

**WEST AFRICA
RICE
DEVELOPMENT
ASSOCIATION**



ANNUAL REPORT

DECEMBER 1971 - DECEMBER 1974

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FOREWORD

This report of the West Africa Rice Development Association (WARDA) covers the period December 1, 1971 to December 1974.

Even before the Association officially started to function in December 1971, it received various forms of assistance from many sources. Thanks to the tremendous goodwill and cooperation of many governments and institutions. To all the individuals, organizations and countries which made our existence possible today, I offer our sincere thanks and appreciation.

Although WARDA is still in its pioneering stage, it has grown from an Association of two staff members in December 1971 to one which can boast of 25 capable rice specialists and administrators and 36 general service staff as of December 1974. WARDA is beginning to make its contribution as a virile regional organization and its first achievements are well noted on the International scene.

We have still a long way to go in trying to achieve our main objective - making West Africa self-sufficient in rice. I am however optimistic that we shall eventually achieve this judging from the enthusiasm and support of our Member States, Cooperating Countries and Organisations and the spirit of sacrifice and cooperation of our entire staff.

Jacques Diouf
Executive Secretary

I. EXECUTIVE SECRETARY'S INTRODUCTION

The Secretariat of WARDA officially began operating in Monrovia, Liberia, on December 1, 1971, the day the Executive Secretary took up office. Before then, the Executive Secretary had been appointed by the First Session of the Governing Council in Monrovia which was held from September 20 to 24, 1971. The Session was attended by delegates from eleven West African countries that had deposited their instruments of acceptance, namely: Dahomey, The Gambia, Ghana, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. Since no instruments had been deposited by Guinea, the delegate of that country was allowed to participate as an observer. Also present as observers were representatives of UNDP, FAO, ECA, France, Netherlands, UK. USA, China, ADB, IITA and the River Niger Commission.

The session which was opened by Dr. William R. Tolbert, Jr., President of the Republic of Liberia (his first opening of an international conference since taking office), took a number of decisions necessary to get the Secretariat started. These included:

- (i) the appointment of the Executive Secretary;
- (ii) approval of conditions for the appointment of the Deputy Executive Secretary;
- (iii) approval of conditions for the appointment of an External Auditor;
- (iv) a provisional scale of contribution by member countries;
- (v) election of members of the Advisory Committee;
- (vi) appointment of members of the Scientific and Technical Committee;
- (vii) consideration and adoption of the draft Financial Regulations;
- (viii) consideration and adoption of draft provisional staff regulations.

The session recommended that the draft mid-term programme and budget prepared by the interim Executive Secretary should be examined in greater detail by the Advisory Committee as that was considered too big at that stage. The proposals for a mid-term programme of work together with the relative summary Budget based thereon, was however, accepted in principle. Members also agreed to give the Executive Secretary the mandate to sign the Plan of Operation of the UNDP project (AGS:SF RAF/71/220).

The project aimed at assisting the Executive Secretary in:

- a) coordinating all assistance from different sources into a single research and development programme;
- b) collecting, analysing and disseminating information on methods applied, experience gained and results obtained both within and outside the region; and for this purpose, in establishing a Documentation centre with a Data Processing Unit;
- c) organizing and arranging for conferences and seminars in the main fields of rice development, securing fellowships and establishing or assisting in the establishment of advisory services and training and extension facilities;
- d) elaborating requests for financial assistance in the field of rice production within the member states of the region.

Through this project the Executive Secretary was the Secretariat. In addition, earlier contacts with USAID resulted in the provision of two consultants in January and February 1972 to formulate the specific projects of the mid-term programme of WARDA. Earlier in November 1971, the Government of the Republic of Liberia had signed the Headquarters Agreement with WARDA. The Agreement conferred on WARDA all privileges and

immunities normally accorded International Organizations. The Government of Liberia also provided free of charge three floors - 4th, 5th and 6th - of the E.J. Roye Memorial Building as offices of WARDA.

The Executive Secretary assumed duty assisted by only one permanent staff, Mr. Abensour, Legal Adviser of WARDA. The Secretariat enjoyed full cooperation of the Ministry of Agriculture of Liberia which released Mr. W.E. Pennoh to it as Liaison Officer; the Resident Representative of the UNDP, Mr. Campagne, who provided some temporary office space and the services of some of his staff and the USAID Deputy Director, Mr. Moore, who released his Secretary to WARDA for three weeks. Later in March 1972, the Executive Secretary of the ECA, Mr. R.K. Gardiner, released the Chief of Administration and Finance of ECA, Mr. Pasquet to WARDA to organize its financial structure, set up the accounts and the coding system. Thereafter a Finance Officer was employed to keep the accounts up-to-date.

With a skeleton staff and hardly any money, things moved slowly at first. By December 10, 1971, the UNDP made an advance allocation of \$93,000 for project activities pending the signature of the Plan of Operations. Twenty thousand dollars was allowed for the purchase of office furniture provided a corresponding amounts was paid back when Member Countries should have paid their contribution. On December 14, the Government of the Kingdom of Netherlands also released \$20,000 for administrative expenses on similar conditions as those of the UNDP. With these amounts a few General Service staff were recruited, two floors of the Secretariat equipped and arrangements were completed for hiring consultants to prepare the different projects within the mid-term programme of WARDA. On January 24, 1972, USAID

released \$50,000 for administrative expenses and another \$100,000 on February 8, 1972 for project expenses.

In January 1972 a meeting was held with Mr. Chabrolin (IRAT), Dr. Moomaw (IITA) and Mr. Oldenhove (FAO) to set priorities within the mid-term programme. The meeting decided on the guidelines of the missions to undertake the preparation of the projects. Messrs. Chabrolin and Oldenhove joined later by Messrs. Buress and Pelissier (USAID) visited the research centers in Sierra Leone, Senegal, Mali, Ivory Coast and Nigeria.

These rice specialists, prepared the first drafts of research projects for the various types of rice cultivation in West Africa, and also the drafts of the seed multiplication and training projects. Dr. Moomaw from IITA also assisted WARDA in preparing the research projects.

Later in March 1972, at the end of the missions, four member states: Sierra Leone, Mali, Senegal and The Gambia kindly made available the services of Dr. Harry Will, Mr. Djibril Aw, Mr. Djibril Sene and Dr. Lamine Marenah respectively, to participate in discussions with the consultants before approval by the Secretariat of WARDA of projects to be presented to the Governing Council. This afforded WARDA the opportunity of benefiting from the accumulated rice knowledge of these experts who were thoroughly familiar with local conditions of rice cultivation in West Africa. Fourteen rice research projects, two development projects and one coordination programme were prepared.

The five regional centres approved by the meeting of rice experts in Rome namely Richard Toll, Senegal (Irrigated rice), Rokupr, Sierra Leone (Mangrove rice), Bouake, Ivory Coast (Rainfed rice), Mopti, Mali (Floating rice) and IITA, Ibadan, Nigeria were visited by the

Executive Secretary for establishing contacts with their Directors and for obtaining technical information on them. Member Countries visited gave full cooperation and received him warmly.

The Executive Secretary later visited FAO Rome to discuss the Plan of Operations; IRRI in the Philippines and Wageningen in Surinam for first hand information on the approach to solving rice production and research problems by these renown rice centres. The centres promised cooperation and assistance in locating suitable staff for WARDA.

The Executive Secretary also undertook trips to secure financing for WARDA's projects. The USAID promised assistance to the tune of \$500,000 each year for three years starting from the fiscal year July 1971 - June 1972. The Government of France also promised financial assistance. Contacts were made with the European Development Fund (FED), Ford Foundation and the Consultative Group on International Agricultural Research (CGIAR), to initiate cooperation.

An Extraordinary Session of the Governing Council was summoned in May 1972 at Bamako, Mali, to review the draft programmes and budgets prepared by the various consultants and experts.

This meeting was preceded by the first session of

(i) the Scientific and Technical Committee at which the following participated:

Mr. Djibril Aw
Director General de l'Institut d'Economie
Rurale (CST)
Bamako, Mali.

Mr. B.O.E. Amon
Secretary, Agricultural Research
Council of Nigeria (ARCN)
Ibadan, Nigeria.

Dr. Robert F. Chandler
Director, IRRI
Los Banos, Philippines.

Dr. L.S. Marenah
Director of Agriculture
Department of Agriculture
Cape St. Mary, The Gambia

Mr. Djibril Sene
Directeur des Services de Recherche
C.N.R.A. de Bambe (CST)
Senegal.

Mr. Guy Vallaey
Directeur Technique (CST), IRAT
Paris, France.

Mr. Leonard Ywassa
Ingenieur d'Agriculture
Conseiller Technique au Ministere
de l'Economie Rurale
Lome (CST).

(ii) and the Advisory Committee with representatives from:

Member States: Ivory Coast
Dahomey
Ghana
Liberia
Niger
Sierra Leone

Cooperating States:

France
The Kingdom of the Netherlands
The United Kingdom
The United States

The Economic Commission for
Africa (ECA)
The International Institute
for Tropical Agriculture (IITA),
The Food and Agriculture
Organization of the United
Nations (FAO)
The United Nations Develop-
ment Programme (UNDP).

Fourteen Research projects and three development projects were examined as follows:

1. RESEARCH

- R1 Regional Research Programme on Water Management and Irrigation (location IITA, Ibadan, Nigeria);
- R2 Regional Programme on Assessment of Crop Losses from Animal Pests (Supervisor to be located at IITA, Ibadan, Nigeria; outreach programmes in five regional countries);
- R3 Regional programme on Rice diseases (field studies at Rokupr, Sierra Leone; laboratory studies at IITA, Ibadan, Nigeria);
- R4 Regional Research Programme on Land Use Classification, Soil Fertility and Fertilizer Use (to be located at Richard Toll, Senegal and Rokupr, Sierra Leone respectively);
- R5 Regional Programme for Perennial wild rice (*Oryza perennis* var. *Barthii*) control (to be located at Mopti, Mali);
- R6 Regional variety trials-fresh water swamp (programme to be coordinated at Mopti, Mali);
- R7 Regional variety trials-irrigated rice (programme to be coordinated at Richard Toll, Senegal);
- R8 Mechanization Research on Irrigated rice (project to be located at Richard Toll, Senegal);
- R9 Regional Research programme on weed control in irrigated rice (programme to be coordinated at Richard Toll, Senegal);
- R10 Regional programme for agrometeorology on upland rice (programme to be coordinated at Bouake, Ivory Coast);
- R11 Regional variety improvement programme for rainfed rice (projects to be at IRAT, Bouake, Ivory Coast and IITA Ibadan, Nigeria);
- R12 Regional programme for cooperative trials on weed control in rainfed rice (programme supervisor to be located at Bouake, Ivory Coast);
- R13 Regional Research Programme for tidal mangrove swamp rice (programme supervisor to be located at Rokupr, Sierra Leone);
- R14 Regional Research Programme for Tidal mangrove swamps (programme supervisor to be located at Rokupr, Sierra Leone).

After discussion, the Scientific and Technical Committee decided to regroup these under six major headings:

- A. Water management and agrometeorology: Projects R1 and R10.
- B. Variety improvement and multi-local cooperative variety trials: Projects R6, R7, and R13.
- C. Weed control: Projects R5, R9, R12 and R14.
- D. Plant protection: Projects R2 and R3.
- E. Soil studies: Project R4.
- F. Mechanized rice farming: Project R8.

The Advisory Committee decided to separate projects R1 and R10 and to restrict project R4 and start with the collection of existing information through a seminar to be organized and financed by UNDP. With few other amendments, sites for the various projects were agreed on as follows:

R1 - R2 - R4 (partly)	Ibadan
R5 - R6	Mopti
R7 - R8 - R9 - R4 (partly)	Richard Toll
R10 - R11 - R12	Bouake
R13 - R14 (partly)	Rokupr

2. DEVELOPMENT

Two development projects submitted as mid-term programmes were approved as follows:

- D1 Regional seed multiplication centre (project to be situated at Richard Toll, Senegal);
- D2 Training (two sites, one at IITA, Ibadan and one at the Training Centre at Bouake were considered and it was agreed to concentrate all training at IITA, Ibadan, Nigeria).
- R16 Coordination of Research and Development projects: this comprised a team of experts at headquarters to coordinate the various elements of the WARDA working machinery.

The Governing Council approved the following priority ratings:

- P1 Variety Improvement
- P2 Training
- P3 Coordination of Research and Development
- P4 Seed multiplication
- P5 Fertilizers Trials
- P6 Agrometeorology
- P7 Weed control
- P8 Plant protection (a) Insect Pests and (b) rice diseases
- P9 Mechanization of rice cropping
- P10 Water Management.

For financing, however, there arose a need on request of the Consultative Group to review these projects to give a clearer view of

- the impact of the research projects
- the priorities among the programmes
- detailed formulation of the projects, and
- the linkage with other research institutions like IITA, IRAT and IRRI.

A review of the research programmes was therefore undertaken with representatives of FAO, IRRI, IRAT and IITA from 4th - 6th December 1972 in Monrovia. This meeting recommended that:

- the coordinated trials on fertilizers and varieties, as well as, on insect and weed control and other possible items suitable for a regional coordinated approach should be given the highest priority;
- that varietal improvement, soil fertility and plant protection programmes should only be specified after the seminars on these subjects to be held early in 1973.

As a result of the seminars (January 1973 on varietal improvement; February 1973 on Soil Management and Fertilizer Use; and May 1973 on Plant Protection), the WARDA research programme was condensed into:

- W1 Coordinated trials
- W2 Varietal Improvement
- W3 Soil Fertility and Soil Management
- W4 Plant Protection

Funding

Negotiations for the financing of projects by cooperating states and organizations met with some success.

USAID: The USAID pledged \$500,000 for each of three years starting from 1972. The agreement between WARDA and the USAID on the financing of projects has however had to be modified a number of times and the effective bilateral funding was of \$625,000.00 for the first three years. The USAID financial assistance has been devoted to: training of rice production specialists; training of field assistants for the coordinated trials; paying for two seminars on rice breeding and varietal improvement and soil fertility and fertilizer use; providing an entomologist for Project W4, and the provision of a rice processing and storage expert and ~~a land and water management expert for the development~~ programme.

Netherlands: The Government of the Kingdom of the Netherlands supported the Association with a grant of \$50,000.00 each in 1972 and 1973 for research coordination. The money was used to finance the salaries and allowances of the research coordinator, the soil and fertilizer use coordinator, and for the procurement of

some materials and equipment, including a project car among other things.

France: France gave assistance to the tune of \$404,695.79 for the implementation of the seed multiplication centre at Richard Toll, Senegal, and for the implementation of the project quantification division of the Development Department.

United Kingdom: Although the British Government pledged financial assistance of \$100,000.00 a year for three years, the money has yet to be realized but negotiations are nearing completion. It is hoped that the money will be used for implementing in 1975 parts of W2 and W3 research projects and for the acquisition of some materials and equipment for implementing these and the entomology project.

CGIAR: With effect from 1974, the Consultative Group on International Agricultural Research (CGIAR) has taken over the financing of project W1 - coordinated trials, for an amount of \$474,000.00. Contributing donors to this project financed by the CGIAR include World Bank (IBRD) \$105,000.00, France \$26,208.00, USAID \$108,000.00, Netherlands \$75,000.00, Belgium \$51,417.19 and Canada \$102,597.25.

Ford Foundation: The Ford Foundation gave a grant of \$30,000 towards the implementation of the rice production specialist course held at the IITA from June to November 1973.

UNDP: The UNDP has financed the personnel and equipment of the Documentation Centre, project design division of the Development department and has also made available the Chief of Administration and Finance, a translator, technical photographer and a bilingual secretary. The total amount committed for WARDA projects \$960,000 for a two year period. This project, because of

delays in recruitment of personnel, lasted from 1972 to 1975 with a request for extension approved for an additional amount of \$1,150,000.00.

I wish to pay tribute to the spirit of cooperation shown by these countries and institutions who made the operation of WARDA possible.

Negotiations With Member States

Agreements were entered into with member states to enable the implementation of the Association's work programme adopted by the Governing Council. In the Agreement, each member state pledged housing and office space for WARDA staff, as well as, adequate amount of land for its projects. This important contribution by member states, if translated into money, has assisted in reducing substantially the investment costs earlier proposed by the Secretariat to the Council. These agreements were signed with The Gambia on December 16, 1972; Mauritania on December 19, 1972; Senegal on December 19, 1972; Mali on December 22, 1972; Togo on January 4, 1973; Niger on January 11, 1973; Ivory Coast on March 14, 1973; Sierra Leone on April 5, 1973 and Dahomey on April 5, 1973.

Contributions from member states to the administrative budget of WARDA and to headquarters projects support came in rather slowly in the first year. This was largely due to the fact that at the time the budget was approved at the first extraordinary session of the Governing Council in Bamako, Mali, in May 1972, and when the exact amounts to be paid were revealed to member states in June 1972, the budgets of the various countries had been approved and provision for contributions to WARDA were not included. In spite of the

initial handicap, by April 1973, 67.5% of the 1972 administrative budget had been contributed by member states and by September 1973, 88% of the 1972 budget and 58% of the 1973 budget had been paid. As of April 1974, 94.8% of the 1972 budget, 62.0% of the 1973 budget and 14.2% of the 1974 budget had been paid. It is noteworthy that in addition to this, The Gambia paid fully its contribution for 1975. Contacts were regularly made for payments of outstanding contributions and it is hoped that the speed of payment will be improved upon since the Association's operations are largely determined by the weather.

I wish to thank the member states for their cooperation and support and for the encouraging rates at which the contribution to the administrative budget have been paid lately. I also wish to acknowledge the assistance of some member states who have released some of their best agricultural experts and administrators to WARDA. It is hoped that other member states will follow this praise worthy example if the Association is expected to discharge its duties effectively.

Organization of Administration and Finance

Clearly defined administration and financial procedures were laid down and were later formalized with increased staffing. The Division was divided into three units: Finance, Personnel and Procurement. The need to control and account for operations in the field, together with the necessity to present statements of expenditure for each source of financing has increased the workload of the finance unit. In addition, problems are likely to arise on personnel and procurements at the different test locations and regional centres. This may require additional resources in staff to ensure proper

programming and management. A system of accounts and control based on the provisions of the Financial Regulations patterned along the FAO lines is being operated. The system was improved upon in July 1973 with the establishment of sub-project ledgers by sources of funds and field of activity. Monthly financial statements are issued and a control system is used to process invoices and voucher payments. Bank reconciliation is made at the end of each month. Since January 1974, the accounting operations have been mechanized.

The coordination of work in the Secretariat is ensured by the setting up of an administrative committee, chairmaned by the Executive Secretary and which comprised the Deputy Executive Secretary, the Senior Advisor, the Heads of departments, the Head of Administration and Finance and the finance officer. It meets on Mondays when it reviews the financial and administrative situation and takes appropriate decisions for improvement. A technical committee meets every Friday under the chairmanship of the Executive Secretary. It is made up of the Deputy Executive Secretary, the Senior Agricultural Adviser, the Heads of departments and divisions. It reviews the activities of each division and department and discusses future work for better programming. Standardized filing and channelling of correspondence have been adopted to ensure that the work is fully coordinated. Once every year, ~~planning of activities to be carried out~~ carried out by the experts during a series of meetings attended by a network specialist. One expert is foreseen to monitor the programs for proper implementation.

Two appointments, promotions and disciplinary committees were also set up: one for Professional Staff and the other for General Service Staff. They are responsible for short listing and interviewing candidates

for various vacancies in the Association and also for recommending to the Executive Secretary suitable candidates for appointment and incremental credits, as well as, proper disciplinary measures in appropriate cases for offending members of staff.

A purchasing committee has also been set up for approving purchases of \$10,000.00 or above. This committee has helped to ensure that correct procedures are followed before purchases are made and that items are purchased at the best possible price, thus bringing about cost control and savings to the Association.

II. MEETINGS

A. Governing Council Meetings

The first extraordinary session of the Governing Council was held in Bamako, Mali on May 9 and 10, 1972. The Governing Council agreed to group the WARDA projects and consider them as an integrated programme.

The Executive Secretary was mandated to negotiate the financing of the projects with cooperating states and organizations so that they could be quickly and successfully implemented.

At the same meeting, the administrative budget for 1972 and 1973 was approved and the contributions of member states fixed according to the scale approved by the Council. The Council also ratified the election of the Deputy Executive Secretary and authorized the Executive Secretary to issue rules in accordance with Regulation III of the Financial Regulations.

The second session of the Governing Council took place in Monrovia, Liberia, from April 17-19, 1973.

Important decisions taken at this meeting include the following:

(i) That WARDA Rice Production Specialist trainees receive allowances equivalent to those of IITA and requests the Executive Secretary to frame an amendment to the recruitment and exclusion clauses drawn up by IITA.

(ii) That United Kingdom aid to WARDA should be on a bilateral basis to WARDA and requests the delegate of the United Kingdom to inform his Government of the view of the Governing Council.

(iii) It decided to admit the OAU and the IRRI as members of the Advisory Committee.

(iv) The Governing Council, having examined the relations of the Association with non-member states in the region decided to maintain contacts, but to stop the regular sending of documents to States that have not ratified WARDA's Constitution.

(v) The Governing Council, having examined with concern the situation as regards the start of coordinated varietal trials and noting a delay in receipt of USAID credit that imperils the start of these trials, requested the Executive Secretary to explore all practical possibilities for implementation of this project.

(vi) It recommended to the Cooperating States and organizations that they take into consideration, in the recruitment of experts for field work, the need for the latter to be able to speak the official language of their country of assignment.

(vii) The Governing Council, having noted a delay in payments of contributions by Member States, urged them to make an effort to pay up their quotas quickly.

(viii) The Governing Council requested WARDA's Member States and Cooperating States to make an effort to recruit French-speaking experts for WARDA in order to redress the linguistic imbalance.

(ix) The Governing Council unanimously ratified the appointment of the auditor proposed by the Government of Ghana.

(x) It recommended that henceforth the reports of the Scientific and Technical Committee and of the Advisory Committee pertain precise recommendations to the Governing Council with statement of divergency of opinions of its members when such occur.

(xi) It noted with interest the suggestion made by the delegate from USA that a consultant be appointed advise the Secretariat on the organization and management of the Association. The timing of such an appointment was to be considered further.

(xii) After considering the recommendation of the Advisory Committee to the effect that a plant quarantine centre be set up, the Governing Council decided to have the rice quarantine centre established at Monrovia operate under WARDA's supervision and under the jurisdiction of the Government of Liberia, having due regard to the plant protection regulations of the OAU.

(xiii) At the request of the FAO representative, the Executive Secretary stated the financial position of the projects, except for the UNDP funds, which are administered by FAO. The FAO representative was not in a position to give precisions on this point. The Governing Council recommended that this agency furnish henceforth such information on a regular basis.

(xiv) The Governing Council accepted the invitation extended by the Ivory Coast delegation to hold its next meeting in Abidjan, in December 1973.

(xv) The Governing Council adopted the report of its session, together with the proposed and accepted amendments.

The third session of the Governing Council took place in Abidjan, Ivory Coast from December 17 to 20, 1973. The 1974 and 1975 administrative budgets of the Association were passed with minor amendments. The Council also made the following recommendations and took the following decisions:

- (i) The Governing Council appealed to the ADB to kindly contribute more effectively to WARDA, especially by financing rice development projects in the member states of the Association.
- (ii) It requested the Executive Secretary to review the whole problem of contribution of member states and to submit to the next session of the Governing Council various alternatives to the system now in force.
- (iii) It requested the Executive Secretary to contact the organization financing the coordinated trials to obtain authorization to undertake the new re-allocation of the amounts earmarked for the various items of expenditure.
- (iv) It also requested the Secretariat to take every possible action to strengthen research and development activities in rice mechanization.
- (v) It requested the Executive Secretary to continue his negotiations with the Ford Foundation in order to obtain financing for printing and distributing the booklet on rice pests, weeds, diseases and physiological disorders of rice.
- (vi) It recommended that the annual research review meeting be held before July 1974. The Executive Secretary should determine the most appropriate date taking into consideration the time taken to obtain the results of the coordinated trials and the schedule of the other meetings of the Association.
- (vii) It felt that in connection with the selection of sites for the coordinated trials, there was some rigidity in the decision making process and that it would be appropriate to make it more flexible. It was decided therefore to leave it to the Executive Secretary to determine, in agreement with specialists in member states,

the location of the various trials provided for in project W1.

(viii) It requested the Governments of the Ivory Coast and Niger, as well as FAO, UNDP and OAU/STRC to kindly do the utmost possible for the speedy construction of the quarantine stations at Abidjan and Maradi.

(ix) It implored member states to inform the Executive Secretary, well in advance, of the dates of meetings of their national committees entrusted with the planning of rice research and development. The Governing Council felt that WARDA should participate as much as possible in these meetings.

(x) It expressed the wish that FAO studies the possibility of giving more flexibility to the administrative rules governing travelling, within the region, of experts made available to WARDA. The Governing Council expressed, in particular, the wish that:

- FAO experts be able to travel within the region without being compelled every time to obtain prior agreement of FAO headquarters;
- steps should be taken to simplify payment procedures of Consultants so as to expedite payments of their remuneration as soon as their report is submitted to the Secretariat.

(xi) The Governing Council requested the Executive Secretary to negotiate for 1974 the use of other training centres outside the IITA and especially the centres in the Ivory Coast, to carry out its training programmes. The Governing Council felt that, for this short term solution, it is necessary to avoid any new investments. The Council also recommended that for the training courses of 1975 onwards, the Executive Secretary should hire the services of a consultant to study the long term training needs of WARDA and to submit recommendations

to the next session of the Council. The Governing Council accepted the offer made by IITA to organize a 12-week training course and left it to the Executive Secretary to decide which type of training should be carried out during that period.

(xii) The Governing Council approved in principle the setting up of a Language Laboratory at the WARDA headquarters to solve linguistic problems of the Association. It gave the Executive Secretary the mandate to continue to negotiate for the financing of the facilities and staff for the laboratory.

(xiii) It supported the terms contained in the reply sent by the Executive Secretary to the letter of the Chairman of the CGIAR as regards the financing of Coordinated trials. It stressed the transitional nature of the proposed Coordinating Committee and the need for finding a more adequate solution, possibly within the framework of the Scientific and Technical Committee.

(xiv) The Governing Council approved that an Annual Report of the Association be published and that this could replace one of the two bi-annual progress reports of WARDA.

At the Third Session of the Governing Council, His Excellency Abdoulaye Sawadogo, Minister of Agriculture of Ivory Coast was elected the new Chairman of the Governing Council. Before them, His Excellency James T. Phillips, Jr., Minister of Agriculture of the Republic of Liberia had been Chairman of the Association since its inception. Special tribute was paid to the out-going Chairman of the Governing Council for his advice, leadership and influential contacts which went a long way to make WARDA's achievements from its inception to that time possible. He in turn thanked member states for the privilege given him to serve as their Chairman

and for their cooperation and he also thanked the cooperating states and organizations for their financial support and cooperation in executing WARDA's programme. He felt that within a few years WARDA would have made positive contribution to rice development in West Africa which member states would be proud of. He wished the new Chairman a successful tenure of office.

The Fourth session of the Governing Council was held in Ibadan, Nigeria from December 2 to 5, 1974. The Council unanimously adopted the 1976 budget subject to a few amendments. It elected the following officers for the year:

Chairman

- Dr. Bukar Shaib
Permanent Secretary
Federal Ministry of
Agriculture & Natural
Resources
Lagos, Nigeria.

First Vice-Chairman

- Mr. Moriba Cissoko
Directeur de cabinet
du Ministere de la Production
Bamako, Mali.

Second Vice-Chairman

- Mr. A.B. Williams-Baffoe
Deputy Director of Agriculture
Ministry of Agriculture
Accra, Ghana.

Rapporteur

- Mr. A.A. Timite
Sous - Directeur de la
Production
Côte d'Ivoire
Abidjan, Ivory Coast.

The Council also made the following recommendations and took the following decisions:

(i) The Council invited the Cooperating States and Organizations to show more flexibility in the implementation of projects which they have helped to prepare.

The representatives of Cooperating States and Organizations agreed to take very seriously into account the priorities and policy of WARDA. They are making and will continue to make efforts to adapt their procedures to WARDA's particular situation.

(ii) The Council adopted the principle of creating a Special Fund to finance

- projects or parts of projects which WARDA considers urgent and for which external financing cannot be obtained;
- advances for projects if funds are delayed at a crucial time;
- loans to small development projects of some member countries.

(iii) The Council requested the Executive Secretary to prepare a document on such a Fund and send it to the member countries.

(iv) The Governing Council decided to call a special session at the Association's headquarters as soon as possible for thorough examination of the ways and means of setting up and operating such a Fund. The Executive Secretary is to prepare working papers for the special session of the Governing Council and to send them in time to the member countries.

(v) The Council requested the Executive Secretary to submit to the forthcoming special session his proposals on the remuneration of personnel assigned to WARDA projects in their countries.

(vi) The Council asked the Executive Secretary to seek its advice if investments in buildings are necessary.

(vii) The Governing Council invited the new State of Guine Bissau to take part in the Association's activities for two years as an observer with all benefits except the

right to vote. This would enable the new republic to become familiar with the Association and subsequently to participate in it as a full member.

(viii) The Governing Council recommended to the Executive Secretary to integrate WARDA's programme as soon as possible with the drought control programme already undertaken in the Sahelian zone.

(ix) The Governing Council recommended to the Governments of the member countries:

- that adequate measures be taken in the matter of credit to make the necessary inputs available to farmers;
- that adequate resources be made available to extension services to enable them to carry out their tasks effectively;
- that where rice is grown under flooded conditions with water control, efforts be made to ensure security of production under economically profitable conditions, taking into account the various situations.

(x) Concerning coordinated trials, the Governing Council strongly recommended their continuation. It asked the Executive Secretary to take measures for solving the problems of seed collection, submission of returns on the progress and expenditure of the trials. The Council asked the Executive Secretary to have implementation of the trials constantly evaluated and reviewed by the specialists in the disciplines concerned engaged on the coordinated trials.

(xi) The Governing Council asked the Executive Secretary to organize and to promote collection and storage of local varieties on a cooperative basis.

(xii) Concerning coordinated fertilizer trials in particular, the Council recommended:

- that their protocols be modified in the light of new knowledge acquired so as to meet the needs of member countries;
- that the choice of sites should enable maximum benefit to be derived from cooperative experimentation;
- that draft protocols be submitted to research institutions of the member countries and that they be possibly finalized through a meeting of research specialists of member countries.

(xiii) Noting delay in the implementation of special research projects, the Council appealed for prompt assistance from the cooperating states and organizations in financing the projects.

(xiv) The Council recommended integration of the coordinated trials programme with the special research projects and the adoption of a multidisciplinary approach in research; the composition of research teams should be adapted to the problems and ecological needs of each station.

(xv) The Council accepts the offer of the Consultative Group on International Agricultural Research to strengthen WARDA's research management by providing WARDA with an expert with international qualifications and experience equivalent to those of a senior researcher in an international centre for the post of Adviser to the Research Coordinator.

(xvi) The Council strongly recommended implementation of the Phase II project for UNDP assistance to WARDA and recommended inclusion of a post of agro-pedologist in the project.

(xvii) The Council recommended to the member countries to advise the Executive Secretary by January 31, 1975, of any amendments to the first issue of WARDA's Annual Rice Statistics so that they could be published as soon as possible.

(xviii) The Council recommended regular publication of the Current Bibliography and WARDA's participation in the global CARIS and AGRIS II projects as an input centre.

(xix) The Council strongly recommended implementation of the training centre project at Johnsonville, University of Liberia, and utilization of all services offered by IITA in the field of training. The Executive Secretary should formulate a training plan including utilization of fellowships offered to the Association.

(xx) The Council requested the Executive Secretary to consider holding the meeting of the Scientific and Technical Committee at the Association's headquarters some time before the meetings of the Advisory Committee and the Governing Council. In this case, the report of the Scientific and Technical Committee would be sent in time to the member countries and to the cooperating states and organizations.

(xxi) The Council urged that replacement of technical assistance personnel, as requested by the cooperating states and organizations, should not automatically stop the financing of posts to be filled by nationals of the region as a result of fellowship and training programmes but that a plan for such replacement should be formulated taking into account the financial capacity of WARDA.

(xxii) The Governing Council complimented the External Auditor on a well-done job and unanimously adopted his report.

(xxiii) The Governing Council asked the Executive Secretary to revise the format of the budget with respect to staff costs by indicating for each item the actual salaries now in force, and to group the appropriations for salary increases in one item.

(xxiv) The Governing Council asked the Executive Secretary to take the necessary steps to appoint a national of the region to the post of Chief of the Administration and Finance Division as soon as possible.

(xxv) The Council recommended that a small committee be appointed in future to make a preliminary examination of the draft budget before submission to the plenary session.

(xxvi) The Council asked the Executive Secretary to pay special attention to staff training and to submit a progress report on the subject to each session.

(xxvii) The Council asked the Executive Secretary to send the documents on the new scheme of contributions to the Member Countries for study and proposals before the matter is discussed at the next session of the Governing Council.

(xxviii) The Governing Council elected the following members of the Scientific and Technical Committee:

Dr. N.D. Bropleh	(Liberia)
Dr. Z. Garba	(Niger)
Dr. R.P. Jappie	(Sierra Leone)
Dr. L.J. Marenah	(The Gambia)
Dr. B. Toure	(Ivory Coast)
Mr. L. Sauger	(Senegal)
Mr. B.L. Ywassa	(Togo)

(xxix) The Governing Council invited the Cooperating States and Organizations, particularly the Consultative Group on International Agricultural Research, to send

observers to the meetings of the Scientific and Technical Committee. The Council also invited Dr. H. ten Have to take part in the meetings of the Scientific and Technical Committee as an observer. The observers will fully and actively participate in the meetings and their views will be recorded in the report.

(xxx) The Governing Council hoped that IRAT and IITA would confirm Mr. G. Vallaeys and Dr. Abifarin as their observers and asked IRRI to designate its representative.

(xxxi) The Governing Council recommended that, after their three-year term, only four members of the Scientific and Technical Committee be renewed so that scientists from all member countries can participate in rotation. After expiry of the three-year term, the countries which were not members of the Committee will be invited to designate scientists to fill the vacant posts.

(xxxii) The Governing Council felt that there was no need for the continued existence of the Advisory Committee. The Executive Secretary was requested to initiate the procedure for amending the Constitution to abolish the Advisory Committee effective January 1, 1976. Council however renewed the term of the members of the Advisory Committee for one year.

(xxxiii) Council unanimously elected Mr. Jacques Diouf Executive Secretary for another three-year term. Dr. Lekan Are was also unanimously elected Deputy Executive Secretary for another three-year term, effective on the expiry of his present term.

(xxxiv) The Governing Council requested that in future the member countries should be informed at least six months in advance about the posts subject to election by the Governing Council.

(xxxv) After considering the functions of the Credentials Committee, the Council asked the Executive Secretary to investigate the usefulness of such a committee and to submit proposals to the Council's next ordinary session.

B. Scientific and Technical Committee

Since the inception of WARDA, four meetings of the Scientific and Technical Committee have been held at Bamako, Mali in May 1972; at Monrovia, Liberia in April 1973; in Abidjan, Ivory Coast in December 1973, and in Ibadan, Nigeria in November, 1974. At each meeting, the research proposals of the Association and studies proposed by the Development department were reviewed and appropriate recommendations made to the Advisory Committee of the Governing Council.

C. Advisory Committee Meetings

Four meetings of the Advisory Committee were also held in May 1972 in Bamako, Mali; in April 1973, in Monrovia, Liberia; in December 1973, in Abidjan, Ivory Coast, and in November 1974 at Ibadan, Nigeria. At the various meetings, the financial implications of the projects submitted were gone into and cooperating states and organizations had the opportunity to make pledges in support of the different programmes.

The recommendations of the committee meetings were later passed to the Governing Council for approval and implementation by the Executive Secretary of WARDA.

III. MANAGEMENT

ADMINISTRATION AND FINANCE DIVISION

This is mainly a service division for the office of the Executive Secretary and the Deputy Executive Secretary and the other Departments. It is divided into three main sections: Personnel, Finance and Procurement. It is headed by a Chief, Administration and Finance. He is supported by the heads of the three sections.

Personnel section deals with general staff matters including recruitment of staff and consultants, terms of employment, service conditions, keeping of personnel records, processing and review of claims, etc. and general assistance to staff generally.

Procurement section is responsible for records of all physical assets of the Association, inventories, procurement procedures and procurement, insurance, import licenses, maintenance of premises and buildings and supervision of the pool of vehicles.

Finance section deals with the administrative budget, overall accounts, payment vouchers and preparation of cheques and payment of staff salaries and other emoluments. This section is also in charge of budget preparation and reporting.

The implementation of the outreach programme of WARDA may make it necessary to strengthen the staffing of these sections.

In the area of Finance, with the assistance of an external consultant from the UN Economic Commission for Africa (ECA), it has been possible to establish an accounting system which has now been mechanised and which enables WARDA's management to know the exact financial position of the Association at any time, thus ensuring

that the interest of member and donor countries are properly protected.

Personnel under the Finance Officer have completed a training course in machine accounting in order to enable them to satisfactorily fulfill their duties.

It is hoped that the most difficult times in accounting have passed and that the present staff, with the help of mechanisation, will be able to cope with the accounts of all the programmes of WARDA and to make the accounts section play their rightful role in management.

While progress has been achieved in the Finance Section, the problem of budgeting and reporting for the needs of the various donor agencies and countries still takes a great deal of management time and effort.

In the area of contributions from member states, the initial poor response has given way to a fairly constant flow. This early slow response was in part due to the conflict between the WARDA financial year and those of some member countries. To alleviate this problem WARDA budgets are now submitted for approval by the Governing Council two years in advance, i.e. the 1976 budget was submitted for approval in 1974.

In addition, a review of the scale of contributions, as requested by the Governing Council, has been undertaken and discussed at the Ibadan Meeting of the Governing Council in December 1974.

Several committees have been created to support administrative activities:

One Appointment, Promotion and Disciplinary Committee for the General Service Staff, headed by the Chief, Administration and Finance, submits recommendations to the Executive Secretary for recruitment of staff members for Grades G4 and below; another Appointment, Promotion and

Disciplinary Committee, headed by the Deputy Executive Secretary submits recommendations to the Executive Secretary for recruitment from Grades G5 and above. A Procurement Committee, to ensure that WARDA's purchases are effected at the best prevailing conditions on the national and international markets, is also functioning.

A Professional Appointment and Promotion Committee, headed also by the Deputy Executive Secretary examines applications for professional vacancies and sends its recommendations for recruitment to the Executive Secretary for staff members from Grades P1 and above.

All these committees meet regularly and also in extraordinary sessions, when the circumstances so warrant.

Associate experts from the Government of France are expected to support the administrative activities of WARDA, particularly in view of the ever increasing requirements resulting from the increasing number of projects being carried out in member countries.

The Peace Corps Organization has been contacted to provide three experts to the Administration (one Budget Officer, one Procurement Officer and one Insurance/Inventory Officer). Our request is now being studied by the Peace Corps authorities and we expect to receive the Volunteers early in 1975.

IV. RESEARCH DEPARTMENT

WARDA's Research Program aims at increasing rice production per unit area by pursuing the following objectives: the introduction of high yielding varieties with improved plant type, high grain quality and resistance to major African pests and diseases; the use of economic fertilizer rates in the different edaphic conditions of the region and the adoption of better cultural practices and proven plant protection measures.

WARDA's Research Department with headquarters at Monrovia (Liberia) coordinates the research activities of the Association. It's staff is made up of a Research Coordinator assisted by two coordinators for Varietal Improvement and Soil and Fertilizer use. An entomologist based at Rokupr (Sierra Leone) later joined the team. The department undertakes two types of research activities in the member countries of WARDA:

- a) Coordinated trials at a network of locations in the WARDA region with the aim of establishing a direct impact on rice production. This program is referred to as Project W1.
- b) Special Research Projects W2, W3 and W4) for reinforcing the existing research work and for filling gaps in rice research in the region. This is backstopped by available knowledge and experience at the international level.

A. Coordinated Trials

The coordinated trials have a multi-disciplinary approach and have been integrated to include trials on varieties, fertilizer use and plant protection (insect and weed control).

1)

Varietal Trials

Background

During the Rice Breeding and Varietal Improvement Seminar at Monrovia, Liberia in January 1973, varieties were nominated for seven coordinated trials covering all major types of rice cultivation in West Africa.

Seed rice was received from the member countries in April ~ May 1973 and treated against nematodes and was protected with a fungicide and an insecticide at Suakoko (Liberia). All seed parcels, along with the guidelines for conducting these trials and the trial information sheets, were dispatched to all member countries during the last week of May, 1973.

Seeds of promising varieties from IRRI, India and Thailand were divided and sent to the various stations as soon as they were cleared by the Regional Plant Quarantine Station at Ibadan, Nigeria. These varieties were entered in the Initial Evaluation Tests or in the Coordinated Variety Trials when adequate seed was available.

Sixty varieties were grown in the 7 trials during the main season of 1973. Table 1 gives the distribution of the variety trials over the various test locations. The actual number of variety trials in the field, however, were around 60 since at some locations the seeds were received either too late (as a result of problems encountered with seed clearance, etc.) or the trials started early in the season due to severe prolonged drought conditions. At Suakoko, on the other hand, a few more trials were actually conducted than originally planned. At most of the locations which were visited the trials were adequately to well managed in the field.

Table 1: Present test locations in the WARDA region along with systems of rice cultivation

Country	Station	System of rice cultivation			
		Rain-fed	Irrigated	Deep flooded-mangrove swamp	Floating rice
Mauritania	Kaedi	*	*		
Senegal	Djibelor		*		
	Sefa	*	*		
	Richard Toll		*		
The Gambia	Jenoi	*	*	*	
	Sapu		*	*	
Sierra Leone	Rokupr	*	*		
	Mange		*		
Liberia	Suakoko	*	*		
Ivory Coast	Bouake	*			
	Man	*			*
	Odienne				
	Ferkessedougou	*	*		
Ghana	Kpong	*	*		
	Nyankpala	*			
Togo	Mission Tove		*		
	Sotouboua	*			
Dahomey	Houeda		*		*
	Ina	*			
Nigeria	IITA	*	*		
	Badeggi		*		
	Bernin Kebbi				*
	Ilushi				
Niger	Kolo		*	*	
	Daikena				*
NAFI	Nopci			*	
	Kogoni		*	*	
	Sikasso	*			

In January 1974 printed data sheets were sent out to all member countries for dispatching the results of their trials to the WARDA headquarters. Reminders were issued one month later. Fifty results were obtained from all

the participating 12 member countries by April 1974. The data were processed and were presented at the Rice Research Review Meeting held in Monrovia, Liberia from July 15-20, 1974.

At 13 test locations with irrigated facilities, the two variety trials were repeated during the dry season of 1973-74. Some of the results obtained have already been forwarded to the WARDA headquarters.

In December 1973 and January 1974, all member countries were invited to propose new promising varieties for cooperative testing during 1974 and to provide WARDA with adequate seed quantities for treatment, processing and re-distribution among the various test locations. Varieties which performed poorly during the 1973 season are to be discarded and replaced by more promising ones for the main season of 1974 when approximately 70 variety trials will be conducted. Results obtained from the 1973 main season coordinated trials are summarised below. More detailed accounts can be found in the Annual Research Report of WARDA published in July 1974.

Results

Varietal Trials - Rainfed Conditions - Short Duration

Grain yields were relatively low, ranging from 2403 kg/ha. Lack of moisture and heavy incidence of ~~Rice blast~~ (blast) were strong contributing factors for the low grain yields at many locations. Weather conditions sometimes varied considerably between one location and another, just as the performance of many varieties varied from one location to another. When severe drought conditions occurred late in the season, varieties with short duration escaped these adverse conditions and produced relatively higher yields. With a

drought spell in the middle of the growing season, certain varieties with a rather long duration performed best as they possessed better recovery ability. These and other factors make it difficult to draw conclusions at this stage, especially when results are limited in nature and have been available only for one season.

It is interesting to compare the results from Sefa (Senegal) with those from Nyankpala (Ghana). At the former location, the three short duration varieties Dourado Precoce, I Kong Pao and Cheke Chiao performed equally well as regards grain yield and out-yielded HBD2 and IR 442 which were a few weeks longer in duration. At Nyankpala, the rainfall pattern was satisfactory for the longer duration types. Thus, the yield of IR 442 was the highest with 3527 kg/ha, whereas the variety with the shortest growth duration, Cheke Chiao, had the lowest yield with only 696 kg/ha. When water was not a limiting factor, varieties with a very short duration usually had a lower yield potential than varieties which were a few weeks longer in duration.

The varieties Dourado Precoce, I Kong Pao, IR 442 and 15/IR 528-1-32 were among the best yielding varieties at four locations, but were also among the poorest yielders at two locations, indicating clearly their erratic varietal behaviour. The varieties Cheke Chiao and Soavina were usually among the poorest yielders.

An area of concern which needs closer attention is the incidence of blast. Careful scoring, both for leaf blast and neck rot, is of utmost importance in order to have an adequate knowledge about varietal adaptability. High incidence of blast on I Kong Pao was observed at Sotouboua (Togo), Bouake (Ivory Coast) and Nyankpala (Ghana) and on IR 442 at Suakoko (Liberia), Bouake and IITA, Ibadan (Nigeria).

Very promising results were obtained with Se 302G, a local variety (control) from Sefa (Senegal), which averaged the highest yield in this trial (4032 kg/ha). It will be interesting to observe its performance on a multi-local basis in 1974 as it is now one of the common entries in the present coordinated variety trial.

Variety Trials - Rainfed Conditions - Medium Duration

As in the first trial, varietal performance was highly dependent on rainfall (amount and distribution) and on the incidence of Piricularia oryzae (blast). The average grain yields obtained at four locations showed that the taller and early - maturing varieties, such as Iguape Cateto, 63-83 and T x 52-10-1 were among the highest yielders. The varieties IR 5, IR 442 and LAC 23 averaged the lowest grain yields. Yet, highest grain yield was obtained with IR 442 (3607 kg/ha) at Nyankpala (Ghana) where rainfall conditions were favourable and the plots were free from blast, but the same IR 442 gave a very low grain yield of 440 kg/ha at Bouake where drought and blast incidence were serious.

As an overall average, when rainfall was adequate and uniformly distributed throughout the growing season and in the absence of diseases as in the case of Nyankpala (Ghana), there was a tendency for the short and good tillering IRRI varieties to perform better than the tall, poor tillering and early-maturing varieties such as USO, AZUCENA, LAC 23 and Moroberek. At Rokupr (Sierra Leone) where rainfall was sufficient and well distributed, serious incidence of blast reduced drastically the grain yields of the IRRI varieties, whereas the tall varieties with better resistance to blast yielded well. A similar trend was not observed at Suakoko (Liberia) where the rainfall was also adequate and the infection of blast was likewise heavy as at Rokupr.

Variety Trials - Irrigated Conditions - Short Duration

Common entries used in this trial were all short, stiff-strawed, fertilizer responsive and high yielding varieties. Their performance from one location to another depended on their adaptability to prevailing ecological conditions. IR 20 performed very well at Kaedi (Mauritania), Suakoko (Liberia), Man (Ivory Coast) and Mission Tove (Togo), but produced very low yields at Djibelor (Senegal). At most of the locations, the varieties IR 20, Cica 4 and DJ 346D were among the top-yielders. They did not however perform equally well at all locations. The overall average yield was about 5,000 kg/ha. The variety I Kong Pao was less consistent as regards grain yield performance than the former three varieties. IR 873 B2 was longer in duration than the other varieties used in the trial and, on the average, its yielding ability was not very promising.

The performance of the varieties was also influenced by the cultural practices given to the plots. At each location, cultural practices were distinctly different and consequently, varietal performance was also different. All varieties yielded well at Kaedi (Mauritania), Kpong (Ghana) and IITA (Nigeria) where proper land preparation was done coupled with good water management. Conversely, where water management was poor, such as at Djibelor (Senegal), Monge (Sierra Leone) and Man (Ivory Coast) and where harrowing was neglected and the number of seedlings per hill was inadequate (e.g. at Sapu, The Gambia), grain yields were low. As an illustration, grain yield of IR 20 which was in all locations the highest with 8082 kg/ha at Kaedi dropped to 2496 kg/ha at Sapu. Among the local standard varieties, 52/IR 630-27 from IITA (Ibadan, Nigeria) and L5-26 from Richard Toll (Senegal) which yielded 6771 and 6354 kg/ha respectively

were very promising. They should, however, be tested all over the region to determine their range of adaptability.

Varietal Trials - Irrigated Conditions - Medium Duration

Common entries used in this coordinated experiment were also the improved high yielding varieties. Performance depended both on their inherent ability to yield well and their adaptability to the environment where they were grown. In each of the locations where these trials were conducted, ecological conditions and cultural practices were both complex and somewhat unique. Subsequently, varietal performance was also distinctly different. Among all physical factors critical to the growth of the rice plant, precise water control was by far the most important in these trials.

At IITA (Nigeria), Kaedi (Mauritania), Kpong (Ghana) and Kolo (Niger) where water management was good and the plots were free from diseases and insects attack, highest grain yields were obtained. Where water depth was sufficient to supply the rice plants with adequate water, but the incidence of diseases, particularly Piricularia oryzae was heavy e.g. at Daloa and Yamoussokro (Ivory Coast), grain yields were somewhat reduced. Where water management was poor (Mange, Sierra Leone), grain yields were lowest.

The highest grain yield in this coordinated trial was obtained with DRC at IITA (Nigeria) with a grain yield of 10,604 kg/ha. However, elsewhere, its performance was somewhat poor. Compared with its grain yield at IITA, there was a reduction of 48.8 percent at Kogoni (Mali) where it produced its second highest yield and a reduction of 81.7 percent at Kolo (Niger) where it fared worst. IR 442 performed well at locations where water management was good and there was no blast incidence.

DJ 684 D and to some extent H 821-3, performed generally well at all locations where water management was good irrespective of the incidence of blast. Because the relative performance of BD 2, IR 442, H 821-3 and DJ 684 D was not uniform at the different locations, they were considered to have a narrow adaptability. As an overall average, each of all these varieties produced less than 5000 kg/ha. Conversely, IR 5 and 58/IR 382-7-2-2 with one exception had high and stable grain yields in all locations. They yielded on an average more than 6100 kg/ha and were considered to have wide adaptability. No meaningful information could be obtained from SML Alupi due to its poor germination at most locations.

Variety Trials - Deep Flooded/Mangrove Swamp Conditions - Medium Duration

The performance of most varieties in this trial depended mainly on the vagaries of the rains. The bulk of the crop was subjected to excessive precipitations leading to floods in the heavy rainfall zones (Rokupr, Sierra Leone and Odienne, Ivory Coast) and to drought in the low rainfall zones (Daikena, Niger; Sapu, The Gambia and Sikasso, Mali) due to inadequate or erratic distribution of rainfall. Nevertheless, grain yield of the varieties common to all locations was generally good with location means ranging from 3445 to 3001 kg/ha in Daikena and Odienne, respectively. Yields of BD2, D 52-37, L 102-8 and IR 442 each exceeded 4000 kg/ha. However, while IR 442 performed well in Odienne alone, BD 2, D 52-37 and L 102-8 performed well in all ecological zones. D 52-37 was the most outstanding variety. Broad spectrum of excellent agronomic characteristics, such as short growth duration, high panicle number per unit area and spikelets per panicle, heavy panicle weight and high 1000 grain weight may have contributed to the wide adaptability of D 52-37.

Varietal Trials - Deep Flooded/Mangrove Swamp Conditions - Long Duration

Poor dynamism of fresh water floods and saline floodings of paddies hampered drastically the performance of most varieties in areas stricken by severe prolonged droughts. In areas with adequate water supply like Rokupr (Sierra Leone), iron toxicity (bronzing) and heavy incidence of Piricularia oryzae and Xanthomonas oryzae reduced grain yields substantially. In each of these complex and variable ecological conditions, varietal performance was vastly different. There was a tendency for shorter and earlier-maturing varieties, such as IM 16 and L78-9148 to escape the drought when moisture stress occurred late in the season as in Georgetown (The Gambia) and Ibetemi (Mali) and hence they produced relatively good grain yields. On the contrary, at Rokupr where water depth was favourable for deep flooded and mangrove swamp conditions throughout the growing season, taller and later maturing varieties like RH 2, Nachin 11 and Phar Com En developed to their maximum potential and outyielded significantly the early maturing varieties.

At all locations, highest and lowest individual grain yields were obtained with the later-maturing varieties. These could be considered to have narrow adaptability. Earlier maturing cultivars with acceptable and stable yields under wide ranges of water conditions could be considered to have wide adaptability, and to be suitable for both water conditions. The best adapted cultivar was IM 16 with yields of 3581, 3908 and 4509 kg/ha at Georgetown, Rokupr and Ibetemi, respectively. The resistance of IM 16 to lodging was probably one of its distinct advantages over the other varieties.

Floating Conditions, Long Duration

As the floods which usually arrive late, reached a very low maximum level and receded quickly thereafter, growing conditions were very abnormal for floating rice. As such, the varietal performance under these prevailing conditions was probably not representative of what is expected under normal floating conditions and the potentiality of the best performers remain still unknown under these conditions. Generally, the Indochine varieties performed poorly during the season.

Conclusion

Highest grain yield was obtained under irrigated conditions followed by the deep flooded/mangrove swamp, floating and lastly, upland rainfed conditions. Under each type of conditions, there was a tendency for the trials conducted with longer duration varieties to yield better than those with shorter duration varieties. The difference in grain yield for each type was higher under irrigated conditions and lowest under upland rainfed conditions.

2) INITIAL EVALUATION TEST (IET)

New selections, recent introductions and other promising breeding material of which usually not much seed is available will be tested for the first time on a multi-local basis in so called "Initial Evaluation Tests". This gives the breeders an excellent opportunity to gain additional information about varietal performance in other regions in West Africa and may provide useful information about disease reaction and varietal adaptability. In 1973 these trials included promising material for rainfed and irrigated rice.

The best material from the Initial Evaluation Tests is promoted to the Preliminary Variety Trial (larger plots and replicated). From this trial the most promising material will be multiplied and introduced in the region. In 1973, these trials included only promising material from rainfed and irrigated rice.

3)

FERTILIZER TRIALS

The experiments were conducted under all major types of rice cultivation conditions with 6 to 8 replications and had the following treatments:

1. O (no fertilizer; control),
2. N - 40 kg N/ha,
3. NP - 40 kg N/ha and 30 Kg P₂O₅ per ha,
4. NK - 40 kg N/ha and 30 Kg K₂O per ha,
5. NPK - 40 kg N/ha, 30 kg P₂O₅ and 30 kg K₂O per ha,
6. NPK - present rates as recommended by the Extension Service for this variety,
7. NPK - optimum levels for N, P and K.

At locations where these experiments were conducted with a modern semi-dwarf variety, the fertilizer rates for N, P and K (treatments 2 to 5) were as follows: 40 kg N, 40 kg P₂O₅ and 30 kg K₂O per hectare.

Not all trials which were originally planned were actually conducted and some others failed early in the season due to drought conditions. Results were obtained from 23 experiments out of the 30 originally planned.

Rainfed Rice

The trials were conducted in seven countries in 1973 and the varieties used were different from one country to another. All trials with a coefficient of variation (cv)

above 30% were discarded. Highest yields were obtained in Dienedian (Ivory Coast) with an average of 4261 kg/ha followed by that at Nyankpala (Ghana) with an average yield of 3180 kg/ha. The lowest grain yields of between 900 and 1000 kg/ha were obtained at Jenoi (The Gambia) and Sotouboua (Togo). Response to phosphorus was very strong at Sikasso (Mali) and Nyankpala (Ghana), but was less obvious at Dienedian (Ivory Coast) where response to potassium was strongest. At many locations, there was positive interaction between phosphorus and nitrogen. Yields obtained nearly doubled those of the control in Ghana, while it almost trebled that of control in Mali. Significant results were obtained with Dourado Precoce in Mali and IR 20 in Ghana.

Irrigated Rice

In irrigated rice cultivation, similar results were obtained especially in Ivory Coast, Senegal, Ghana and Mauritania. The preponderant role of nitrogen and phosphorus were demonstrated, but it would be more accurate to speak of synergic nitrogen-phosphorus interaction. They are the two main elements most deficient in irrigated rice soils of the region. Whenever phosphorus deficiency is reported, laboratory analysis should be able to determine the actual P reserves in the soil and the possibilities of mobilizing them. If for instance the rate of assimilable phosphorus is known, phosphate deficiency could be remedied. The effect of potassium has not been shown in these trials, but it seems that it is the most abundant major element in most African soils.

Floating and Deep-flooded rice

Trials involving floating and deep-flooded rice under unfavourable ecological conditions (water shortage) have not given significant results. No conclusion can be

drawn from them. Moreover the relatively high yield of the control plots under deep-flooded conditions indicated a high degree of soil fertility. This natural fertility of the soil masked the effects of the treatments. In the floating rice experiments, control plots also outyielded the treated plots, and depressive effects were recorded especially with potassium and high rates of N.

Mangrove Swamp Rice

As for mangrove rice, Rokupr (Sierra Leone) the only location where the experiment was conducted produced highly significant results. Response to nitrogen was very strong and potassium had a negative effect. NK also gave significantly higher yields than the control. NPK (at rates recommended for extension) and N were however the two best treatments. There was no correlation between the high organic matter content of the soil and grain yield in view of the high response to N. While no toxicity has been reported, it is known that iron toxicity often poses problems in mangrove soils.

Conclusion

No definite conclusions can be drawn from the first set of fertilizer trials. It should be pointed out that they were carried out under different climatic and soil conditions and with different varieties. Developments would have to be watched during several campaigns to reach sound and valid conclusions.

However, as fertilization of any crop -- not only of rice -- is closely bound up with environmental conditions, information on the nature of the soil (physical and chemical data) should accompany the results of every trial for its better interpretation. Cultural techniques, plant growth during the vegetative cycle, weed and disease control,

favourable distribution of rainfall -- all these factors play their role, together with the intrinsic action of fertilizer. A harmonious relationship among all these factors, appropriate production technique and rational fertilizer use, always enable a given variety to express its potential. Soil studies on the other hand could make a great contribution to the entire operation.

Insect Control Trials

It is designed to assess insect damage on irrigated rice in terms of yield losses and to study the effectiveness and economics of a granular insecticide (Basudin 10) in comparison to the presently recommended control practices. Difficulties encountered in obtaining the granular insecticide delayed the start of this coordinated trial. Immediately after the receipt of the insecticide in May 1974, samples were dispatched to all member countries with the general guidelines for the conduct of this experiment.

Weed Control Trials

The first weed control trial for irrigated rice started during the 1973-74 season. Some of the herbicides to be tested were obtained from IRRI. Herbicides to be used for the weed control trials for both irrigated and rain-fed rice in the main season of 1974 have been dispatched to the different test locations in the region.

B. Special Research Project

Not much has been achieved under Special Research Projects as the main projects in Rokupr, Mopti and Richard Toll are yet to be fully started. Progress made so far are however, reported upon below:

Rokupr, Sierra Leone:

Dr. E.R. Vogel resumed duty in December, 1973 at the Rice Research Station, Rokupr, Sierra Leone under USAID assistance to WARDA as Entomologist. He laid down two trials under mangrove, three under upland and three under irrigated conditions before he resigned nine months later in September, 1974.

Under each cultural condition, one experiment was designed to find out whether the application of systemic granular insecticides at periodic intervals would control insect pests in rice fields over a long period and also to find out its effect on rice yields. The second experiment was to test the resistance to insect damage of 37 rice varieties under upland condition and 103 varieties under both mangrove and irrigated conditions. In addition, insecticide demonstration tests on 0.45 ha for upland and 0.11 ha for irrigated rice using the granular systemic insecticide Furadan were conducted.

A summary of the results from these experiments analysed by Dr. W.E. Taylor, Entomologist, Njala University College, Sierra Leone at the request of the Director of the Rice Research Station, Rokupr showed that in all cases (upland and swamp), periodic application of three systemic insecticides (Furadan 30; Basudin 106, Gamalin 20) increased rice yield significantly, but had no effect on either plant height or the number of tillers produced.

Bouake, Ivory Coast:

Mr. J. Dallard was appointed Associate Breeder at Bouake, Ivory Coast, under French assistance to WARDA. He arrived at Bouake, in October, 1974. He is reinforcing the work of Mr. Jacquot, the IRAT Breeder at the Station in the hybridisation and selection programme for rainfed

rice; he also conducts the WARDA initial evaluation tests. The approximate annual budgetary support to his programme is \$6,500.00 for operation. A total investment cost of \$5,280.00 was made in purchasing a car, laboratory and field equipment and housing installation.

Richard Toll, Senegal:

Mr. J.N. Bassil, the Associate Soil Specialist posted by the French Government was involved in the management of the WARDA coordinated trials and the study of the soil-P status in the Senegal Valley in association with the Director (Pedologist), at Richard Toll, Mr. Sonko.

V. DEVELOPMENT DEPARTMENT

From a rather slow start, the staffing of the Development Department picked up towards the end of 1973. By September 1973, there were only two professional officers in the Department, namely, Mr. O.S. Wild, Economist and Mr. C.E. Tagoe, Agronomist. By November 1973, however, the Department had grown to six professional officers by the arrival of Mr. K. Bach, the Irrigation Engineer; Dr. R.E. Parker, the Rice Processing Engineer; Mr. J.G. Vianen, the Associate Economist and Mr. H.P. Rozeboom, the Associate Rice Processing Engineer. In February 1974, Mr. Djibril Aw arrived to assume duty as head of the Department.

Requests from Member States for development activities have also shown an increase after a very slow beginning. By the middle of 1973, only three requests had been received. One from Dahomey asked for an identification Mission and the other from Togo asked for the appraisal of two already prepared projects. The third request from Liberia asked WARDA to examine the prospects of large scale commercial rice production within the Cocopa area of the country.

The activities of the Department in 1974 substantially increased largely due to an increase in the number of its professional staff. This rose from four to ten. Twelve missions were undertaken in member countries for a total of 361 man-days.

The request from Dahomey resulted in a two-man identification mission made up of an agronomist and an economist in September 1973. The mission met with officials of SADEVO and the Department of Rural Engineering and was shown round the following projects:

- (i) the Oueme Valley left bank development project;
- (ii) a lake-shore irrigation project in the Kpinnon area;
- (iii) an irrigation project near Dome and the proposed extension area at Ahlan.

The Dahomey Government expressed a desire for financing for further studies on the right bank of the Oueme Valley and for the rehabilitation and extension of the Dome-go/Ahlan Scheme.

A possible expansion of the Domego-Ahlan area has since been found incompatible with the expansion of the SADEVO (Oueme Valley Development Company) area. Discussions between a second WARDA mission and the Dahomey authorities in May 1974 brought out the importance of carrying on the studies undertaken by the UNDP/FAO project now nearing completion. The aim is to determine the feasibility of building a small retaining dam on one of the tributaries of the Oueme. The additional area to be gained for irrigation will make for better utilization of the existing rice mill and of the equipment financed by ADB for land development. WARDA has offered its assistance to Dahomey in drawing up a request for funding these studies.

A four-man mission made up of an agronomist, an economist, an irrigation engineer and a processing engineer visited Togo in October 1973. The mission was shown round the Sio valley development project around Mission Tove and Covie areas of the Maritime Region and the rice development areas in Savannas Region around Mango and Dopango. Project documents for these two areas had already been prepared and the mission was expected to appraise them and to get WARDA to find financing for them.

In answer to the request from Liberia, a team made up of the Research Coordinator, a pedologist and an agronomist spent three days examining the Cocopa area to find out if possibilities existed in the area for large scale rice development. It was evident that while the conditions were favourable for the development of large number of small inland swamps, the prospects for large scale production were rather slim.

In late September 1973, a two-man team composed of the FAO Adviser and a rice processing engineer left for Nigeria to give support to an IBRD appraisal mission to the East Central and South Eastern States of Nigeria. The team was concerned with the mechanization and processing aspects of the project.

Towards the end of the year, more requests were received from Member States and these gave rise to a number of Missions from the Department between December 1973 and December 1974.

Two missions - a rice processing survey Mission and a project survey Mission - were mounted for Ivory Coast in December 1973. In February and March 1974, an identification mission toured Senegal, Mali and Niger.

A mission comprising the Head of the Development Department, an economist and an irrigation specialist visited Senegal, Niger and Mali in February and March 1974 at the request of those member countries. This followed a decision taken by the Governing Council at Abidjan in December 1973 to give priority to the Sahelian countries in project preparation.

In Senegal, the project submitted to the WARDA mission involved reorientation of the Matam pilot plot project in the Northern part of the country, on the Senegal River. The plain has an area of about 10,000 hectares with a population of some 3,000. Since the

Senegal river's low water can irrigate only 3,000 hectares for annual double cropping of rice pending the construction of planned dams, the Senegal River Development Organization (OMVS) intends to establish three 1,000-hectare pilot plots at Boghe, Matam and Nianga, the first on the Mauritanian bank and the other two in Senegal. The Nianga project is now underway with assistance from the European Development Fund. In addition, another rice project is being carried out above Nianga, at Dagana. The Senegalese authorities concerned want to reorient the Matam project in such a way that a larger area is developed from the outset with only one annual rice crop. The Senegalese Government's decision is now being awaited.

In Niger, the WARDA mission found that the financiers had already agreed to undertake project preparation. WARDA's assistance will therefore only be required when the identification mission planned by the (French) Fund for Aid and Cooperation has completed its investigations concerning the possibilities of rice cultivation along the Niger River. The WARDA mission however gathered information on various rice projects underway in Niger.

In Mali, the Government asked WARDA for an urgent perspective study for intensification of rice cultivation in the area of the Niger Office. The project, which started in 1952, is aimed at developing the Central Niger Delta whose irrigable area covers 1,105,000 hectares. A dam makes water control possible. At present, 40,000 hectares are planted with rice by about 3,400 families, in addition to a state farm of about 3,500 hectares. Yields and the farmers' living conditions have improved in the past few years whereas drought whose effects are known throughout the world has affected the neighbouring areas. The project can certainly contribute to the national economy, especially to the improvement of the

food situation. WARDA is now working to determine the various stages of development in the Niger Office area and the conditions required for each phase of intensification.

One such project concerns the Northern part of the country which has been hardest hit by the drought. It is far from supply centres and difficult to reach, but has some lakes with potential for intensive agriculture. Among the lakes, the Horo is easiest to harness and studies and development work started about 30 years ago on this. When the River Niger is in flood the lake can be easily filled through a canal. Soil management is simple since there is no irrigation or drainage network and small dykes and accurate levelling are unnecessary because the water does not flow out. WARDA was requested to study possible improvements, particularly the chances of double cropping. So far, the WARDA mission has identified varietal improvement as the first priority. Those recommended have a cycle of less than 130 days, do not shatter badly and their yields are twice to thrice those now in use by the farmers in the area. It is also felt that rice cultivation should be expanded from the present 2,000 to 6,000 hectares.

A brief of other missions undertaken in 1974 is as follows:

(a) Togo

WARDA was requested to look into two projects. SORAD of the Savannahs, which had received partial financing, and SORAD Maritime, where the low volume of the water from the Sio limits the project size that could be submitted to the World Bank. A WARDA mission visited Togo in May 1974 when feasibility studies began and exchanged views on rice cultivation.

(b) Liberia

A study was undertaken on the economics of small-scale rice milling. WARDA also investigated, for the Liberian Government, the feasibility of building a modern rice mill at Monrovia with a capacity of six tons of paddy per hour.

(c) Ghana

WARDA assisted Ghana in studying the problems of three government rice mills in the Northern part of the country, whose performance was considered inadequate. No mill which previously parboiled rice operated satisfactorily, but it is possible that the application of modern parboiling techniques could assist in producing good quality rice, reduce the rate of brokens and increase milling yield.

(d) The Gambia

WARDA's mission to the Gambia in September 1974 was initially a case study. But following this first mission, the Gambia considered it necessary to ask for WARDA's assistance in preparing the second phase of the Agricultural Development Project in the McCarthy Island Division. Initially this involves assistance to the project management which is undertaking an identification study of the second phase.

Case Studies

WARDA has been somewhat cautious in preparing projects. Its intervention has been mainly in the form of preliminary or identification studies and consultations. No feasibility study has yet been made. This is due to several reasons. Our sub-region has a great diversity of types of rice cultivation and management

systems. Economic conditions, too, vary greatly. Techniques producing identical physical effects result in different rates of returns, depending on the country, because of the differences in producer prices of paddy and inputs.

Another reason is that the WARDA team is composed of experts from highly diverse backgrounds, with sometimes different approaches to problems. Finally, there are language problems which sometimes are obstacles.

A certain run-in period therefore seemed necessary before WARDA could achieve full capacity in the matter of project preparation.

The first field missions and the Rice Project Managers' Seminar have enabled the Department to profit from on-going projects. Two missions were sent to the Gambia and Upper-Volta.

Agricultural Development Project (ADP) in the Gambia

The ADP in the McCarthy Island Division appears an example that could be applied in the sub-region on a wide scale. It involves small-scale irrigation. The pilot project, now in its second year, was studied. The project relies on large-scale participation by the population and its development units are adapted to the working capacity of the villages. The division's report will be released as soon as it has been reviewed and approved by the Government of The Gambia.

Kou Valley Development, Upper Volta

It is one of the biggest and oldest projects of intensive rice cultivation. It started in 1970, covers 1,200 ha and has averaged 13 tons per hectare with double cropping. The project used gravity irrigation from a diversion dam. Land was mechanically cleared

and allotted in sizes of one hectare per family. All farm work is done by hand, except for threshing. Draft animals are also being introduced. WARDA studied the project in July 1974.

Cooperation with Financing Institutions

Agreements for cooperation have already been concluded or are under negotiation with the World Bank and the African Development Bank. In this context, WARDA's cooperation with the World Bank dates back to October 1973 when WARDA's Rice Processing and Storage Engineer and Rice Mechanization Specialist joined the World Bank appraisal mission to East Central and South Eastern States of Nigeria. WARDA in June-July 1974 took part in an appraisal mission of the World Bank concerning an integrated development project in Sierra Leone. As a result, the World Bank requested that a WARDA expert follow the progress of the project by visits at regular intervals. Although this was not possible, this type of cooperation would seem highly valuable and should be put into practice whenever possible.

Other Activities

The Department, in addition, took active part in a number of other activities of the Association; particularly those dealing with Conferences and Seminars. The Department was involved in the preparation of a paper on Socio-Economic Problems of Rice Production and Consumption for the Third Meeting of the Governing Council in December 1973, and a paper assessing investment requirements for self-sufficiency in rice in West Africa. The Department also took part in the Project Manager's Meeting from 4th to 8th of February 1974.

For the Socio-Economic Seminar in March 1974, the Department presented four papers entitled:

- a) Economics of Small Scale Rice Mills.
- b) Virtues of Modernized Rice Processing Systems for the West African Region.
- c) Self-Sufficiency in Rice in the WARDA Region, and
- d) The Regional Specializations Model: A Tentative Quantification for Liberia.

WARDA has worked out the draft of a regional model for rice production which could serve as the basis of a study aimed at self-sufficiency in rice in West Africa. The draft of the model was discussed at the seminar on the socio-economic aspects of rice cultivation which formulated recommendations. With the help of an FAO consultant, the methodology is going to be developed by drawing up a model simulating the behaviour of a small producer in an area of Liberia on which the necessary data are available. Subsequently, a model for each country may be envisaged.

On the same subject of self-sufficiency in rice, a study is under way to determine rice requirements in 1980 and to ascertain national rice plans and projects so as to make recommendations for consideration by the governments. As the joint ECA-FAO project concerning this problem could not be carried out for budgetary reasons, UNDAT (The United Nations Development Advisers' Team) based at Niamey, has been asked for assistance.

During the visits to Member Countries, staff members of the Department helped in collecting data on rice for the Data Processing Division. The report of the Appraisal Team to Nigeria has been sent to the IBRD.

The Department has, in addition, also prepared:

- a) An identification report for the Domego-Ahlan project in Dahomey;
- b) an internal report on the suitability of the Cocopa area for large scale commercial rice production;
- c) an internal report on two rice projects in Togo;
- d) a report on Valley Swamp Development Projects in Eastern Region and the existing Paddy Processing facilities in Ivory Coast;
- e) an identification report on the Office du Niger in Mali;
- f) a paper on Rice in West Africa.

Seed Multiplication

WARDA is producing foundation seeds of improved rice varieties for its member countries at its Seed Multiplication Centre in Richard Toll, Senegal. Certified seeds for distribution to farmers are to be produced from these through the seed multiplication schemes of each member country. This may prove the fastest way of improving the yield and quality of rice varieties now planted in the region.

Moreover, the seed centre will assist in accelerating the introduction of new promising varieties. WARDA with its international contacts can acquire and import the necessary seed direct from the Breeder and multiply it for the benefit of the national multiplication stations and ultimately the West African farmers. The WARDA seed multiplication centre could also constitute a seed bank that can be placed at the disposal of countries facing urgent needs for rice seeds in an emergency.

The area of the seed centre is at present about 30 hectares, but this can be extended to 50 hectares.

Owing to delay in land redevelopment, only one harvest was possible in 1974. Because of excessive salinity in the lowlying area, only 30.5 hectares, out of 50, were planted. The breakdown of varieties is as follows:

SE302 G	20.0 ha
IR442	2.0
IR20	1.5
CICA4	1.0
IR5	0.5
Total	<hr/> 25.0 ha

In addition to these varieties intended to meet the demand of member countries, 5.5 hectares were planted with varieties to be used in the coordinated trials and new varieties introduced from IRRI and IITA.

The assistance given by the Government of Senegal and Sierra Leone which assigned a crop and a seed superintendent respectively to the project is sincerely appreciated.

The crops grew satisfactorily. Weeds and pests raised some problems. Inadequate installations prevented adequate weed control in a part of the area (about 5 percent) which was therefore abandoned.

Member countries should make full use of the services offered by the project: supply of foundation seed, assistance in setting up and operating national seed multiplication centres, and quick various varieties are already available.

Production Mechanization

Research into mechanization of rice production is of special interest in West Africa. A joint UNDP/FAO/Netherlands small scale mechanization project is already in progress, but WARDA plans to carry out large scale mechanized rice production studies to fill the gap in the present studies. An experimental unit of 100 ha will be set up at Richard Toll, Senegal, for studies on irrigated rice, while another study on 5 ha on mangrove rice cultivation will be carried out at Rokupr, Sierra Leone. The technical objectives will be to determine the most suitable type of equipment for each farm operation, the best methods of carrying out each operation and the optimum combination of mechanized field operations. From the economic standpoint, the following will be investigated: the time required by and the unit cost of each operation, the input/output ratio, the optimum economic combination of mechanized rice production systems.

The station will assist in testing machines which might be imported in large quantities by member governments. Such a service will diminish the risk of importing machines which are less adapted to the prevailing conditions in West Africa. Improvements and modifications can be suggested and these effected by manufacturers on a series of machines before they are exported to the various countries in the region.

VI. DOCUMENTATION DIVISION

Financing of the activities of the Division is mainly provided by the UNDP which has supplied WARDA with personnel and equipment. The Indexer's post is financed by WARDA. Part of the funds originally earmarked in the Plan of Operations for transporting and processing the archives of the Inter-African Bureau of Soils (B.I.S.) will be used for the purchase of equipment and supplies for the Documentation Centre and its library.

The WARDA Documentation Centre and Library are located at the headquarters in Monrovia. Its main aim is to collect, analyze and disseminate information relevant to rice in West Africa. It achieves this by providing information in the form of indexes on all aspects of rice production in West Africa to the member countries and to any organization concerned with rice. The service takes the form of collecting, cataloguing, indexing and publicising these documents in the form of printed indexes in English and French, enabling all relevant documents to be retrieved in response to requests for literature on specific subjects. There is also a question and answer service based on the indexes, while a library to serve the needs of WARDA staff is being established at the headquarters.

The Documentation Centre was started by Mr. Baulkwill who worked at WARDA from August 2, 1972 to July 11, 1973, when he had to go back to his work at the Overseas Development Administration (ODA).

During his stay he arranged the contribution of IRAT, IITA, TPI and IRRI to the "World Rice References for West Africa". By the time of his departure, the first volume of World References was ready for translation and publication. Mr. Baulkwill located a suitable computer (Bong Mine) for publishing of indexes and worked on this

problem with OMVS Centre at St. Louis, Senegal. He arranged the training of the photographer at Saint Louis and Paris and the training of the indexer in Rome and Rabat. Visits were made to Sierra Leone (Rokupr), the Gambia and Senegal in March and September 1973, and arrangements to purchase photocopies of documents at Njala University College, Sierra Leone and Bambey, Senegal were completed. He also investigated numerous sources of documents which are now followed by the new documentalist who is also increasing the inflow of documents from countries outside the region.

The Documentalist lost a lot of time on Secretariat duties related to the January and May 1973 seminars. The inflow of materials from WARDA member countries was and is still rather poor.

The photographer returned from training in April 1973 and the equipment were installed. The first microfiche was made on April 10, 1973, and since then, 732 microfiches have been produced, i.e. 43,920 pages were microfilmed. 56,450 hard copy prints were made from the reader-printer. 654 Diazo copies have been made upon request from member countries, 105 large maps and charts copied with the Studio "7" camera, 71 rolls of 134mm films and 40 rolls of 120mm films developed from field projects. WARDA publications and the first Current Bibliography are now microfilmed. Four general cleanings of all equipment and two major repairs were carried out by the photographer: one on the micro-data camera and the other on the reader printer.

The Indexer returned from the training course on May 22, 1973. From May 25 to June 23, 1973, the Indexer worked on the sorting out of all the papers presented at the three WARDA seminars and on the cataloguing on simple cards of the existing documents and microfiches received

from FAO-DC and OMVS-DC. This continued until August 24, 1973. He also consulted Field Crop Abstracts, Tropical Abstracts, Fertilizer Abstracts, WAERS Abstracts, FAO Current Bibliography, IRAT Index Cards, as sources for current and retrospective documents and 365 documents were selected. During the same period, the Indexer and the Photographer visited the Libraries of the Suakoko station on August 17, 1973, Cuttington College on September 7, 1973, the University of Liberia Farm on September 24, 1973 and finally the University of Liberia on September 28, 1973. Documents were borrowed from these Institutions for microfilming and indexing as well as important periodicals selected for the use of WARDA experts. The Documentalist left on July 11, 1973. The Indexer worked alone between July 1973 and January 1974, on the indexing of 180 documents and the establishment of the WARDA method of cataloguing and indexing. The recorded data were sent to FAO-DC, Rome for correction and comments. While the correction was going on at Rome, the indexer went on leave on February 5 and resumed duty on March 6, 1974.

Another set of 185 units of current documents were selected, catalogued and indexed as from April 1974, according to the suggestions of FAO which earlier approved the method used. The new Documentalist arrived on April 21, 1974. The inventory of the library was started and publishing of the first index was planned.

Considerable time was spent for printing the vocabulary and program tapes given to WARDA by OMVS Documentation Centre. Three visits were made to BMC Computer Centre by the Data Processing Expert, the Indexer and the Documentalist. Several visits were also made to the Computer Services Bureau, Public Utilities Authority (PUA) and the Ministry of Planning in Monrovia, Liberia,

to try to get the tapes copied and printed because the BMC could not initially print those tapes for technical reasons.

The tapes have since been copied at the Ministry of Planning, Monrovia and printed on BMC computer. The print-outs of the vocabulary and the program are now available together with copies of the tapes. Also the processing of 245 units of current bibliography was delayed due to lack of FAO Multilingual Vocabulary tape and final approval of the contract with Bong Mine for the use of the computer. A bibliographical list of WARDA documents was typed in view of the Rice Research Review Meeting. Finally, the contract with Bong Mine was approved by FAO and the first Index was ready for the Governing Council in November 1974.

The first issue of the "World Rice References" including 200 references on rice of special interest for West Africa was published at the end of December, 1974 only, due to the overload of work in the Communication Division which was in charge of the layout of the publication.

The documentalist visited the OMVS Documentation Centre between the 16th and 20th December, 1974 to collect new documents and get acquainted with the developments of the OMVS indexing method.

VII. STATISTICS AND DATA PROCESSING DIVISION

On July 15, 1973, the Associate Expert for the Data Processing Unit, Mr. Sachers, arrived in Monrovia and resumed duty. In view of the need to up-date the FAO Inventory Mission Report on Rice Cultivation in West Africa (Bonetti/Warnod Report of 1970), meetings were held on the necessary data requirements with the Development and Research Departments and the Executive Secretariat. A questionnaire for a Rice Production Survey in the WARDA Region was therefore designed. Details carried by the questionnaire included many aspects of the rice economy such as production, consumption, imports of rice, prices, rice milling, use of modern outputs and agricultural external trade. Returns were not made by many member countries in good time and missions had to be undertaken to collect the data. The Data Processing Associate (DPA) therefore visited The Gambia, Sierra Leone, Ghana, Nigeria and the Ministry of Agriculture in Liberia between October and November, 1973. These visits enabled contacts with appropriate officers in the WARDA member countries for effective data collection. Another round of visits was made to the francophone member countries also for data collection on rice production and economy.

~~Assistance of the FAO Rice Trade Training and Unit was received in connection with the statistical data on the rice situation on the World market. This formed the basis for the material used in the Rice Review Report presented by the Executive Secretary to the Governing Council in Abidjan, Ivory Coast in December, 1973.~~

In January, 1974, the DPU cooperated with the Development Department in the preparation of an outline for a Regional Model for self-sufficiency in rice. It

supplied data on financial and non-financial requirements needed to achieve this set objective by 1980.

The Data Processing Expert, Mr. Gerard, resumed duty in February, 1974. During the Project Managers' Meeting of February, 1974, a list of on-going rice projects in the region and those planned for execution between 1974 and 1980, was compiled. Information on 23 rice projects in 11 WARDA countries was collected. More information on Rice Development Project Surveys in the WARDA Region have however been collected only through the time and money consuming procedure of visits to member countries. One of such missions for an intensive data collection on rice production and rice development project survey was undertaken to Senegal, Mali, and Mauritania. On the basis of all the information assembled, a brochure on "Rice in West Africa" is being prepared.

In March 1974, a start was made on the processing of the grain yield results of 73 coordinated trials carried out during the main season of 1973 by the Research Department of WARDA. The analyses were carried out on the Bong Mine computer IBM 360-64K for the statistical analysis of randomized complete blocks. A computer programme was written on PL 1.

During October and November 1974 the Division completed the first draft of an Annual Rice Statistics which was submitted to the Governing Council at Ibadan in December 1974. The draft was thereafter sent to member countries for corrections and comments.

- The coordinated trials of 1973/74 dry season were analyzed, processed and transmitted to the Research Department in February 1974.

- In the same way, processing of the coordinated trials of the 1974-1975 main season, for the Research Department, was achieved on April 1975 when the print-out was released; the programme-package of this work is now complete and presented in its final form.

In November 1974, the FAO programmes on documentation data processing were completed and tested on the Bong Mine computer. This permitted the release of the first Index of Current Bibliography.

- At the end of January the Division finished the data processing of the yield census carried out by office du Niger, Mali, during the season 1973-1974.

VIII. COMMUNICATIONS DIVISION

The Communications Division was created in September 1974, out of the former Editing and Translating Unit of the Documentation, Data Processing, Editing and Translation Division. Its main activities have been carried out in the fields of translation, printing of publications and public relations.

The Division handles the translation into French or English of all documents prepared by the Secretariat and the staff of the Association. It also designs the layout of documents, arrange their printing and distribution. The workload has been very heavy and it has been possible to execute the projects effectively only with the assistance of temporarily hired external translators just before, during and after the Association's meetings and seminars. The workload of the Division had increased considerably in 1974 in view of staff increase in other Departments and Divisions of the Association on the one hand and the increase in the number of publications by the Association.

Translation activities dealt primarily with the documents of the Project Managers Meeting, of the Seminar on Socio-Economic Aspects of rice cultivation, the Annual Research Review Meeting, the WARDA Research Report and of the documents of the November/December 1974 Ibadan Meetings. Work also included the translation, the layout and the printing of the Annual Rice Statistics, of the first Index and of the World Rice References.

The regular publications of the Association include the following:

- (i) WARDA: What it is, what it does, how it works - a concise brochure which is reviewed annually in June.

- (ii) WARDA Newsletter - published quarterly in March, June, September and December.
- (iii) Annual Report: To be published every December.
- (iv) Annual Research Report.
- (v) Rice Research in West Africa.
- (vi) Rice Statistics: Every September/October.
- (vii) World Rice Reference for West Africa - Quarterly.

Others include Proceedings of Seminars, reports of Meetings and Special Project. Some of these are listed below:

- (i) Rapport de la mission d'etude sur la formulation d'un programme national de recherche rizicole en Mauritanie, May 1975.
- (ii) Dahomey, Dome-Go Ahlan Project, Identification Mission, February 1974.
- (iii) Rice in West Africa, March 1974.
- (iv) WARDA Seminar Proceedings No.1: Rice Breeding and Varietal Improvement, May 1974.
- (v) Identification Mission Report-Prospective Study for Development of Rice Cultivation at Office du Niger, Mali, June 1974.
- (vi) Annual Research Report of WARDA, July 1974.
- (vii) WARDA Publications (January 1973/April 1974), August 1974.
- (viii) Cataloguing and Indexing Method at WARDA Documentation Centre, October 1974.
- (ix) Current Bibliography No.1, November 1974.
- (x) Annual Rice Statistics (Draft), November 1974.
- (xi) World Rice References for West Africa No.1, December 1974.

As far as Public Relations activities are concerned, the Division assisted in preparing a series of histograms for a slide show, on the occasion of the visit to WARDA by the President of the Republic of Liberia, and in organizing a "Field Day" at Richard Toll, Senegal, which was attended by the Minister for Rural Development, His Excellency Mr. A. Senghor, numerous high government officials, members of the diplomatic corps and the press.

IX. TRAINING

WARDA's training programmes are essential in order to quickly and fully convert accumulated research findings into rice production. Because of the bilingual nature of WARDA member countries, all courses are given in French and English. This implies translation of Training Manuals and lecture notes, and simultaneous interpretation of all lectures.

A. Rice Production Specialist Course

This is a six month course designed to produce rice production specialists who are to return to member countries to organize, manage and conduct training courses for extension workers who in turn will assist rice farmers to increase their yield.

The long training period will allow adequate emphasis on all aspects of rice cultivation and processing as practised at the farm level. The trainees are expected to acquire knowledge of both production techniques and extension methods. Trainees are expected to possess a B.Sc. in Agriculture or a Diploma in Agriculture plus five years post qualification experience in rice production.

The 1973 course was financed jointly by USAID and Ford Foundation. It started on June 1, 1973 at the IITA, Ibadan and ended on November 10, 1973. The course was attended by 23 trainees from Senegal (2), Nigeria (3), Mali (3), Dahomey (2), Ghana (2), Sierra Leone (3), Liberia (2), Niger (1), Togo (2), Mauritania (2) and Ivory Coast (1). There were no trainees from The Gambia. Three people, namely Mr. D.V. Castro (Training Coordinator from the Philippines), Mr. E.J. Findley (Training

Associate from Liberia) and Dr. Adama Ouattara (Training Associate from Mali), were recruited to supplement the training staff of the IITA headed by Dr. H. Reeves. The three gentlemen did an excellent job.

The Director of the IITA and his staff, particularly Dr. W.H. Reeves, Head of Training, showed a great deal of enthusiasm during the course and gave WARDA and the trainees maximum cooperation. Despite initial problems, the course was a huge success judging from the performance of the trainees, the vigour and performance of the rice in the field and the comments of visitors at the Field Day on October 13, 1973. The rice crops were also reported to be the best ever grown in the history of the IITA.

Although the course was designed to emphasize practical training, some trainees would want the formal theoretical aspect reduced. Trainees were also unable to pay visits to Mopti (to study the constraints of floating rice cultivation) and to Rokupr (to study problems of growing rice in mangrove soils) as originally proposed in view of the rather high cost of air tickets, hotel accommodation and per diem payments to trainees and interpreters. Moreover as the trip was to cover only seven to ten days at a cost of \$15,450 to \$18,250, it was considered not worthy of such a large financial investment. Instead, a rice specialist was invited each from Mali and Sierra Leone to give illustrated lectures on Floating and Mangrove rice cultivation respectively.

An evaluation of the programme by the participants after 12 weeks of the course revealed that most trainees were satisfied with the course. Enthusiasm was naturally highest at the beginning of the course and this was maintained for the first eight weeks by most trainees.

All trainees liked the atmosphere at the IITA which they regarded as conducive for study and research. They also felt that the course was well organised and they enjoyed the ease of contact with IITA Scientists for solutions to their problems.

B. Field Assistants Course

This is closely linked with the successful implementation of WARDA's Coordinated Trials. The training of these Field Assistants will ensure standardization of observations and data collection. The first course was held in February 1973 at the University of Liberia Farm, Fendall, Liberia. It was attended by 37 Field Assistants who returned to their various countries in March 1973 to collect data on the 100 Coordinated Trials in progress in member countries. The next course is scheduled for January/February 1975 at the IITA, Ibadan. The Field Assistants are directly supervised by Senior Field Officers of member countries, while overall coordination of the programme is by the WARDA Research Coordinator.

X. SEMINARS

Seminars are regularly organized to tap existing rice knowledge in the region and elsewhere. The first three seminars on Varietal Improvement (with 39 participants), Soils and Fertilizer Use (with 44 participants) and on Plant Protection (attended by 44 participants) held in Monrovia, Liberia, proved helpful in formulating and finalizing arrangements for the Coordinated Trials (W1). They also assisted in further improving on the WARDA Special Research Projects (W2, W3 and W4). The first two were held in January 1973, while the last one was in May 1973. Two other Seminars: The Project Managers Meeting and the Socio-Economic Aspects of Rice Cultivation were held in Monrovia, Liberia, in February and April 1974, respectively. All WARDA Seminars were attended by scientists from all member countries and from IRRI, IITA, IRAT, ILACO (Netherlands), FAO/UNDP, ECA, OAU/STRC, the Quelea Project in Chad, Upper Volta, USA, France, United Kingdom and The Netherlands.

Apart from accepting the entries for the different varietal trials, general guidelines and observations to be recorded were determined during the Seminar on Rice Breeding and Varietal Improvement. The participants at the Seminar resolved:

- a) that every attempt should be made to collect, register and use for hybridization and selection programmes the numerous local varieties of Oryza glaberrima. Seeds collected are to be distributed to institutes within and outside the WARDA region with facilities for long-term storage of seed in a viable condition.
- b) that considering the important effect of agro-climatological factors on the interpretation of

the results of varietal trials, certain meteorological data (on temperature, rainfall, humidity and solar radiation) should be recorded on the sites where varietal trials are conducted.

- c) that for the time being, materials originating from and being circulated among the member countries of WARDA should be subjected to hot water treatment only; the materials thus circulated should bear phytosanitary certificates issued by the respective countries of origin and bear appropriate labels to facilitate their movement within the member countries.
- d) that the materials originating from outside WARDA member states should undergo compulsory treatment at quarantine stations approved by IAPSC and should bear additional declaration wherever necessary.
- e) that considering the quantities of new varieties bred outside the WARDA region and the desirability of introducing them to the WARDA region as rapidly as possible, a strong appeal should be made to IAPSC to increase the quantity of seeds which may be introduced under quarantine regulations to enable their distribution to all WARDA stations within the space of one year.

At the Soil Fertility and Fertilizer Seminar, apart from determining the different rates of fertilizer to be used in the experiments, the following recommendations were adopted:

- a) that a concerted effort be made among other things to study the fertility of the major soils on which rice is grown and assess their potential. Special emphasis should be put on vertisols and

mangrove swamp soils and that these studies be carried out by WARDA with the assistance of the IITA, FAO Regional Office, IRAT, ECA and OAU/STRC.

- b) that the methods of soil description and analysis be standardized on all the WARDA experimental stations. To this end, the Seminar drew up a series of standard procedures which will be adopted.

In May 1973, a seminar on Plant Protection financed by UNDP was held at Monrovia, Liberia, during which the present situations on pests, diseases and weeds of rice were presented and discussed. Plans were also drawn up during the seminar to start with coordinated trials on insect and weed control at suitable locations during the second season of 1973.

Although IRRI scientists were unable to attend the seminar, three stimulating papers on diseases, insects and weeds of rice were presented on their behalf. The meeting proved useful in delineating WARDA's programme for the near future. It also forged close cooperation between the Association and member states on the one hand, and the Association and the International Research Institutes on the other. Three committees were formed to collect and assemble essential information for the publication of a handy field book for identifying diseases, insects, mineral deficiencies and physiological disorders of rice in the field and for preparing a simple flora of the predominant weed species of rice in West Africa. The seminar also passed a resolution requesting WARDA to supplement the facilities at the Regional Plant Quarantine Station at Ibadan rather than build a new Plant Quarantine Centre of its own.

The Project Managers Meeting was attended by the Managers and Co-Managers of rice development projects and officials responsible for rice development policy in West Africa from February 4-8, 1974 in Monrovia, Liberia. The meeting recommended to the Governments of WARDA Member Countries:

- a) to have a clearly defined National Rice Development Policy which should be integrated within a Regional Rice Development Policy with the ultimate aim of self-sufficiency in rice for the region;
- b) to cooperate closely with WARDA in its effort to collect all relevant data in the field of rice consumption, production, processing and marketing and regularly transmit such data to WARDA headquarters.
- c) to coordinate as far as possible National Price policies and to encourage the payment of higher prices to farmers with a view to give them more incentives for rice production;
- d) to encourage the mechanization of rice cultivation to compensate for the lack of manpower by continuing studies on the available equipment with a view to adapt them to the technological level of the farmers and the ecological conditions of West African rice growing areas;
- e) to set up necessary institutions to assist farmers in land clearing and land preparation;
- f) to strengthen the relationship among WARDA member countries with a view to achieve closer cooperation between National Projects and to organize if possible exchange of Personnel, and Project Managers meeting at regular intervals.

- g) to strengthen national research activities in such areas as to support the respective national rice development programmes with requisite technical information;
- h) to invest more in Training Programmes by setting up National Centres for training Extension Agents and technical staff so as to quickly convert research findings into production;
- i) to encourage as a matter of priority the setting up of National Seed Multiplication Centres to produce adequate quantities of certified seed rice for farmers if high yields and increased rice production are to be quickly achieved;
- j) to set up quickly for flooded rice, infrastructures as complete as possible with total water control so as to avoid re-investments which are often very expensive;
- k) to create adequate storage and transport facilities in order to reduce post-harvest rice losses and also to encourage more research into storage and processing of rice;
- l) to appoint as a matter of priority qualified local personnel as Project Managers and to other positions of responsibility where available and to pay them adequate remuneration commensurate with their status and responsibilities as an incentive for efficiency and high productivity. The meeting appeals to Financing Agencies to support the above policy.

The participants at the WARDA Seminar on Socio-Economic Aspects of Rice Cultivation in West Africa held in Monrovia, Liberia, from April 22-25, 1974, considered that for the

assessment of the rice situation in the WARDA member countries and for future economic analysis, it is necessary that a reliable set of data be collected.

In order to allow for comparative analysis between countries, the methodology of data collection and analysis in the different countries must be fairly uniform.

It is therefore proposed that WARDA should device such a uniform system in close consultation with specialists in the member countries. Steps should be taken to generate data using the approved methodology. Data are particularly needed in the areas of labour allocation (inter-crop as well as, farm non-farm allocations, transportation costs), etc.

The participants generally feel that the idea behind the development of a regional planning model for the WARDA countries is a sound one and that the efforts of WARDA in this direction should be continued.

In order to ensure that the model and its results are used by the policy-makers in the individual WARDA countries, it is imperative that WARDA liaise very closely with Government officials and local specialists while the model is being developed. With such a model, it should be possible to assess trade-offs and alternative production and marketing policies within individual WARDA countries as well as between different countries.

The participants recognize that rice processing and storage are crucial elements in rice development in the Region, since inefficiencies and lack of facilities in these areas lead to substantial losses between production and consumption. It is therefore proposed that WARDA should devote a great deal of effort in solving problems of processing and storage.

As far as processing is concerned, studies of the cost/benefit relationships between alternative techniques of parboiling and milling in the different countries are urgently needed.

In the area of rice storage, it is necessary to develop on-farm facilities which will be simple in design and in-expensive, as well as, large scale facilities both of which should be efficient.

The situation in WARDA countries is that rice production is mainly in the hands of small producers. National and regional plans for rice development and marketing should make adequate provision for incentives and facilities needed by the numerous small farmers. Training should be increased and extension intensified.

When planning a rice development programme, it is important to pay due attention to the marketing and credit aspects, as well as to the production aspects. If efforts to increase production directly are not complemented by efficient marketing and credit systems, farmers who respond to the appeal to increase production may be disappointed. It is therefore necessary to identify the elements of the marketing chain and to determine where inefficiencies exist.

In view of the rising prices of inputs, particularly agro-chemicals on the world market, the participants consider that more emphasis should be placed on maximizing returns rather than on maximizing physical production.

The proceedings of the five seminars held in January and May 1973 and February and April 1974 are being compiled. The proceedings of the Rice Breeding and Varietal Improvement Seminar were printed and released in May, 1974. Others will be released in due course.

STAFF LIST

As at 31/12/74

Executive Secretariat

Mr. Jacques Diouf	Executive Secretary
Dr. Lekan Are	Deputy Executive Secretary
Mr. P.G. de Boer	Senior Adviser (FAO/UNDP)
Mr. John Osguthorpe	Project Coordinator (USAID) (to Dec. 1974)
Miss B. Jagne	Bilingual Secretary
Mrs. B. Phillips	Secretary
Mrs. C. Woods	Secretary
Mr. Peter Daniells	Projector Coordinator (USAID)

Research Department

Dr. Harry Will	Research Coordinator (CGIAR)
Mr. Omer Koffi	Soils and Fertilizer Trials Coordinator (CGIAR)
Mr. Francois Faye	Variety Improvement Coordinator (V.I.C.) (CGIAR)
Dr. Everardo Vogel	Entomologist at Rokupr (USAID) (up to September 1974)
Mr. M. Larinde	Seed Superintendent (CGIAR)
Mr. O. Mafolasire	Associate V.I.C. (CGIAR)
Mr. J.N. Bassil	Associate Soil Fertility Specialist at Richard Toll (France)
Mr. J. Dallard	Associate Breeder at Bouake (France).

Development Department

Mr. Djibril Aw	Production Agronomist & Head (FAO/UNDP)
Mr. C.E. Tagoe	Production Agronomist

Development Department (cont'd)

Mr. O.S. Wild	Economist (FAO/UNDP)
Mr. J.G. Vianen	Associate Economist (FAO/ Netherlands)
Mr. W.K. Bach	Land and Water Management Engineer (USAID)
Dr. R.E. Parker	Rice Processing and Storage Engineer (USAID)
Mr. H.P. Rozeboom	Associate Rice Processing and Storage Engineer (FAO/ Netherlands)
Mr. T.P. Sessou	Assistant Rural Engineer (France)
Mrs. J. Sharobim-Fascione	Bilingual Secretary.
Mr. A. Codenzi	Seed Specialist at Richard Toll (France)

Documentation Division

Miss K. Hoppe	Documentalist & Head (FAO/UNDP)
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Mr. P. Gerard	Data Processing Specialist & Head (FAO/UNDP)
Mr. W. Sachers	Data Processing Associate (FAO / West Germany).

Administration and Finance Division

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