of Agriculture, Plant Protection Department
Project location:	Amman

1. The context

In Jordan, pesticides are used intensively but not always appropriately. A lack of statutory regulations and agencies to control the sale and use of pesticides makes it difficult to implement countermeasures. The consequences are cases of poisoning among both humans and animals, excessive residues in and on foodstuffs and serious environmental pollution.

2. Aim of the project

Control measures for monitoring foodstuffs for pesticide residues are to be introduced and implemented in order to ensure that residue levels recorded are in the long term in line with international standards.

3. Project design/Scheduled results

Important governmental decision-makers are to be advised and assisted in the implementation and monitoring of statutory regulations on the use of pesticides. The technical basis will first be created by setting up an analytical laboratory for pesticide-residue monitoring. Parallel to this, Jordanian specialists will be trained to perform the routine analyses in the laboratory. It is envisaged that the following results will have been achieved by the end of the project:

- The residue situation in Jordan will have become known.
- The draft of a pesticides law or appropriate regulations will have been drawn up.
- The results of the residue analyses will be taken into account in extension recommendations.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
1 expert on pesticide-residue analysis for up to 24 man-months, short-term expert(s) for 1 man-month, 1 project vehicle, laboratory apparatus, solvents and chemicals.

Inputs by project country:
Provision of an adequate number of specialists, administrative staff and support personnel, meeting of costs relating to operation of project facilities, releasing of specialists for training measures in Jordan and in the Federal Republic of Germany.

5. Implementation status

The project is currently in the operational phase, which is designed to last from 1986 to 1988. The residue laboratory was set up in 1981 and commenced routine operation in the same year. The GTZ expert on residue analysis will join the project in 1986. Some of the Jordanian specialists have undergone training and upgrading. Initial analysis findings are on hand.

Control of the Larger Grain Borer

PN: 84.2095.2

GTZ project leader:	Dr. U. Röttger
Counterpart organization:	Min. of Agriculture and Livestock Development (MOALD)
Project location:	Nairobi

1. The context

Maize is Kenya's most important staple foodstuff. As a result of poor harvests and high population growth the country has had to import maize since 1980. In the early eighties, a new storage pest, the larger grain borer Prostephanus truncatus (Horn), was brought into the neighbouring country of Tanzania from Central America. Given favourable conditions, this pest can cause a storage weight loss of up to 30 % in Africa in six months. It also attacks cassava and is encountered primarily in smallholders' stores. It spread throughout Tanzania in a short time and in 1985 - according to FAO investigations - caused damage to the value of $ 27 million.

Starting from Tanzania, this pest is now beginning to spread to neighbouring countries. Reports of its occurrence have been received from Kenya's Taveta Region since 1984, and it is likely that Prostephanus truncatus will soon also spread to other parts of the country. Given the present general conditions it appears impossible to eradicate this pest or totally prevent it from spreading.

2. Aim of the project

The aim of the project is to minimize the smallholders' anticipated storage losses and curb the spread of the larger grain borer by introducing appropriate measures to combat this pest.

3. Project design/Scheduled results

The project is designed as an advisory project. The advisory services will be accompanied by the provision of suitable storage-protection agents. The project is designed primarily for the infested Taveta Region, but is if necessary to extend its activities to newly infested areas. The following results are envisaged by the end of the project:

- Prefabricated houses for the project will have been constructed in Nairobi and Taveta.

- Equipment and expendable materials will have been made available.

- Training and extension measures will have been carried out.

- Storage-protection agents will have been made available in the Taveta Region.

- Appropriate control measures will have been introduced in the Taveta Region.

- Biological and economic data on the larger grain borer will have been collected.

- The danger of spreading of the larger grain borer will have been reduced.

- Continuous monitoring of the potential infestation areas will be guaranteed.

- Fumigatable village stores will have been built as a pilot project.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
1 expert on post-harvest protection and quarantine for up to 24 man-months, short-term experts for up to 3 man-months, prefabricated house in Nairobi, 2 prefabricated houses in Taveta, supply of materials and equipment, 2 passenger cars and 2 motorcycles, extension and training materials, vehicle servicing and maintenance costs, wage costs and ancillary costs for support personnel, travelling expenses, counterpart training.

Inputs by project country:
Provision of qualified counterparts, meeting of costs for operation and maintenance of project facilities, provision of sites, amendment of plant-protection legislation.

5. Implementation status

The project agreement has been submitted to the Kenyan Ministry of Agriculture for signing.

The project is initially designed to run for 24 months.

Pesticide Formulation Control and Residue Laboratory

PN: 79.2167.9

GTZ project leader:	Dr. G. Vaagt
Counterpart organization:	Department of Agriculture, Crop Protection Branch
Project location:	Kuala Lumpur

1. The context

In passing the Pesticide Act in 1974, Malaysia created the legal foundation for regulating all aspects of pesticide use. The greater intensity of agriculture, the higher quality requirements, e.g. for export products, and the population's growing problem awareness as regards the use of pesticides all combine to make heavy demands on the responsible governmental agencies. The principal tasks of the responsible authority, the Pesticides Section, are as follows:

- Registration and approval of pesticides

- Evaluation of pesticides according to toxicological criteria, with regard to biological effectiveness, degradation etc.

- Pesticide quality control (formulation control)

- Execution of residue analyses, including those required under the Food Act

- Determination of waiting periods and maximum quantities

- Monitoring of sales

- Formulation of new guidelines (e.g. for the sale, storage and manufacture of pesticides)

However, the Pesticides Section still requires additional equipment and technical know-how in order to be able to carry out laboratory and field tests more efficiently.

2. Aim of the project

Through the provision of technical equipment and staff training, the Pesticides Section is to be in a position to perform the tasks assigned to it by the relevant legislation.

3. Project design/Scheduled results

Project activities focus on the creation and equipping of efficient analytical units, i.e. supplementation of the technical equipment of the formulation control laboratory and setting-up of the pesticide residue analysis unit, accompanied by the necessary training programmes.

The following results are envisaged by the end of the project:

- A fully operational formulation laboratory will have been set up.
- A fully operational residue laboratory will have been set up.
- Testing and research programmes will be in progress.
- The results of the work will have been put to use.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
3 long-term experts for up to 72 man-months, short-term experts for up to 6 man-months, 14 short-term counterpart training measures, 2 long-term training measures (Master of Science degree), supply of materials and equipment required for setting up and expanding the laboratory, 1 passenger car, 1 bus, 1 jeep, supply of miscellaneous materials and equipment for training, field tests etc.

Inputs by project country:
Provision of qualified counterparts, personnel for laboratory work, field tests etc., buildings and land, experimental land, meeting of costs relating to expendable materials for laboratory work, field trials, office work, transport etc. Contributions towards rents, maintenance and travelling expenses.

5. Implementation status

The project was started in September 1984 and the routine work for the most important investigations commenced at the same time. The technical equipment of the other working units (registration, approval, biological effectiveness, sales monitoring) was assessed and necessary equipment obtained. Initial results on pesticide residues in vegetables have been obtained. First field tests to determine the degradation behaviour of pesticides and to establish waiting periods have been started. The on-the-job training is being backed up by accompanying instruction. Master's degree training courses (2) were commenced in 1985 and eight short-term training measures have been completed. The project is supporting the setting-up of an information centre for cases of poisoning.

Continuation of the project for a further two years is planned.

Sparrow Control

PN: 80.2081.0

GTZ project leader:	L. Mosich
Counterpart organization:	Ministère de l'Agriculture et de la Reforme Agraire, Direction de la Protection des Végétaux, des Contrôles Techniques et de la Répression des Fraudes
Project location:	Rabat

1. The context

Out of the 5.3 million tonnes of cereals which it requires each year, Morocco is able to produce 4.5 million tonnes itself. The country spends US $ 100 million each year on making up the shortfall through cereal imports. As the annual population growth of 2.7 % is causing the food-supply problem to become increasingly acute, Morocco is making considerable efforts to boost its agricultural production.

Bird pests destroy up to 10 % of the potential cereal and oil-plant harvests throughout the country. Effective crop protection is therefore an important factor in safeguarding incomes (particularly those of smallholders) and harvests.

2. Aim of the project

Bird damage to cereals and oil-seed crops is to be reduced.

3. Project design/Scheduled results

The project deals with the control of Spanish sparrows (Passer hispaniolensis), house sparrows (Passer domesticus) and hybrids of the two species. The control methods used to date are to be improved. In particular, efforts are to be made to achieve a drastic reduction in the quantities of chemical control agents (avicides) used or to largely replace them by mechanical or other methods. The following results are envisaged by the end of the current project phase:

- The bird pest centre will have been established.
- Vehicles and equipment will be operational.
- Data will have been collected.
- Monitoring of the efficacy and economic viability of the control measures will be carried out.

- Training and advisory measures will have been carried out.

- Alternative control methods will have been made available.

- Coordinated, countrywide non-chemical control will have been introduced.

- Control measures will be implemented by the centre and on a local basis by the rural population.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
2 long-term experts for up to 72 man-months, scientific assistants for up to 48 man-months, various short-term experts for up to 8 man-months, staff under local project contract for up to 36 man-months; 2 passenger cars, 2 cross-country vehicles, 1 UNIMOG with 2 drift-spraying units, 1 small passenger car, various items of workshop equipment, miscellaneous laboratory equipment and apparatus, passenger-car trailer, bird snares, camping equipment, spare parts; advisory and planning services for the bird pest centre in Salé; training of 3 counterparts for up to 3 months each, training of 3 counterparts in supplementary/long-term studies.

Inputs by project country:
Provision of qualified counterparts and support personnel; construction of project centre in Salé (office and laboratory building, workshop, hangar and aviary); staff for running the centre; provision of agricultural aeroplanes, control agents and fuel and other supplies for vehicles and equipment.

5. Implementation status

The project is currently in the second year of the three-year establishment phase. The large-scale control measures have been substantially improved and the quantities of avicides used drastically reduced. Alternative, non-chemical control methods have been introduced. The bird pest centre in Salé is not yet ready for occupation and delays in the achievement of some of the planned results are therefore likely. The laboratory/office building and workshop will be ready for use and the aviary equipped in the course of 1986.

Forest Protection

PN: 81.2005.7

GTZ project leader: P. Graf

Counterpart organization: Direction de la Protection des Végétaux, des Contrôles Techniques et de la Répression des Fraudes

Project location: Rabat

1. The context

In recent years the Moroccan forests have been increasingly attacked by pests. The Moroccan authorities' past and ongoing forest protection measures, in some cases involving the use of aircraft, have not always met with the anticipated success. The forest service is extremely environment-conscious in its choice of pesticides for forest protection and permits the use of biological agents only.

2. Aim of the project

The quality and capacity of the Moroccan forests are to be preserved by reducing or eliminating biotically caused damage.

3. Project design/Scheduled results

The project is to acquire in-depth knowledge of the causes of mass multiplication of individual pests and use this knowledge to initiate economically and ecologically appropriate pest control measures. The following results are envisaged by the end of the project:

- The forest protection unit will have been set up.

- Forecasting and early-warning systems for the major insect pests will be in operation.

- The significance of other insect pests - particularly those breeding in the wood and bark of trees - and fungus diseases will have been determined.

- Control strategies will have been formulated.

- Practice-oriented study programmes will be in progress.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
Provision of vehicles and equipment; assignment of a forest management expert for up to 36 man-months, a forest entomologist for up to 30 man-months, a scientific assistant for up to 30 man-months and short-term experts for up to 11 man-months; equipping of a forest protection unit at the plant protection service headquarters in Rabat; equipping of 3 forest-protection field stations; training of Moroccan specialists; interim evaluation.

Inputs by project country:
Provision of specialists, administrative staff and support personnel; provision of the necessary offices and laboratories; meeting of running and maintenance costs for project facilities, vehicles etc.

Inputs by third parties:
World Bank loans to finance the purchase of pesticides and chartering of aircraft; financial contributions by forest-owning local authorities in Morocco.

5. Implementation status

The project started in July 1985. A control campaign aimed at the processionary moth has been implemented in cooperation with a short-term expert. Preparations are being made for setting up the first forest-protection field station. The first counterpart arrived in the Federal Republic of Germany in January 1986 to begin his long-term upgrading programme. A ministerial order has separated the field of forest protection from the forest service in organizational terms and allocated responsibility for this area to the plant protection service.

Improvement of Plant Protection Services

PN: 81.2044.6

GTZ project leader:	Dr. R. Daxl
Counterpart organization:	Ministerio de Desarrollo Agropecuario y Reforma Agraria
Project location:	Managua

1. The context

Pests and plant diseases cause average yield losses of 35 % in Nicaragua. The food-supply situation and the farmers' incomes are consequently uncertain. A lack of relevant knowledge means that the methods used to control these pests and diseases are generally inappropriate, leading to one-sided, often careless use of pesticides with the familiar detrimental effects on the country's economy and ecology.

The national plant protection service has been unable to effectively solve these problems, as it is poorly equipped and staffed and the few available specialists have not received adequate training. Furthermore, the various field offices of the plant protection service are not appropriately linked to the headquarters.

2. Aim of the project

The aim of the project is to enable the Nicaraguan plant protection service to successfully perform its functions.

3. Project design/Scheduled results

Project work focuses on developing and implementing appropriate integrated pest control methods and on improving the structure and organization of the plant protection service by means of training, construction measures and the supply of materials and equipment. The following results are envisaged by the end of the project:

- A plant protection centre meeting the country's requirements will have been established.
- Qualified plant protection specialists will have management and decision-making responsibility in important posts.
- Integrated plant protection measures will have been developed for the major crops and made available to farmers.
- Extension aids will have been compiled and published.

- Production methods for Trichogramma, Bacillus thuringiensis, beneficial nematodes and natural insecticides will have been developed for local conditions and can be used by small-scale industry or the government.

- Pesticide import requirements will have been reduced.

- Important diseases and pests will have been identified and recorded in the relevant literature.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
Assignment of two long-term experts for a total of up to 144 man-months and short-term experts for up to 12 man-months, assignment of scientific assistants for up to 60 man-months, meeting of salary costs for personnel under local project contract; supply of equipment for the plant protection centre; financial contribution to building of the plant protection centre, partial financing of running and maintenance costs; financing of long-term and short-term scholarships for Nicaraguan specialists.

Inputs by project country:
Provision of qualified personnel; provision of plots for trials, sites and buildings, construction of plant protection centre; proportionate financing of running and maintenance costs; provision of equipment and materials for the plant protection stations; releasing of specialists for training and upgrading.

5. Implementation status

The project is currently in the fourth year of implementation; all the official vehicles, numerous items of apparatus and around 450 textbooks have been supplied. The first building for the plant protection centre has been acquired and construction measures started in October 1985. Twelve short-term expert assignments have been carried out, 4 Nicaraguan specialists are currently on long-term scholarships abroad and 10 short training measures/study trips have taken place; long-term experts have provided services for 26 man-months in the field of plant pathology and for 51 man-months in the field of general plant protection. Major plant epidemics have been checked; a large-scale programme for integrated boll weevil control was designed and for three consecutive years insecticide treatment was reduced by more than 30 %; manuals on integrated plant protection for maize, beans and cotton have been published and numerous courses and field days held; methods for the production of beneficial organisms and neem insecticides have been formulated and are being further developed; advice on the control of major plant diseases has been passed on to the farmers.

The operational phase currently in progress is scheduled to end on 31 December 1987; the next stage will be a follow-up assistance phase.

Support to the Plant Protection Service

PN: 77.2065.9

GTZ project leader:	M. Zweigert
Counterpart organization:	Ministère du Développement Rural Direction de la Protection des Végétaux
Project location:	Niamey

1. The context

The Republic of Niger has been a net importer of staple foodstuffs for many years. The country is dependent on substantial grain imports and extensive food aid, particularly in years when the situation is especially critical on account of climatic factors. Drought years are often followed by the large-scale occurrence of pests (locusts, bird pests, rats etc.) which substantially reduce the yields expected in normal years.

The uncertain climatic conditions and the occurrence of these pests mean that the usual yield-boosting measures, such as the use of improved seed, fertilizers, or the introduction of new cultivation techniques , have only a limited effect in rainfed farming. Plant protection measures designed to maintain and safeguard the domestic production of staple foodstuffs are essential. As a result of the prolonged drought and above all the catastrophic situation which faced the country in 1984, Niger's agricultural policy gives top priority to achieving self-reliance in staple foodstuffs. To this end, the government is also subsidizing production inputs, including pesticides. This requires considerable efforts in extension work on plant protection if detrimental effects on the country's ecology and economy are to be avoided.

2. Aim of the project

The aim of the German contribution to the project is to enable Niger's plant protection service to provide a farmer-oriented extension programme on plant protection and combat major pests in an appropriate manner. It is intended that government plant protection measures should be increasingly reduced in favour of measures implemented by private individuals.

3. Project design/Scheduled results

The measures focus on technical and material support to the plant protection service and on farmer-oriented plant protection extension services. The service is to be decentralized and responsibility transferred to the regional level. This applies both to large-scale campaigns (bird pests, locusts) and to individual plant protection measures by cooperatives and farmers; however, the infrastructural prerequisites for the latter (availability of pesticides and equipment) have still to be created. The following results are envisaged by the end of the operational phase (1984 - 1986):

- The control measures for plant diseases and pests will have been drawn up and disseminated throughout the country by means of training and extension services.
- The feasibility of the use of hand-held ULV equipment by smallholders will have been demonstrated.
- The service will be using large-scale equipment for controlling mass pests, independently.
- Methods for preventing bird damage will be in use on a damage-oriented basis.
- Plant quarantine stations will be operational.

In addition to consolidating the measures implemented so far, the planned final phase of the project will devote particular attention to plant protection for irrigated crops.

4. Scheduled inputs

Inputs by the Federal Republic of Germany (over the entire project):
Project management/entomology 105 man-months, phytopathology 93 man-months, workshop expert 84 man-months, plant-protection advisory services 75 man-months, control of bird damage/mass pests 70 man-months, short-term experts for 50 man-months, German Volunteer Service (DED) specialists for 300 man-months; construction of an office/laboratory building, a workshop and 6 field stations; vehicles, pesticides, application equipment, laboratory apparatus, extension aids; 3 long-term training measures and a number of short-term upgrading measures for counterparts; partial financing of wages of support personnel; travelling expenses and running costs.

Inputs by project country:
Provision of counterparts for Niamey headquarters and 10 field stations; office building, sites, increasing meeting of operating costs for 2 agricultural aircraft; purchase of pesticides.

Inputs by third parties:
Over the past eleven years the Canadian Government has supplied large quantities of pesticides and equipment. The Canadian contribution in the current phase primarily involves the provision of advice to the plant protection representatives of the plant protection service at Département level.

The German Volunteer Service (DED) is represented at regional level with six specialists who are promoting the introduction of plant protection innovations by means of demonstrations and extension services for the farmers.

5. Implementation status

The project is currently in the eighth year of implementation. Following the expansion of the plant protection service headquarters with combined office/laboratory building and central workshop, six field stations were built, equipped and staffed with DED specialists by 1983. The economically significant pests and diseases affecting food crops have been identified, appropriate control measures developed and publicized throughout the country by means of extension aids and training measures. In 1985 the counterpart organization assumed responsibility for the use of large-scale equipment as well as for the central workshop and the five quarantine stations. The training measures implemented up to mid-1985 in the fields of entomology, phytopathology, application techniques etc. are being continued by Canada. A method developed by the GTZ has substantially reduced the cost of averting bird damage and even halved it by comparison with the use of aircraft. The ULV programme to permit the farmers to implement plant protection measures by themselves has met with an excellent response in the 20 pilot villages. Ecologically-acceptable post-harvest protection measures for smallholders' stores have been introduced throughout the country.

Plant Protection Programme

PN: 74.2028.4

GTZ project leader:	E. Pfuhl
Counterpart organization:	Ministry of Agriculture, Bureau of Plant Industry
Project location:	Manila

1. The context

Agricultural production in the Philippines is in need of improvement. Harvests must be increased in order to ensure a food supply for the rapidly growing population.

Coconuts, rice and maize are the most important crops in economic terms for the Philippines' smallholders. In rice growing in particular, the farmers' plant protection measures have to date concentrated on the prophylactic use of chemical pesticides. The sharply rising cost of agricultural production inputs and inadequate producer prices are leading to reduced farm incomes and to questionable plant protection strategies on the part of the farmers such as underdosing of insecticides with the subsequent risk of resistance. An integrated programme using the concept of damage thresholds is intended to remedy the situation. Plant protection strategies for maize growing, however, have still to be developed.

2. Aim of the project

The project is promoting a programme by the Philippine Ministry of Agriculture to introduce appropriate plant protection technologies, incorporating the following measures:

- Introduction of a national surveillance and early-warning service for rice and maize
- Institution-building through the establishment of regional plant protection centres
- Pesticide residue and formulation control together with establishment of plant quarantine stations
- Economic evaluation of plant protection programmes
- Promotion of self-help groups.

3. Project design/Scheduled results

The project is endeavouring to promote the concept of integrated plant protection by providing advisory services to the Ministry of Agriculture and the national plant protection authority, the Bureau of Plant Industry. Major importance is attached to institution-building. The following results are envisaged by the end of the project:

- An efficient early-warning system for rice and maize will have been set up in selected areas.
- An integrated plant protection concept for the work at the headquarters and in 12 regions will have been introduced.
- Pesticides will be used more rationally and more selectively from the economic and ecological point of view, with appropriate monitoring.
- Expansion of the quarantine facilities will have been guaranteed.
- Farmers' self-help groups will have been promoted.

4. Scheduled inputs

Inputs by the Federal Republic of Germany:
6 long-term experts for up to 266 man-months, short-term experts for up to 18.5 man-months and scientific assistants for up to 3 man-months; vehicles, motorcycles, aircraft, SSB radios, equipment for the central diagnostic laboratory, biological laboratory and residue laboratory as well as literature. Support in the establishment of regional plant protection centres and quarantine stations, and the construction of up to 300 Farmer's Centres.

Inputs by project country:
Provision of qualified counterparts for the early-warning service, biological laboratory, residue laboratory and plant quarantine, recurring costs in connection with buildings, transport, Philippine personnel etc. Implementation of the results of the work.

Inputs by third parties:
The project is also receiving financial support from the European Community (construction measures, supply of materials and equipment).

5. Implementation status

The project is in the eleventh year of implementation. Ongoing activities aim to reinforce the most important plant protection recommendations for maize and rice and adapt them to poorer general conditions.

The agricultural extension service is being supported by a countrywide radio campaign to supplement the traditional extension services by informing the small farmers about the concept of integrated plant protection. To back up this work, the project is also involved in promoting self-help groups.

A surveillance service for rice has been established and a corresponding system for maize is currently being set up.

The project components "Residue and formulation control" and "Plant quarantine" have already been handed over to the counterpart organization. Four residue laboratories and twelve plant quarantine stations have been established and are operational. Twelve regional plant protection centres have been set up and equipped.

Extensive training programmes and seminars have helped to ensure that the Philippine specialists are now considerably better qualified for their work.