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PROGRAMMES OF THE WEST AFRICA
RICE DEVELOPMENT ASSOCIATION^{1/}

by

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INTRODUCTION

The West Africa Rice Development Association is unique among other international organizations in that it is the first agency formed by a group of developing nations for the purpose of increasing the production of a commodity whose rising import, due to increasing consumption, posed a threat to the future balance of payments problems of the member states.

As an illustration of the importance of rice in the member countries, between 1960 and 1964, rice imports into the region were about 276,000 metric tons per year at an average CIF cost of about US\$32.34 million. In 1974 imports rose to 594,000 metric tons at the phenomenal CIF cost of US\$235.17 million, and representing 5.33% of the total value of imports into the region.

While the resources for rice production can be considered immense, with millions of acres of land, on which the only economic crop that can be produced is rice, lying unused, the aim of the Association is not only to increase production through expansion of acreage, but also by improving yields per acre and increasing the rate of recovery of rice from paddy.

Thus apart from financing for land development, which is a scarce resource in the region, WARDA places special emphasis on transfer of improved technology. In fact, WARDA's programmes are based more on this objective.

The Association's programmes are built around three main areas of activity. These are Research, Training and Development.

I. THE WARDA RESEARCH PROGRAMME

The WARDA research programme is highly tilted towards adaptive research while collaborating with the larger international research institutions such as the International Rice Research Institute (IRRI), The International Institute of Tropical

Agriculture (IITA), and the Institute de Recherches d'Agronomie Tropicale (IRAT) in the field of basic research. The programme has evolved from top level discussions with the above three institutions and the Technical Advisory Committee (IAC) to the Consultative Group on International Agricultural Research (CGIAR). It has two principal components, namely, the Coordinated Trials and the Special Research Projects. These will be described later on. However, the aims of the programme, as a whole, are to identify the new technologies, bring them in to the proper locations within the region, test them under local conditions, sieve out those that can be adapted to the local conditions and to train people in the techniques of trials and adoption.

Taking account of the fact that research is a very expensive undertaking requiring highly qualified manpower and technical resources, but knowing that research can be a highly economical undertaking if executed with the objective of getting results that can be used by masses of people in a particular field of endeavour, WARDA's research programmes have been designed to cover the main ecologically distinct rice growing zones in the region which are the mangrove swamps along the coast of West Africa, the rain forest belt where both rainfed and freshwater swamp rice are grown, the major river beds which carry deep flooded and floating rice varieties and the drier northern areas where irrigated rice farming is the only possible method of rice culture.

A. THE COORDINATED TRIALS

The most important research effort of WARDA is in the field of Regional Coordinated Trials with its emphasis on varietal improvement and crop protection. This, in brief, comprises of two seed nurseries, one at Suakoko in Liberia and the other at Richard Toll in Senegal, where promising varieties from the region and from other rice research centres all over the world are grown and observed for their behaviour under West African

conditions. About 90 varieties and lines are presently in the field. Promising varieties are then selected for initial evaluation trials located at 14 different sites throughout the region where highly trained staff are available for selection of promising varieties for the regional coordinated trials at 30 sites. Also included in these trials are herbicides and insecticides trials.

These trials are also backed by a WARDA phytosanitary laboratory at Ibadan, where all introduced varieties are screened for various diseases, and a seed storage and testing laboratory where seeds are stored and treated and tested before supplied to member countries for carrying out the trials.

B. THE SPECIAL RESEARCH PROJECTS

The special Research Projects have been designed to fill the gaps in current rice research with particular emphasis on specific ecological conditions in West Africa. Thus, a special project at Rokupr in Sierra Leone deals with mangrove swamp rice, the special project in Mopti is planned for deep flooded and floating rice and the special project at Richard Toll is to be devoted to irrigated rice under dryland conditions.

C. RESEARCH MANPOWER RESOURCES

The research programme relies on the manpower resources of both secretariat staff and scientists in member countries. As such, all rice research personnel within the region devote part of their time to the Coordinated Trials, the coordination of which is the responsibility of staff stationed at headquarters but making constant visits to trial sites to be sure that the same standards of managements are maintained throughout the region.

The personnel for the special projects have however, to be staff who virtually belong to the Secretariat. Since each special project should have its full complement of Breeder, Soil Chemist or Agronomist, Entomologist, Pathologist and Weed Specialist, it has not been easy to assemble the personnel for all the disciplines even for the on-going projects. WARDA has, however, been able to select and train local research assistants for all the disciplines and these are at post getting the ground work laid before the arrival of the specialists.

D. FINANCIAL RESOURCES FOR RESEARCH

Thanks to our many sponsors and donors, such as the many countries which contribute to the CGIAR our coordinated trials have been successfully funded since 1973. The U.S. through USAID, the United Kingdom, the French and the Canadian Governments have either been funding or have pledged fund for our special research projects. Our financial resources for agronomic research are therefore healthy for the short and medium term.

E. PROBLEMS OF RESEARCH

WARDA's experiences over the last few years shows that there is usually a long time lag between identifying the project and getting it implemented. First the project has to be sold to one or two of our donor countries. This means preparing it in a form acceptable to the country. If rejected by one but appeals to another, the project has to be redesigned according to the requirement of that other country. This process of designing and redesigning may take years.

Even after acceptance by a country or agency it takes time to find the right scientist who will accept this job. Within the last 15 to 20 years the living conditions between developed and developing countries has widened so much that few really good scientists are willing to stay and work in some parts of the developing world.

Thus after the time consumed in identifying the projects, time is required to bring the project to fruition within its desired location. Also required is time enough for testing technology to find whether it suits specific locations. This of necessity, has not to be rushed since permanent adaptability to both ecological and socio-economic conditions has to be assured. Lastly, technology is useless in an environment where no trained personnel exist to make efficient use of it. And hence training becomes imperative.

II. THE WARDA TRAINING PROGRAMME

A. GENERAL

WARDA's training programme tries to cover as many aspects of the rice industry as possible. However, the most important training programme is what we like to call the Training of the Trainers programme. This is a six months course held every year to train graduate and diploma level staff who are involved in the rice industry. The participants go through a complete production cycle starting from land preparation to harvesting and processing. Apart from getting participants to know as much as possible about the rice crop and the recent advances in its production, the course emphasizes communication and transfer of knowledge techniques. The latter emphasis is

necessary if the multiplying effect required is to be achieved.

Another course offered annually is that for lower level technical staff who have to carry out the day to day operations on the WARDA trial sites. These technicians have to be brought in each year for six weeks to exchange views on their work and to be taught specialized aspects of running trials and taking observations.

Special courses are sandwiched in between these two regular courses. These may be on water management, mechanization, project management, rice post-harvest processing technology, etc.

B. MANPOWER RESOURCES FOR TRAINING

Although the training programme is geared mainly to the rice industry it can be seen from above that it covers all of the fields of the industry. We have therefore adopted the most economic means for the use of manpower. The training centre has a core of two permanent lectures together with the Director who also takes part in the training programme. We have sited the centre near our headquarters from where we can draw on the various specialists there for specific courses and we bring in guest lecturers from all over the region. Donors financing special courses also send in their selected lecturers.

C. FINANCIAL RESOURCES FOR TRAINING

The training programme is basically financed by the US Government through USAID. The CGIAR finances our training of research assistants while for specialised courses we have been able to find countries like The Netherlands and Switzerland willing to sponsor some of them. We have found many countries and institutions willing to support a good training programme held within the local environment, and it is our hope that this willingness will continue.

D. PROBLEMS OF TRAINING

As a bilingual organisation, the Association carries some of the problems of international gatherings such as translation of all training material into the two official languages, simultaneous translation of lectures and discussions and the problem of having to group practical courses on language basis. These problems will remain for ever. But there are other problems which the Association regards as teething problems of a newly established institution and which should be solved in the course of time.

III. THE WARDA DEVELOPMENT PROGRAMME

It was not until WARDA started looking more closely at the rice industry did member countries become aware of the immense post harvest losses they suffer as a result of inefficient processing of harvested crops of the by-products in the industry.

Before putting forward the Association's views on what has to be done in the field of processing, it is necessary to give a short description of its work in the field of development since, in effect, it is a development agency and all its efforts in research and training are directed towards the ultimate goal of development.

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Infact it is through its development efforts that the magnitude of post harvest losses in the region was discovered and it will be through that effort that the Association hopes to attack the problem.

A. GENERAL

A multidisciplinary team, made up of agronomists, economists and financing experts, rural and irrigation engineers, rice storage and processing experts, statisticians and data processors, is at headquarters and at the disposal of member countries and financing institutions for consultancy services and project identification, preparation, appraisal and supervision. They are also charged with fact finding and with what, for the lack of a better phrase, I would like to call intelligence work. This latter task calls for detailed study of the industry in member countries to ferret out problems and constraints, analyse these and to make recommendations for corrective action. In this task they have to find out exactly what is happening in the fields and in the processing centres.

Needless to say that they have come out with a number of recommendations to a number of member countries. But every now and again the implementation of these recommendations pose problems in themselves which may be due to the member countries' lack of either the will or the human and financial resources for carrying them out.

B. STAFFING AND FINANCING OF THE DEVELOPMENT DEPARTMENT

The Development activities of WARDA, like those of Research and Training, are supported by external agencies. Initially the UNDP, through FAO (two agencies which, together with USAID, were very actively involved in the establishment of the Association) was to take the greatest share of the WARDA development programme. However, the present and future overall position is that bilateral agencies now contribute and may continue to contribute more than UNDP.

UNDP assistance is now mainly in kind and consists of a Senior Advisor and team leader, two agronomists, a rice processing specialist, a translator and a documentalist. The prospects are that, next year, this is to be further cut down drastically.

French assistance, which is in the form of both personnel and cash, has supported a rural engineer, his assistant, a draftsman and all the supporting administrative and material support required for the efficient performance of work in this area of development. It has also provided for a statistician and a calculator as well as the necessary equipment for a functioning statistical office. Last but not least, French assistance has completely supported our seed multiplication programme with technical management personnel, land development costs, machinery and equipment as well as all operating costs.

The USAID has just agreed to one senior economist (a post dropped by UNDP) as well as two junior economists while the Swiss Government is supporting us with a financing specialist.

The Netherlands has provided an associate rice processing expert for sometime now and she intends to fill in the post of associate economist which it did until the end of 1975.

For the work in hand, it is obvious that our manpower and financial resources in development has to be strengthened and many bilateral agencies are becoming more interested in helping the Association in its development activities, and it is hoped that they will not only fill in gaps left by UNDP but would be interested in strengthening them by providing staff and material support for those aspects of development which are being discovered as vital to the rice industry of the region.

Examples of those are small scale irrigation projects along the main rivers of the region and improvement in rice post-production technology.

3. PROBLEMS OF DEVELOPMENT

The will to carry out projects often needs political backing but very often it is not the fault of the politics of the member countries but the personality problems involved in any administration, whether in a developed or developing country. WARDA like UNIDO or any other international agency has no influence on these. However, after three years experience in trying to influence development, WARDA has realised that it should use its favourable position as an agency established by the member countries themselves to take certain actions which other international agencies may find delicate to handle. Fortunately most member countries realise that WARDA is their own organisation and as such they can be more tolerant and cooperative.

This does not mean that WARDA would like to step on the toes of the various administrative establishments in member countries. Rather it means that WARDA would want to make it clear to member countries that they pay to get the Association running and, therefore, have to make the fullest use of it. The Development Department has therefore been asked to carry out more fact finding missions and to prod member countries into concrete actions.

IV. RICE POST-HARVEST TECHNOLOGY

WARDA is very much aware of the considerable losses resulting from the rice post production processing practices as practiced in the Region. This refers to harvesting, threshing, winnowing, storage, parboiling, drying and milling. As such the Association considers it as obligation to do everything possible to reduce these losses.

In close cooperation with specialists of the Food and Agricultural Organisation of the United Nations, a programme of work was drafted by the Development Department of WARDA and approved. Its aim was to survey and analyse the situation and to make recommendations for improvements. These recommendations should lead to the reduction of losses and, simultaneously, to a better quality of milled rice.

A. INVENTORY SURVEY

In support of these objectives an extensive inventory survey on applied rice post harvest processing methods was recently conducted in the 13 member countries of the Association namely in Mauritania, Senegal, The Gambia, Sierra Leone, Liberia Ivory Coast, Ghana, Togo, Benin, Nigeria, Niger, Upper Volta and Mali.

By standardising the reporting system for each country report it will be possible to produce regional subject matter reports giving detailed information on the different post production practices in:

- harvesting
- threshing and winnowing
- drying
- storage
- pest control
- parboiling
- milling and
- by-product utilization.

The completed survey also produced very detailed information about the processing methods applied and on all installed equipment as well as those just about to be obtained and installed. It has been possible, simultaneously, to determine deficiencies in the processing industry and, to a large extent, to identify responsible sources of quantitative and qualitative losses in the processing operation.

A number of these problems are associated with:

- insufficient awareness of the industry of the important relation between quality conservation measures in the field, in drying and in storage as they relate to the final performance results in milling. This leads to considerable losses and quality deterioration of the milled rice
- insufficient knowledge of available processing equipment capable of better performance
- the installation of equipment not properly suited for the job to be done
- limited knowledge of the operation and maintenance of the equipment in use
- restrictions of imports and consequent limited availability of urgently required maintenance parts
- too high prices for maintenance parts resulting in inability of the industry to buy all needed parts and leading to deterioration of equipment
- the absence of training institutions
- the lack of awareness of the possible uses of valuable rice mill by-products
- the decentralized nature of the processing industry throughout the region with the exception of the Ivory Coast
- the importance of the role of villages in the conversion of

paddy into milled rice for subsistence
traditional influences on processing methods.

B. DEVELOPMENT OBJECTIVES

Having been able to identify the problems, WARDA now can play an active role in the introduction of better processing methods in its member countries. In this respect, extensive use is to be made of the available knowledge and experience of the FAO Secretariat in Rome, other existing national and international research institutions and expertise acquired by the WARDA/FAO Specialist during previous assignments in West and East Africa, in the Far East and in Asia.

By carefully taking into consideration the socio-economic aspects of the rice industry in the different member countries it is WARDA's intention to apply improved technology in a manner which can attract a wide degree of response. These development activities will be concerned with rice post harvest technology at all levels of processing and will take into account the manual processing methods used at farm and village levels, the small scale mechanical processing methods at the village and town levels as well as the commercial processing of paddy at rice mill centres.

14.5 The inventory survey was completed this year and as such it is only now that the analyses of the overall processing position in the region is being carried out. Consequently although WARDA has been giving support to the processing industry since 1973 through consultancy programme, it is only now that an overall approach has been initiated.

C. MAIN FIELDS OF DEVELOPMENT ACTION

1. Support to the Industry

This involves a direct support to the industry in the form of advice and recommendations and by WARDA's involvement with international agencies such as IBRD, ADB, FAO Investment Centre or with bilateral agencies in project evaluation and supervision of projects which involve rice production and processing. It is also intended, in 1977, to start the preparation and distribution of selected technical bulletins dealing with specific processing problems and their solutions. In addition WARDA will continue to investigate the state of the industry in member countries whenever necessary and possible by studying unidentified problem areas and making recommendations.

2. Training

The surveys conducted throughout the member countries made it clear that progress in the processing industry very much depends on proper training of engineers and technicians involved in the application of processing technology. In view of the absence in the region of any training facilities dealing with rice-post harvest technology, WARDA decided to organise regional training courses on rice post harvest technology.

The first six-weeks regional training course will be conducted in March-April 1977 and will be supported through bilateral aid programmes. Extensive use will be made of available training material previously produced by FAO/WARDA Specialist for similar training activities in the Far East, and guest lecturers will also be available from the Tropical Products Institute of the UK and other countries.

The training programme will include a wide range of related workshop activities and for that purpose a large rice processing laboratory for group training and applied research has been constructed near Monrovia and machinery and equipment are in the process of installation.

3. Research

The rice processing laboratory is large enough to allow the installation of specific equipment which will enable WARDA to conduct research activities in support of its coordinated variety trials and seed multiplication programmes. It will also help the activities of the Processing Division in its investigations into certain aspects of the rice post harvest processing industry.

4. Utilization of By-Products

A characteristic of the processing industry in the region as mentioned above, is the very large number of small village-type mills and the limited number of medium size commercial mills. During the 1976 survey it was observed that most of this bran, particularly that produced by the village-type mills, was considered as waste and not utilized.

This observation led to immediate initiatives by WARDA and in cooperation with the University of The Philippines in Los Banos and the Food and Agricultural Organization of the United Nations in Rome, work has started on the compilation of data on the nutritional aspects of bran and its utilization prospects.

The objective is to produce a WARDA bulletin on bran utilization in the form of a component of feed for poultry, pigs or cattle and taking into account the components of other feed mixtures available in the different member countries. In this respect, WARDA has the fullest support of animal husbandary specialists at FAO in Rome who are supplying some additional data and who will help in editing the WARDA draft document before printing and distribution.

The extraction of rice oil from bran can only be considered for large capacity rice mills and these do not exist in the region. The only country with well organized centralized milling facilities is the Ivory Coast where most of the processing is concentrated at 12 sites throughout the country.

The individual processing centres are, however, too small to justify extraction facilities. The alternative is to stabilize the bran at the site of production (in order to stop the increase in Free Fatty Acids) and transport the bran to a central bran-oil extraction plant sited where the de-fatted bran can be taken over by an animal feed production plant.

This possibility was discussed with SODERIZ (the agency for rice development in Ivory Coast) in Abidjan and it was found that the SODERIZ specialists were well aware of it and were already evaluating the feasibility of implementation in cooperation with manufacturing industries in Europe.

The UNIDO project DTT-8/76 "Research of the Development of a Rice Bran Stabilizing Unit" specifically deals with the development of small scale simple and low cost bran stabilizing equipment for use in developing countries which can be easily attached to small and medium scale rice mills. Such equipment will indeed help in the conservation of the quality of the bran so as to enhance its marketability. In a stabilized state, it can be kept over a longer period, and thus lend itself to collection, storage and transportation over longer distances either for direct feeding to stock or for oil extraction before use in stock feeds.

Rice bran oil, after neutralization, bleaching and deodorization in a refinery plant can be converted into an excellent edible oil, while the de-fatted bran can be absorbed in the animal feed industry in developing countries or be exported. In support of this interesting UNIDO project WARDA could:

- Summarize the situation in the WARDA region regarding bran production and bran utilization
- Collect samples, carry out physical analyses on them in its processing laboratory and the chemical analyses carried out in cooperation with existing research and other laboratory institutions in the region

- Conduct a study on the possible implementation of bran stabilization in the region, taking into consideration the socio-economic situations, the prospects for bran-oil extraction and for utilization of by-products for animal feed production in each member state.
- Conduct tests on a bran stabilization pilot plant designed and made as a result of this UNIDO project.

WARDA has specific interest in this UNIDO project and would like to be involved in all the project phases in support of our main objective to produce more food for human consumption, to reduce losses in food production and to improve its overall quality.

The effective utilisation of by-products from the rice processing industry as mentioned above will definitely contribute towards achievements of these WARDA objectives.

v.

Summary

In the field of rice post-harvest processing technology in the region we are concerned about the method applied, the identified and recorded problems and the possible solutions. The step by step approach can be summarized as follows:

a) Identification

Through the rice processing inventory survey WARDA now has a clear picture of the processing methods practised in the region, as well as specific data on installed equipment in the region. Simultaneously it has been possible to identify the problem areas and to obtain the basic data needed for correction and improvement of the situation.

b) Determination of Technology Sources

Fortunately, rice post harvest technology has been the subject of intensive studies at national and international research institutions and, through a wide range of UNDP sponsored projects throughout the world, data are available on applied techniques which lead to improvements in performance. The manufacturing industry, through laboratory research, field experience and in frequent cooperation with research agencies has responded favourably to established needs and has adjusted equipment design, or designed new machines to meet specific objectives. This makes it possible to select the right equipment and to

c) Bring the required technology to the Region

Conditions in the region can be similar to the prevailing condition in the traditional rice producing countries elsewhere in the world. However, there are certain rice post-harvest processing conditions that are unique to the region and require careful consideration before available technology can be applied. For instance, a considerable quantity of paddy in West Africa is harvested under overdry conditions and processing of paddy at very low moisture content leads to considerable recovery losses and quality deterioration. This is a unique problem. In addition the acceptability of better processing techniques which deviate considerably from traditional methods needs to be evaluated. This makes it necessary to

d) Test new technology under local conditions

Here, the approach differs from case to case. It is possible, through comparative tests, to prove the advantages of recommended equipment. The performance data thus gathered can be used to justify specific recommendations.

WARDA will conduct such a series of tests on milling at village level under the 1977 programme of work of the Development Department. Another method that can be used is that in which the principles for the solution of a specific technical problem has been determined. In that event the principle will be first tested through a laboratory research programme and, based on the results, the principles will be tested at the industrial level before recommendations are formulated.

WARDA in 1977, will follow these procedures when studying recommendations for storage treatment of over-dry paddy before milling in the hope that it will lead to improved recovery rates and improved milled rice quality.

e) Adaptation of Technology.

The results of these studies could lead to immediate implementation of the recommended processes or to the need for further adaptation. In the process of adaptation, the test results will be fed back to the cooperating source of technology; the objective of this is that the design of the equipment or process shall be modified to suit the specific local environment.

f) Adoption

Based on experience, test results, research findings and successful adaptation, recommendations will be formulated and made available to WARDA member countries. This, however, may not be enough and wherever possible, WARDA will play an important role in assisting member countries with the implementation of the recommendations. Often the process may be readily adopted because of lack of training in the use of it and hence there is a need for

g) Training

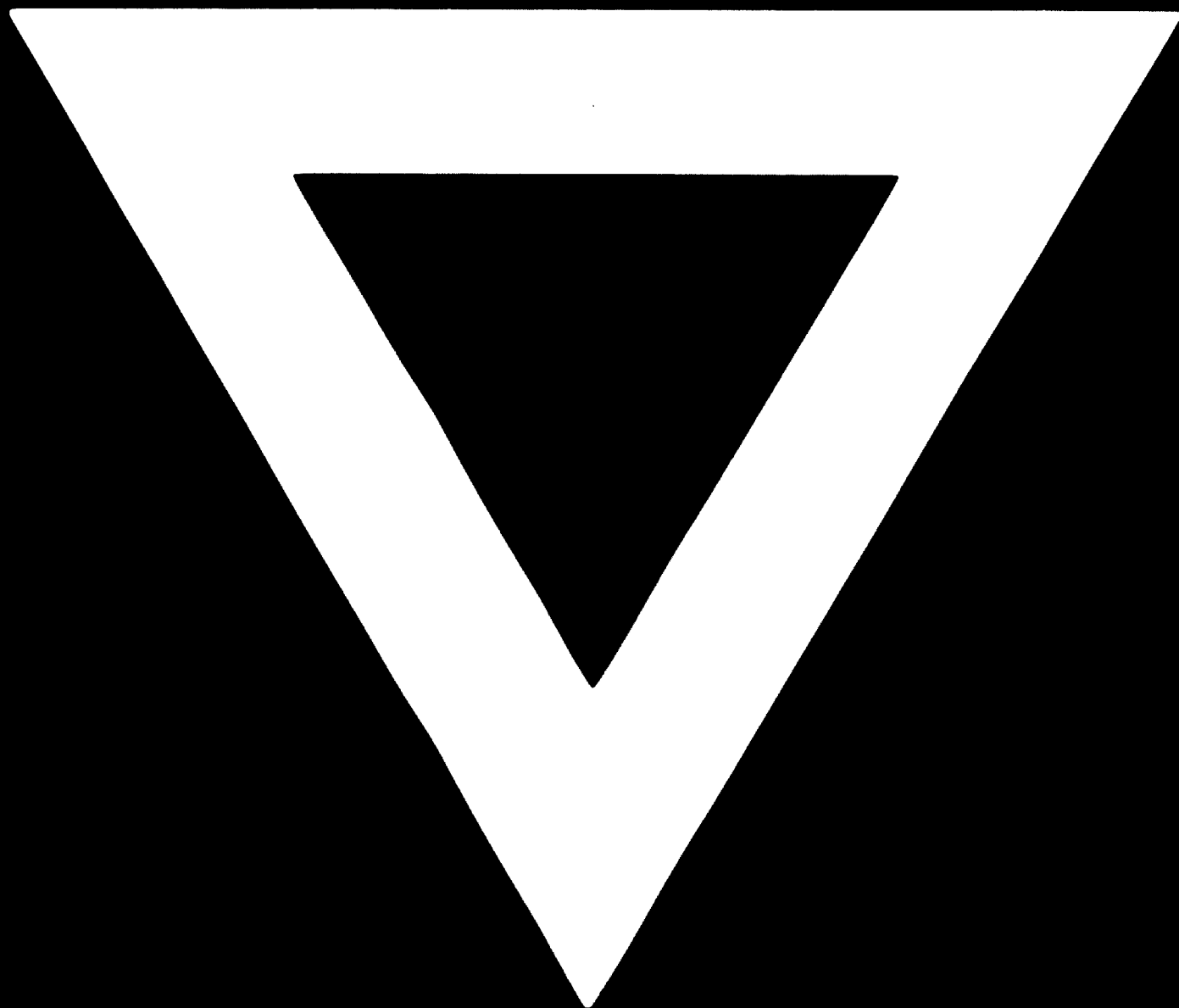
Although some training is carried out in member countries on request, most of the training activities of WARDA will be of regional nature and carried out at its regional training centre in Liberia. This training will be practical in nature and will emphasize rice post-harvest processing technology, identification of processing problems and possible solutions. It will stress on prevailing situations in the region and will be supported by workshop exercises on all aspects of processing. The first regional six weeks training course on rice post-harvest, processing technology will be conducted in March-April, 1977. It is necessary to state also that post-harvest technology is included as a minor subject in rice production training courses and in special courses for extension specialists in order to make the trainees aware of the fact that processing results are very much related to the quality of the paddy from the field.

h) Financing

WARDA has so far managed to supplement the UNDP/FAO programme in post-harvest technology from its own resources. However there is a limit to which a young organization, made up of developing countries, can support all its programmes, however urgent they are. The deficiencies in post-harvest technology in the region are so many that it will not be an easy task to introduce corrective technology. In this respect WARDA will welcome any financial assistance from any organization interested in helping to solve these problems. WARDA will be glad to negotiate the terms for this financial assistance.



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