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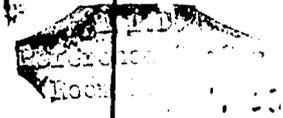
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6/10/69

14p.

FROM - New Delhi

SUBJECT - PROP - RICE RESEARCH IMPROVEMENT

REFERENCE -

NON-CAPITAL PROJECT PAPER (PROP) & PRELIMINARY PROJECT PROPOSAL (PPP)

Country: India Project No: 386-11-110-379

Submission Date: June 10, 1969 Original

Project Title: Rice Research Improvement

U.S. Obligation Span: FY 67 through FY 73

Physical Implementation Span: FY 70 through FY 74

Gross life-of-project financial requirements:

U.S. Dollars:	1. TC Grants	\$ 964,000
	2. Non-Project Loan	\$ 127,000

U.S.-controlled local currency (Trust Fund): \$ 794,000
(Rs. 6,028,000)

Cooperating country cash contribution \$2,105,300
(Fourth Five-Year Plan only) (Rs. 16,000,000)

U.S.-owned local currency: None

Other Donor: None

Total: \$3,990,300

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PROF - Rice Research Improvement**I. Summary Description****A. Necessity/Justification/Significance**

Average rice yields have remained practically constant over the years despite the relatively long history of rice research in India. The nature of the rice plant, the large number of varieties/types, and the divergent conditions under which it is grown pose difficult research problems. An all-out, concerted, sustained research effort will be required to bring about significant improvement in total rice production. However, under the recently organized All-India Coordinated Rice Improvement Project (AICRIP), India is moving rapidly to increase rice production. In response to India's request, AID has contracted with the International Rice Research Institute, Philippines, to provide support to the AICRIP.

B. Project Goals and Targets

Within the context of India's urgent overall target of achieving food self-sufficiency in the early 1970's, the targets of this project are to:

1. accelerate and improve rice research in India by strengthening the operational aspects of the All-India Coordinated Rice Improvement Project (AICRIP), and
2. improve the research capabilities of rice research personnel so that promising rice varieties and improved cultural practices are made available to farmers.

C. Minimum Levels of Achievement

The proposed U.S. assistance is one input into a nation-wide program and will be discontinued if the program ceases to draw national support and participation.

D. General Approach/Plan of Action

The general plan is to provide a small contract team of rice scientists (five, in disciplines of major importance for rice improvement) to conduct research with counterparts at AICRIP's national headquarters and to backstop and monitor the research of AICRIP cooperators. This team arrived in FY 1968. All of AICRIP's cooperators are rice scientists working at State, university and Central experiment stations.

The contract specialists will provide leadership in developing and designing cooperative trials to be conducted simultaneously each season throughout the country. In addition, through on-going research at AICRIP's national headquarters, they will provide short-term, special, on-the-job type training for selected cooperating scientists.

The IRRI will also make available consulting scientists for short periods to visit India and investigate special problems which arise. Additionally, it is planned that long-term (6 to 12 months), post-graduate type research training and study will be provided at IRRI for promising and responsible researchers in subject matter areas important to rice production in India.

Using Trust Fund rupees, AID will support demonstrations, seminars, and field trials so as to accelerate programs and increase the effectiveness of contract operations.

Through semi-annual, national workshops for AICRIP cooperating scientists, research results will be presented, analyzed and discussed, and new programs developed. The workshops will provide opportunities for scientists from different regions to get acquainted, exchange information and develop an appreciation and understanding of the need for coordination and cooperation in research.

E. Summary Description/Tabular Breakdown of the Required Life of the Project Financial Inputs

NON-CAPITAL PROJECT FUNDING (OBLIGATION IN '000)

Table 1
Page 1 of 2

PROP DATE Mo/Day/Yr.
Original June 10, 1969
Rev. No.

COUNTRY: India

PROJECT TITLE: Rice Research Improvement.

Project No. 386-11-110-379

Fiscal years	Ap	L/G	Total	Cont	Personnel Serv.			Participants		Commodities		Other Costs	
					AID	PASA	CONT	U.S. Agencies	CONT	U.S. Dir Ag.	CONT	U.S. Dir. & Ag.	Cont
Prior thru Actual Year FY 1969	TC	G	312	312	-	-	267	-	32	-	13	-	-
Oper. Yr. FY 1970	TC	G	174	174	-	-	143	-	26	-	5	-	-
Budget Year FY 1971	TC	G	177	177	-	-	143	-	30	-	4	-	-
B + 1 FY 1972	TC	G	162	162	-	-	139	-	19	-	4	-	-
B + 2 FY 1973	TC	G	139	139	-	-	138	-	-	-	1	-	-
B + 3 FY _____													
All Subs.													
Total Life			964	964	-	-	830	-	107	-	27	-	-

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NON-CAPITAL PROJECT FUNDING (OBLIGATION IN 000)

Table 1

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Exchange Rate ₹ 1 = Rs.7.50

Project No.386-11-110-379

Fiscal Years	AID-Controlled Local Currency		Other cash Contribution Cooperating Country	Other Donor Funds (\$Equip)	Food for Freedom Commodities		
	U.S.- owned	Country- owned (\$ Equip)			Metric Tons (000)	CCC Value \$ Freight	World Market Price (\$000)
Prior thru oper. yr. FY 1969	-	263					
Budget year FY 1970	-	126					
Budget year +1 FY 1971	-	141					
Budget year + 2 FY 1972	-	131					
Budget year +3 FY 1973	-	133					
Total Life	-	794 (Rs.6,028)					

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II. Setting or Environment

Rice research in India, which has a relatively long history of scattered effort dating back to the first decade of the Twentieth Century, is undergoing rapid change. In a short period of four years, India has broken with the past, organized its resources and put together a functioning rice research program which has far exceeded expectations.

In 1965, the Government of India through the Indian Council of Agricultural Research (ICAR) initiated the All-India Coordinated Rice Improvement Project (AICRIP). Proceeding on approval in principle from the GOI, ICAR, with the help of the Rockefeller Foundation, received encouragement and breeding materials from the International Rice Research Institute (IRRI), Philippines, and with the cooperation of the Indian States and agricultural universities established a headquarters for the AICRIP on the campus of the Andhra Pradesh Agricultural University at Hyderabad and began operations. Coordinated research trials were initiated during the winter season of 1965-66; thus, the AICRIP actually got underway before final GOI financial approval was obtained in 1968. Rs. 11.3 million of Central Government financing have been approved for the period 1968-71. Through a contract with IRRI, USAID is providing the services of experienced rice research experts to work with Indian scientists in strengthening the AICRIP. The IRRI continues to supply breeding materials and occasional technical consultants.

AICRIP's growth and progress has been just short of remarkable. There is a headquarters staff of 25. Through an organizational structure which divides the country into seven zones and 12 regional centers representing regional and area ecological conditions, the AICRIP develops and conducts experiments at up to 30 locations during a cropping season. The field staff consists of 200. At many locations, two crops a year, kharif and rabi, are grown. Conferences and workshops for AICRIP scientists are held twice a year where results, problems and solutions are discussed and specific plans for the next season are made. The AICRIP headquarters staff, including AID/IRRI personnel, visit and backstop the zonal, regional and local testing sites and personnel and monitor the research underway. Each year, two reports based on the results of the previous cropping season are published and distributed widely. Significant research results to date include the development and release of: two high-yielding rice varieties of Indian origin and a "package of production practices" for the major rice growing areas.

The initial successes of AICRIP, as significant and important as they have been, when viewed against the total rice improvement problem represent only a small beginning. Considered alone, rice, as a crop plant, poses difficult and diverse problems for the researcher.

The fact that rice is grown widely throughout India and is a major food item, perhaps the food, for up to three-fourths of the population gives an indication of the nature and magnitude of the problem. Rice is grown from sea-level to 6000 feet, and on soils which vary from deep loams and clays to shallow laterites, with reaction ranging from extremely acidic to highly alkaline. At some places deep water rice is grown in 15 to 20 feet of water; at other places rice is grown under sub-humid conditions where the rainfall barely reaches 20 inches. In some areas, a single crop is produced once a year, in others, three crops are grown in succession on the same land in a year. A rice crop may be of 70 days duration or it may take up to seven months to mature, and it can produce reasonable yields under widely differing sunlight and atmospheric conditions of the Indian summer, autumn, and winter. Thus, rice in India - *Oryza sativa*, sub-specie indica - has undergone a selection and adaptation process over the millennia which has resulted in a large number of varieties suitable for use under widely varying conditions. It has been reported that at least 4000 varieties of rice are grown in India. In practically every area or district where rice is grown, there are local varieties which have adapted to the prevailing soil, climatic and biological conditions in line with local needs and preferences for food and fiber - varieties which are in equilibrium with a particular environment. The implications for research and improvement are clearly apparent.

The technical problems of rice improvement are further complicated by matters of consumer acceptance. Indian consumers tend to prefer slender, fine-grained, non-sticky, aromatic qualities which so far have not been closely associated with high-yielding characteristics. Consumer preference is reflected in prices. The price difference for high over low quality rices may be as much as 100%. The wide price difference can and does act as a disincentive to the spread of the lower quality, higher-yielding rices. Thus, a major concern and problem is that of developing high-yielding, fertilizer-responsive rice varieties which incorporate quality factors acceptable to the Indian consumer.

The quality orientation of rice research in India over the years may be responsible, in part, for general lack of progress in increasing rice yields in India. From the earliest years, research has been devoted primarily to selection and breeding for quality and better adaptation to prevailing conditions. As a consequence of this approach, Indian scientists developed varieties with outstanding grain quality and adaptation to Indian conditions. Maximizing yields under high levels of fertilization and management did not receive adequate attention. Fertilizer research that was carried out was compromised by the inherent yield limitations of varieties selected for grain quality rather than yield. In retrospect, considering the existing conditions between the 1930's and the mid-1950's, the direction of research

was logical and reasonable. Few commercial inputs, such as fertilisers, were available or in prospect; further, there was no pressure of permanent foodgrain shortages.

Research programs in rice expanded rapidly over the years and by 1960 there were 82 rice "research stations" throughout the country. Practically all of them were controlled and operated by the individual states with little coordination and exchange of information. The Central Government's first attempt to concentrate and coordinate rice research occurred in 1946 when it took over the Cuttack station in Orissa. Established in 1932, this station was re-named the Central Rice Research Institute and reorganized to undertake fundamental research in all aspects of rice, investigate problems of wide applicability, and act as a center and source of authoritative rice information.

By the late 1950's, concern was developing over impending food problems and pressures began to mount to increase rice yields. At this time, the Center made another attempt to coordinate rice research programs and introduced a program, with FAO's help, to improve the yields of local indica varieties by cross-breeding with selected, high-yielding japonica varieties. The program was generally unsuccessful and was finally abandoned. ADT-27, an improvement over existing local varieties and currently popular in the Tamil Nadu area, is one of the few successes of the program.

When the full weight of the food crisis fell in the mid-1960's, India possessed a rather large and extensive rice research set-up which was largely uncoordinated, tradition-bound, in the doldrums, and generally not in line with prevailing needs. On the positive side, some excellent work had been done, facilities existed, and there were sizeable numbers of rice scientists and workers.

Spurred by the example of the IRRI and the overwhelming need to make improvements, the ICAR was able to sell the idea of AICRIP and a project headquarters - research center at a new location free from existing influences. In the few short years of its existence, AICRIP has demonstrated the value of team work and the inter-disciplinary approach to the solution of problems.

The vigor and successes of AICRIP have silenced, at least temporarily, the forces with vested interests in the status quo. So far, with one or two exceptions, cooperation of the States has been good; but problems exist. Some States have not maintained the level of expected financial contribution to AICRIP programs. Certain States feel they have an obligation to maintain separate rice research programs for the solution of local problems, which carried to extreme, could lead to unnecessary duplication and or diversion of effort from important research priorities. Then there is the problem of personal and State interest and preoccupation with recognition and publicity.

Individual and State contributions often get submerged and over-looked in a joint effort. Some States and AICRIP cooperators chafe under the strict discipline and coordination required for the success of joint research.

The current organizational, administrative and procedural problems cited are cause for concern when viewed against a past history of failure of previous "All-India" type rice improvement schemes. Perhaps the best way to overcome the problems is to push harder to insure continued AICRIP successes. A solid record of achievement and contribution to overall national welfare, hopefully, would outweigh any argument to return to programs of the past.

It is probable that a minimum of a decade of successful experience will be required to firmly establish AICRIP-type concepts in India. AID and/or other external assistance throughout at least half of that period will be necessary to nurture and develop AICRIP to a point where it will no longer be a temporary expedient to meet a current crisis, but an accepted and established way of meeting India's current and future needs.

III. Strategy

A basic element of Mission strategy has been and continues to be to encourage and support, with available resources, the development of beneficial agricultural programs. A consequence of this strategy has been an agreement with the GOI to support rice research improvement as a means of achieving their and our goals in agriculture (See FY 1970 Program Memorandum).

Efficiency in resource utilization has been a major criteria and guide in determining the kind, magnitude, and point of U.S. assistance to rice research in India. Fortunately, the structure and operations of the AICRIP provide an unusual opportunity for channeling assistance. Through a relatively modest input of technicians and participants at the headquarters of AICRIP, practically all organized rice research in India can be reached and influenced.

This aid activity complements other Mission agricultural activities and projects, and is consistent with AID's agricultural program objectives to increase food production and enhance the capabilities of the institutions involved. In addition to making possible immediate material and human benefits through increased rice production, the project supports and fosters a concept of unity and cooperation for the achievement of national objectives.

IV. Planned Targets, Results and Outputs

The ultimate goal of this project is a productive, prosperous, permanent agriculture which will meet the needs of India. Within this context and India's urgent, short-range target of achieving food self-sufficiency in the early 1970's, the specific targets of this project are to:

1. accelerate and improve rice research in India by strengthening the operational aspects of the All-India Coordinated Rice Improvement Project (AICRIP), and of the
2. improve the research capabilities of rice research personnel so that promising rice varieties and improved cultural practices are made available to farmers.

It is expected that it will take a minimum of five more years of U.S. support to build AICRIP to a permanent organizational and conceptual way of conducting rice research to meet India's present and future needs. Indicators to assess progress and changing assistance needs will be: (a) levels of activity expressed in men, money, physical facilities, and research underway; (b) research results - new varieties and technology; and (c) efficiency in the use of national resources. After five years of operation at present levels of support and progress, it is believed that sufficient impact will have been made to insure continuation of AICRIP concepts of organization and, perhaps, even AICRIP as a permanent institution. This latter point is not crucial; the AICRIP headquarters is located on the campus of Andhra Pradesh Agricultural University and, conceivably, could become an element of the university. What is crucial is the continuation of the AICRIP organizational and conceptual approaches to rice research. When these approaches are clearly accepted or rejected, U.S. assistance should be phased out or reduced to a minimum level to meet special requirements. This judgement is based on the notion that what rice research in India really needs is re-vitalizing and re-orienting. The AID/IRRI contract project provides the stimulus for both and when they are achieved current assistance can be terminated.

V. Course of Action

Activity targets are being achieved by providing, under contract with the International Rice Research Institute (IRRI), Philippines, (a) five experienced rice scientists (agronomist, plant physiologist, entomologist, plant pathologist, and an experiment station design and layout specialist) to work with Indian AICRIP counterparts at the

National Headquarters and with AICRIP cooperators throughout the country in designing and conducting field experiments and laboratory research to solve problems and produce better rice varieties and production practices; (b) short-term IRRI consultants to assist with urgent problems; (c) special individual training programs at AICRIP's National Headquarters for cooperating Indian scientists; and (d) advanced training in rice research at IRRI in the Philippines. By these means, the U.S. through AICRIP will accelerate the growth of human, organizational, and physical capabilities for the rapid development of superior rice varieties and supporting technology for farmer use. U.S. technicians will act as trainers and catalysts, with and through counterparts, to speed up and spur Indian activities.

From FY 1970 through FY 1973, the five U.S.-supplied technicians will assist AICRIP with the programs described below:

In Research -

Breeding and testing for high-yielding, stiff-strawed, fertilizer responsive varieties acceptable to the Indian market will continue with:

Breeding Blocks	Thousands of progeny rows each cropping season.
Crossing Programs	Specific crosses undertaken to incorporate special characters such as stem borer or gall fly resistance into high yielding varieties.
Testing Programs	Trials throughout the country in at least 3 stages to evaluate breeding materials at different centers.
Screening Nurseries & Trials	Identification of varieties resistant to insects and diseases.

Entomological research to determine effective control measures for major insect pests, such as leaf hoppers, stem borers, and gall flies.

Agronomic research on the use of fertilizers and other factors necessary to maximize yields of new varieties in farmers' fields.

Plant Physiological research relating the vegetative development, light transmission, photosynthetic activity, and dry matter production of the tall indica, ponlai, and dwarf indica varieties.

Experiment station improvement activities will be undertaken at AICRIP Headquarters and at cooperating AICRIP stations throughout the country to develop better functional layouts to conduct research and service research activities.

In Training -

Development of research capabilities of the technical staff of Indian agricultural universities and research institutions by:

- Assisting with two national workshops each year.
- Assisting with seven zonal workshops each year.
- Making approximately 20 visits by IRRI and AICRIP scientists to state research centers each year.
- Publishing progress reports by cropping season and distributing to all concerned scientists.
- Assisting with national and regional training programs by arranging selective training at the (1) AICRIP headquarters, (2) regional AICRIP installations, and (3) IRRI.

In the Dissemination of Research Results -

Farmer information and training programs with the Center, Indian States, agricultural universities and private foundations (Rockefeller and Ford) to ensure that research findings are put into practice.

In addition to the Rs. 11.3 million provided by the Center and large expenditures by the States, the GOI has provided foreign exchange amounting to \$150,000 for the purchase of research supplies and equipment, of which \$127,000 will be obtained from a U.S. non-project Development Loan to India. The AID will use Trust Fund rupees to support the U.S. technicians and expand and accelerate research and training programs at AICRIP headquarters.

The kind and scale of proposed U.S. technical assistance is adequate for the achievement of objectives. In addition to the five AID/IRRI contract technicians, an India-based IRRI/Rockefeller scientist will act as contract Chief of Party and Joint AICRIP Coordinator. Through AICRIP, these six scientists will be able to influence, directly and indirectly, practically all of the rice research in India. The size and intensity of AICRIP programs are of sufficient magnitude to absorb and utilize the contemplated level of U.S. assistance fully and effectively.

Provision is also made for short-term IRRI consultants who may be needed to assist with the solution of difficult problems which continually develop in research programs. It is expected that this requirement will not exceed twelve man-months annually through FY 1974.

Contract Technicians/Consultants

Position	No./Man-Months				
	FY 1970	FY 1971	FY 1972	FY 1973	FY 1974
Plant Physiologist	14	12	12	12	12
Agronomist	12	12	12	12	12
Entomologist	12	12	12	12	12
Plant Pathologist	12	12	12	12	12
Exp. Sta. Dev/Mgmt. Adv.	3	12	12	12	12
Consultants	12	12	12	12	12
Totals:	65	72	72	72	72

Through FY 1974, a yearly maximum of 79 man-months of training will be provided at the IRRI for selected AICRIP scientists.

Contract Participants - No./Man-Months

Type of Training	Location	FY 1970	FY 1971	FY 1972	FY 1973	FY 1974
Rice Breeding	Philippines	2/12	2/12	-	-	-
Rice Pathology	Philippines	2/18	2/18	-	-	-
Rice Agronomy	Philippines	2/18	2/12	-	-	-
Rice Entomology	Philippines	2/12	2/12	-	-	-
Exp. Station Mgmt.	Philippines	1/12	1/12	-	-	-
Short-term	Philippines/ Taiwan	9/7	-	-	-	-
To be determined*			9/7	20/79*	20/79*	20/79*
Totals:		18/79	18/79	20/79	20/79	20/79

*Based on needs at this time.

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