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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

CERTIFIED A TRUE COPY THIS
26 DAY OF Feb. 1975
BY E. L. Amis

DEC 31 1974

Dr. Nyle Brady
Director
The International Rice Research Institute
P. O. Box 583
Los Banos, Laguna, Philippines

Subject: Grant No. AID/ta-G-1179
PIO/T No. 931-11-130-826-
73-3158609

Dear Dr. Brady:

Pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the Agency for International Development (hereinafter referred to as "A.I.D." and/or "the Grantor"), hereby grants to the International Rice Research Institute (hereinafter referred to as "IRRI" or "Grantee") the sum of One Million Nine Hundred Twenty Five Thousand ($1,925,000) in support of your program in Calendar Year 1975 to strengthen the worldwide network of international and national institutions engaged in rice research, consulting, extension and training activities.

The funds being contributed under this grant, along with contributions from other specified donors, will enable IRRI to meet as its broad objectives the enhancement of the world's capacity to meet goals of increased output and increased efficiency in the production of rice in developing countries.

This grant is effective as of the date of this letter and shall continue in effect through December 31, 1975. Funds granted hereunder shall apply to specified costs incurred during the period January 1, 1975 through December 31, 1975.

Funds provided by this grant are to be used exclusively in support of IRRI's core budget which is set forth as part of the total Calendar Year 1975 operating budget, attached hereto and made a part hereof. These funds represent A.I.D.'s commitmen to support the Grantee in an amount which represents up to 25% of IRRI's combined capital and core budget for Calendar Year 1975

This grant is made on condition that IRRI shall carry out the activities as are more fully described in the Program Descrip tion (Attachment I) and shall administer the funds in accordance with the aforementioned Budget (Attachment II) and the Terms and Conditions hereof (Attachment III).

Please sign the Statement of Assurance of Compliance and the original and all copies of this letter in the space provided below to acknowledge your understanding of the conditions under which these funds have been granted.

The Statement of Assurance of Compliance (one copy only) and the original and five copies of this letter and accompanying

attachments are to be returned to my office.

You may retain two copies of the letter with attachments.

Sincerely yours,

for V. C. Perelli
Grant Officer
Technical Assistance Branch
Contract Operations Division
Office of Contract Management

Attachments:

Statement of Assurance of Compliance

I. Program Description
II. Budget
III. Terms and Conditions (including Appendix "A")

ACKNOWLEDGED:

THE INTERNATIONAL RICE RESEARCH INSTITUTE

BY: N C Brady

PRINTED NAME: N.C. Brady

TITLE: Director

DATE: 12/31/74

The International Rice Research Institute (IRRI)

Program Description

January 1, 1975 through December 1975

The overall objective of this Grant is to strengthen the worldwide network of international and national institutions engaged in rice research, consulting, extension and training activities.

The International Rice Research Institute (IRRI) has as its broad objectives the enhancement of the world's capacity to meet goals of increased output and increased efficiency in the production of rice and associated crops in developing countries. IRRI is one of the eight international centers supported by the Consultative Group (CG) on Internationa Agricultural Research. The U.S. is a donor member of the CG and through AID is committed to provide up to 25% of the combined core and capital budgets of IRRI.

IRRI achieves its objectives through research and training programs aimed at helping rice farmers produce more food. Most of the effort is devoted to rice, both that grown under lowland (paddy) and upland conditions. The systems in which rice is grown are receiving attention through a comprehensive multi-disciplinary program with research locations in different agro-climatic regions of South and Southeast Asia.

The two major components of the research and training (R & T) program at IRRI are: (a) rice production and (b) cropping systems in which rice is grown. Each of these programs requires interdisciplinary research and training efforts at the IRRI headquarters in the Philippines as well as coordination with cooperative national research and training

programs in rice-producing nations.

Rice-production focus in 1975 will account for 75% of the R & T program while cropping systems will utilize 25%. The following major research and training programs are included.

A. The IRRI Program

IRRI programs concentrate on these activities:

1. Genetic Evaluation and Utilization of Rice
2. Control and Management of Rice Pests
3. Irrigation Water Management
4. Soil and Crop Management for Rice
5. Environment and its effects on Rice
6. Agro-Economic Network (Constraints)
7. Increasing Rice Yield Potentials
8. Cropping Systems
9. Machinery Development
10. Post Harvest Management of Rice
11. Research - Related Formal Training
12. Outreach Program (International Activities)

B. Specific Objectives

(1) Genetic Evaluation and Utilization of Rice:

The primary goals of this interdisciplinary program are to systematically evaluate the abilities of different rice strains to resist or tolerate natural enemies, and, through selective breeding, to incorporate into new rice varieties as many as possible of these favorable genetic characteristics, i.e., high yields, resistance to diseases and pests, high levels of protein, and others. Most of the screening to identify such favorable characteristics is done at the IRRI headquarters. Samples of promising genetic materials are then furnished to cooperators to use in their national breeding programs.

The development of high-yielding, fertilizer-responsive varieties is one of IRRI's most important contributions. There is great potential for further exploitation of the genetic resources of the rice plant with

an ultimate goal of developing varieties that are resistant to insects and diseases; that will tolerate drought, adverse soil conditions, deep water, and cold weather; and that contain a higher protein content than present varieties. The 30,000 samples in the IRRI germ plasm bank must be thoroughly characterized to determine which of the many lines and varieties carry the desired characteristics to be bred into practical farm varieties. Once characterized, this breeding materials must be included not only in IRRI's genetic improvement program but also in national rice research programs throughout the world.

To capitalize on the initial successes at IRRI, an institute-wide "genetic evaluation and utilization" (GEU) program has been developed. Teams of scientists in each of the major problem areas will thoroughly explore the genetic potential of the rice plant to resist or tolerate its enemies and adverse ecological conditions. This systematized approach will not require an increase in supporting personnel and operation funds.

Other countries contribute to this program and benefit from it; 4,000 new accessions drawn from cooperating countries were added to the IRRI germ plasm bank in 1973. More than 8,000 samples were sent from the IRRI germ plasm bank to cooperators for use in country rice improvement programs. Likewise, about 6,000 samples of promising new genetic materials developed at IRRI were shared with cooperators throughout the rice-growing world. The international testing program gathered momentum, being patterned after the rice blast nurseries which have been in operation for 11 years.

(2) Control and Management of Rice Pests:

Cultural, biological, and chemical means are used in this program to manage insect, disease, and weed pests of the rice plant. Special attention is given to the field evaluation of low cost control and management techniques. IRRI continued its search for genetic resistance to economically important insects and diseases. A new variety, IR26, was released. IR26 is at least moderately resistant to six of the major insects and diseases, including the brown planthopper, which is causing severe crop losses in parts of the Philippines and India. It is the first of a series of lines which have multiple disease and insect resistance and which may be candidates for release as varieties. The marked strides in genetic improvement are illustrated by the fact that about 70% of the entries in the IRRI replicated yield trials in 1973 had resistance to 5 or more of the major insects and diseases. A year ago less than 5% had such a range of resistance.

Tolerance for resistance to other environmental and pest enemies of the rice plant is being sought. Lines and varieties with a marked degree of tolerance to drought have been identified among the 30,000 accessions in the IRRI germ plasm bank. Likewise, materials with tolerance to adverse soil conditions such as salinity, alkalinity, acidity, and iron deficiency were identified. Lines were also found with protein content 20 percent higher than usual. These characteristics will be incorporated into a more systematized "genetic evaluation and utilization" program and will be made available by IRRI to cooperators throughout the world.

The effectiveness of root-zone applications of insecticides was further evaluated, and single root-zone treatment has been found to be as effective as four comparable spray treatments. The potential for "integrated pest control" - combining such low-level pesticide treatments with at least moderate host resistance - is promising.

An informal network of cooperators working on weed control was established. IRRI scientists distributed chemicals for 142 experiments to cooperators in 15 Asian countries. Relatively inexpensive and effective herbicides have been identified through this program.

(3) Irrigation Water Management:

This program encompasses the development and testing of improved systems of delivering irrigation water to rice farmers and of innovative social organizations to assure the continuation of these systems. This activity is important because water management appears to be a critically limiting factor in rice production.

Inefficient management of irrigation water is a major constraint to rice yields. Even where major canal systems have been properly laid out, the on-farm delivery is unefficient and untimely due to inadequacies of both engineering and social structures.

A request is made for a senior scientist to provide the leadership for a water management program. He will work with donors and national irrigation schemes to measure the efficiencies of specific delivery systems, to design new systems, and to ascertain the effectiveness at the farm level of these new layouts.

(4) Soil and Crop Management for Rice:

This program is concerned with soil characteristics which affect rice and with the effect of soil management, nutrient inputs and crop culture on rice yields. The current fertilizer shortage and the spiraling prices for these chemicals have made this a high priority area.

Research to increase the effectiveness of low rates of applied fertilizer was expanded. The addition of at least part of the fertilizer just before panicle initiation gave the best results when only low rates of fertilizer were applied. Slow-release sulfur-coated urea was effective where the land could not be continuously flooded.

Nitrogen fixation at the roots of the rice plant at rates of up to 60 kg N per hectare were observed under flooded soil conditions in the laboratory. Under such conditions vital oxygen and nitrogen for rhizospheric nitrogen-fixing organisms is excreted from the rice roots. Means of enhancing this important nitrogen-fixing process are being sought.

(5) Environment and Its Effects on Rice:

Environmental factors, such as solar radiation, humidity, light, and others, that affect rice plant growth and the response of rice to environmental differences and changes are studied in this program. The effects of micro-climate differences on rice insects and diseases and the comparative responses of different rice varieties to environmental changes are investigated.

The newly constructed phytotron offers IRRI scientists an opportunity to accurately measure the response of the rice plant to differences in environmental factors such as temperature, solar

radiation, atmospheric carbon dioxide concentration, humidity and soil moisture stress. Under field conditions, years are required to accurately determine such measurements; in the controlled environment chambers, they can be determined in a matter of a few months.

The effects of factors such as humidity and temperature on the viabilities of insects and diseases will be evaluated in the fields. Factors associated with and/or responsible for insect and disease outbreaks will be investigated with special micro-climatic studies coupled with epidemiological studies.

(6) Agro-Economic Network (Constraints):

In spite of the demonstrated potential of improved technology and of the high-yielding varieties, adoption of these new innovations by farmers throughout the rice growing areas of the world has been disappointing. Biological, social, and economic factors have tended to preclude acceptance of the new technology by farmers. Numerous constraints and roadblocks discourage or prevent adoption. In some cases, the technology is not as workable on farmers' fields as it is on experiment stations, while in other cases, socio-economic and political factors are the stumbling blocks.

The constraints which prevent farmers from adopting the new technology and varieties must be identified, and methods to remove these constraints must be developed. The initiation of an inter-disciplinary network of cooperating researchers, economists, social scientists, and agronomists to thoroughly ascertain the constraints to the yields achieved by farmers under different agroclimatic and socio-economic conditions is proposed. Techniques developed and pilot-tested by IRRI's home-based scientists will be used in multi-

location studies to implement the program.

Techniques for determining the constraints on rice yields in farmers' fields were developed and tested. A network of cooperating social scientists in six countries participated in one survey and worked with farmers in 30 Asian villages. Insects and diseases were found to be the most serious constraints to rice production, especially during the wet season. Suitable modern varieties were not available for some villages, particularly those where frequent flooding was a threat.

(7) Increasing Rice Yield Potentials:

This program encompasses activities, including basic research, directed toward gaining new knowledge to enhance the productive potential of the rice plant. This research is aimed primarily at breaking through existing biological and ecological barriers to improving rice productivit

A country-wide demonstration of a package approach to increase rice production was implemented in the Philippines. Termed "Masagana 99" this country-wide action program was based on cooperative field demonstration results obtained by a team of Philippine government and IRRI scientists. Rice production in 1973 rebounded from the low level to which floods and drought had driven them; despite fertilizer and pesticide shortages, rice production is at near-record levels in the Philippines.

(8) Cropping Systems:

Ascertaining and devloping productive and practical cropping systems which involve rice in different agroclimatic zones of the rice-growing areas of the world are components of this study area. Cropping

systems, the newest of IRRI's research programs, offers great potential for increasing world food production. Among the systems being studied are: (a) simple changes which permit one crop in addition to rice, and (b) more complex systems which involve intercropping, sequential cropping, and integrated control of pests.

A simple cropping system was evaluated which permits two crops of rice to be grown during a season where only one crop of rice had been grown before. This was made possible by the availability of short-season IRRI lines which mature in 100 days rather than the 120 to 180 days required for traditional varieties, and a direct seeding technique which utilizes herbicides for weed control. This new technology was first demonstrated in Central Luzon and will be tried next year by the Philippine government on a large-scale basis.

A hectare of intercropped upland rice and corn produced as much as 1.33 hectares when each crop was grown separately. Mixed cropping also appears to help control weeds and insects, for example, intercropping corn and mung lowers the need for weeding.

(9) Machinery Development:

This program includes the testing of machinery for use by small farmers and small millers; consideration is given to the indigenous capabilities to manufacture, market, and use the products developed through this IRRI program. Primary attention is given to the design and development of machinery for: (a) crop production, (b) post-harvest handling of rice on farms and in villages, and (c) crops grown in systems which include rice. Encouragement of timely operations, which

will not only increase the amount of food delivered to the consumer, but also will permit maximization of labor inputs, is top priority in this program.

Indigenous manufacturers in Asia are encouraged to build the machines which are generally much cheaper than those imported from the more developed nations. In the past, this work has been financed under a special grant but has been implemented mostly at IRRI's headquarters in Los Banos. The present proposal is to integrate this research into the IRRI core program and to expand its focus to include work on small tillage implements for upland cropping and for cropping systems. Also, research to improve small village rice mills and on-farm drying of rice will be expanded.

(10) Post-Harvest Management of Rice:

Storage, processing, distribution, and marketing of rice are considered in this area, with emphasis placed on small farm operations. A relatively small part of IRRI's research and training funds are used in this program since production problems appeared to require attention first. Modest expansion is justified, especially in the development of machinery, improved rice drying facilities and procedures, and small village milling operations.

(11) Research-Related Formal Training:

IRRI staff and institutional support for the research training of young scientists and educators from the rice-growing areas of the world is included in each of the research programs above. Some of the recipients of training at IRRI are enrolled in formal degree programs

at the University of the Philippines at Los Banos. Others participate in practical on-the-job short courses which prepare them for field-oriented research and training programs in their home countries.

Of the 126 graduate students and 6-month production trainees from rice-growing countries trained at IRRI in 1973, 92 were in research-oriented programs. Most were enrolled in M.S. and Ph.D. programs at the University of the Philippines at Los Banos.

(12) Outreach Program (International Activities):

IRRI's outreach program is assuming an ever increasing significance. Efforts are being expanded to help cooperating countries by furnishing biological materials and sharing results from the IRRI programs. In addition, IRRI is assiting selected rice-growing countries through special cooperative projects which provide for resident IRRI selections to work as members of national teams. Furthermore, the Institute collaborates with researchers in these countries on international testing programs such as those designed for evaluating new lines and varieties for insect and disease resistance, and those involving cooperative fertilizer and pesticide trials. Cooperative planning efforts with Bangladesh, Vietnam, and Indonesia focus on the long range rice research and training needs in these countries. In addition, formal and on-the-job training programs were conducted at IRRI for 126 scientists and educators from countries.

IRRI's international program continued to expand, both in participating IRRI staff and in on-going cooperative programs. Nearly a third of IRRI's scientists are now in the international programs; they work in Indonesia, Bangladesh, India, Egypt, Sri Lanka (Ceylon), South

Vietnam, and the Philippines. International testing nurseries in cooperation with local scientists are in operation for blast, sheath blight, and bacterial blight diseases. An international yield nursery is also underway. These nurseries are planned during the annual international rice research conferences, which provide forums for discussions of research findings and ideas.

Seventy-five scientists from 20 countries participated in the 1973 Rice Conference held at IRRI. A special conference on rice machinery development, sponsored jointly by IRRI and the United Nations Industrial Development Organization (UNIDO), attracted 75 participants.

INTERNATIONAL RICE RESEARCH INSTITUTE
CORE OPERATIONS BUDGET FOR 1975

Major Activities	
1. Research	
Rice	$2,380,000
Multiple Cropping	780,000
Total	$3,160,000
2. Conference & Training	
Training	$ 187,000
Technical Conferences	115,000
Total	$ 302,000
3. Library, Documentation Information Services	
Library & Documentation Center	$ 111,000
Information Services	180,000
Total	$ 291,000
4. Support Operations	
a. Service Activities:	
Buildings & Grounds including Motor Pool	$ 346,000
Security Guards	46,000
Total	$ 392,000
b. General Administration:	
Board of Trustees	$ 13,000
Administration	462,000
Total	$ 475,000
5. General Operations	
Rent, light & power	$ 99,000
Postage, telephone & telegraph	39,000
Insurance	88,000
Institute's help towards SSA	18,000
Auditors	11,000
Miscellaneous	75,000
Total	$ 330,000
6. All Other	
Medical Services	$ 8,000
Study Leave Replacements	60,000
Contingency Reserve	93,000
Total	$ 161,000
Total Core - Operating Budget	$5,111,000
Add Capital Budget*	2,909,000
Working Capital	500,000
Total Core Budget	$8,520,000

* See Article XI of Attachment III

CY 1975

PROPOSED SOURCES OF FUNDS

AUSTRALIA	$ 430,000	
FORD FOUNDATION	750,000	
GERMANY	100,000	
IDRC	700,000	
JAPAN	700,000	
ROCKEFELLER FOUNDATION	700,000	
UNITED KINGDOM	535,000	
USAID	1,935,000	
WORLD BANK	1,850,000	
TOTAL	$7,700,000	(1)

Note: (1) Of the total proposed sources of funds, approximately $3.15 million is for capital projects.