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INDONESIA

PROJECT PAPER REVISION

FOR

AGRICULTURAL RESEARCH PROJECT

(497-198)

DATE OF ORIGINAL PROP:

APRIL 28, 1971

DATE OF PP REVISION:

MARCH 14, 1977

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AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE

A ADD
 C CHANGE
 D DELETE

PP

2. DOCUMENT CODE
3

J. COUNTRY ENTITY

INDONESIA

4. DOCUMENT REVISION NUMBER

1

5. PROJECT NUMBER (7 digits)

407 0108

6. BUREAU OFFICE

A. SYMBOL B. CODE
ASTA 04

7. PROJECT TITLE (Maximum 40 characters)

Agricultural Research

8. ESTIMATED FY OF PROJECT COMPLETION

FY 80

9. ESTIMATED DATE OF OBLIGATION

A. INITIAL FY 77 B. QUARTER 2
 C. FINAL FY 79 (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$1 -)

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L C	D. TOTAL	E. FX	F. L C	G. TOTAL
AID APPROPRIATED TOTAL	350		350	023	130	1953
(GRANT)	(350)	()	(350)	(023)	(130)	(1953)
(LOAN)	()	()	()	()	()	()
OTHER U.S. 1. 2.						
HDST COUNTRY		4614	4614		4614	4614
OTHER DONOR(S)	400		400	400		400
TOTALS	750	4614	5373	1323	4744	6067

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY 77		H. 2ND FY 78		K. 3RD FY 79	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1)	5121	000		350		200			
(2)								274	
(3)									
(4)									
TOTALS				350		200		274	

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	P. GRANT	Q. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1)					023		<div style="border: 1px solid black; padding: 2px;"> MM YY 12 78 </div>
(2)							
(3)							
(4)							
TOTALS						023	

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 NO
 2 YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE Thomas C. Miblock

Thomas C. Miblock

TITLE Mission Director

DATE SIGNED

MM DD YY
03 08 77

15. DATE DOCUMENT RECEIVED IN AID/W. OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY
03 14 77

Project Paper

Agricultural Research
Indonesia project # 497-11-110-198

Part I. Summary and Recommendations

1. Statistical

Project Title: Agricultural Research
New or Extension: Extension for three years
Contractor: International Rice Research Institute
Duration: Original Contract: Feb. 9, 1972 -- Feb. 8, 77
Extension: Feb. 9, 1977 -- Feb. 8, 80
Funding to Date: \$1,262,000
Estimated Additional Funding: \$922,550 to February 8, 1980
2/9/77 to 2/8/78 - \$358,400
2/9/78 to 2/8/79 - \$290,275
2/9/79 to 2/8/80 - \$273,875
Project Officer: Walter C. Tappan

2. Narrative Summary:

a. Efforts or Activities:

Targets of the original project, to be continued in the extended project, were to coordinate and consolidate the activities of research projects of high economic priority; to establish a specific project to develop improved varieties and techniques for rice and related crops as a model for other coordinated research projects, to institutionalize professional development programs for research administrators and staff; and to establish those effective linkages with extension and education necessary for dissemination of the new technology to farmer producers. Also additional targets were to build a national cadre of well trained and fully supported scientists through systematic and selective programs of recruitment and advanced training; and to forge strong links between research, education and extension at both central and provincial levels to ensure that research efforts are relevant to needs of Indonesian agriculture.

The International Rice Research Institute was selected as the contractor because it was recognized as the most qualified research institution in the Asia tropic region in both rice and secondary crop techniques.

b. Objectives:

Objectives are to transfer research program components developed at IRRI and elsewhere into the Indonesian program so as to increase the national staff's capability to conduct high priority research on rice and rice-based cropping systems. Strategies employed to attain these objects are: (1) utilize IRRI scientists to strengthen current Indonesian programs and to design and implement new ones; (2) involve senior Indonesian scientists in IRRI's Los Banos program so that they become acquainted with research management in action; (3) offer academic and specialized overseas training programs; and (4) make available selected equipment to support priority research programs. Other strategies added or to be added are: initiate field trials on typical farm plots; develop linkages and networks, cooperate with field oriented GOI agencies, institute in-service, in-country training and work shops, and establish an information service as a part of Central Research Institute for Agriculture (CRIA).

c. Synopsis of Activities

The initial period covered by this research contract has been effectively used by IRRI/CRIA to evaluate the performance of improved rice varieties imported from IRRI and those resulting from early stages of Indonesian plant breeding programs. The incidence and significance of serious rice diseases and insect pests have been evaluated, as well as adaptation of available rice varieties to temperature differences at higher elevations, length of growing season (of selected varieties) from planting to maturity, and the role of secondary crops to include in rice farming systems. Important opportunities for increasing yields have become evident, and at least one year of trials in farmers fields indicate the direction for further evaluation and modification to suit small farmer capabilities and interests. For upland agriculture, there have been detailed IRRI/CRIA studies made of various farming systems with complex inter-planting of crop species to supplement rice and to produce year around harvests of suitable food crops. The early testing of economic benefits from the better systems are rather spectacular, and could virtually revolutionize farming practices, if subsequent and more extensive field testing under actual farm conditions confirms the early results in 1975-76.

In September, 1976 two upland and three high elevation rice varieties tolerant to cool temperatures were released. Also new varieties of secondary crops were released in late 1976 and early 1977.

Although considerable progress has been made in strengthening research programs and improving staff qualifications, the planned development of a National Center for rice and secondary crops research is behind schedule; and program planning for present and proposed regional stations in the outer islands will absorb more of the CRIA scientific and administrative resources. The GOI wishes to retain IRRI services for three years beyond project termination date of 8 February 1977. Availability of the IRRI team for this period will contribute both to ultimate establishment of the National Center (with World Bank assistance) and the Sumatra Research Stations (with AID assistance.)

Part II. Project Background and Detailed Description

1. The Development Problem

National development of agricultural production may be envisioned as a continuum: (1) beginning with basic research, (2) followed by adaptive research, then (3) implemented by field demonstrations and an extension program to activate producers, and (4) the final phase of actual production on an economical, viable basis by the farmers on the land. Each step is indispensable if improved technology and management are to be applied to wide-spread augmented production. Failure at each step must be avoided to achieve a significant increase in production. While different categories of specialists are involved in each sequential phase, they must all be aware of the importance of the contribution that is expected of each to permit the achievement of the ultimate goal.

When different agencies are involved (such as CRIA, AID-IRRI, World Bank, etc.) there is a crucial need that each agency be made aware of the specific contributions that are expected, including timeliness of activity and economic significance.

2. State-of-the-Art Supporting this Proposal

Regional stations in the outer islands and cropping systems research in transmigration (resettlement) areas require additional CRIA scientific and administrative resources. IRRI has demonstrated that it possesses the competence to provide assistance in expanding to new areas.

The physical development of the National Research Center for rice and secondary crops at Sukamandi (World Bank loan, December 1975) is behind schedule and it will be several years before it is prepared to receive and utilize external assistance. Staff at CRIA estimate this development will take from three to five years. In the meantime the extension of the IRRI contract with technicians assigned to CRIA at Bogor will permit priority IRRI-assisted research and breeding programs to continue.



Under this extension the CRIA/IRRI program can continue its momentum and provide the bridge between the ongoing national program and development of the national center at Sukamandi. The IRRI staff has the confidence of CRIA and excellent working knowledge of research problems and CRIA's objectives. The extension of this project provides an excellent opportunity to take advantage of ongoing arrangements.

The proposed Sumatra Agricultural Research Project (0263) will be an extension of the concept of assistance to CRIA and, when implemented, is expected to provide technical assistance, training and physical facilities for a network of field research stations. However, the Sumatra project construction is not targeted for completion before late 1979; U.S. commodities are not expected to arrive until the same date and the cropping systems calendar is not scheduled for publication until late 1980.

AID should continue to finance the present IRRI contract for another three years or until such time as facilities are completed and staff assigned to implement the World Bank loans. This could considerably be more than three years. The IRRI job has not been completed. The project is not ready for a cutoff. IRRI not only has provided CRIA with full time services of scientists in plant breeding, economics, and applied research for rice and secondary crops but also with numerous essential consultants who can be quickly fielded to investigate specific problems. To illustrate the importance and magnitude of the IRRI TDYs, there have been 27 scheduled for 1977 in cropping systems, water management, soil microbiology, plant breeding, information services, agronomy, pathology, economics, engineering and administration.

Important

Since 1972 IRRI has maintained two types of programs in Indonesia: (1) cooperative programs to increase research capabilities, and (2) international network programs to assist national scientists in focusing on high priority problem areas. Both types of program are designed to be integrated with current Indonesian research programs and provide general program assistance. Programs at Bogor, Sukamandi and Maros fall in the first category; the farm mechanization network (planned for expansion), cropping systems network, international rice testing, germ plasm collection and international agro-economic network activities fall in the second category.

3. Rice Production, Imports and Population Trends

Rice production, rice imports and population growth for Indonesia for the five years of this project, as provided by the Agricultural Attache of the U.S. Embassy are as follows.

<u>Year</u>	<u>Net Production</u> (Less Seed & Losses-6%) (Millions of tons)	<u>Imports</u> (Millions of Tons)	<u>Population</u> (Millions)
1972	13.18	0.75	121.63
73	14.61	1.66	124.60
74	15.45	1.00	127.59
75	15.27	0.68	130.60
76	15.34	1.50	135.00

Because rice constitutes the largest single item in the average consumer's expenditures, the government can judiciously buy, store and sell a small portion of domestic production and imports to control inflationary tendencies and promulgate an atmosphere of economic stability, which is important for increased domestic and foreign investment. Rice purchases constitute 42% of a middle-income consumer's expenditure for food and 33% of his total expenditures. As a single item, rice is by far the major component of the consumer's purchases, followed distantly by fish and fish products at only 6.0% of total expenditures. Rice is also the major source of calories (42%) and protein (33%) of the middle-income consumer.

4. The Project and the Small Farmer

The success of this project can be judged by the extent to which it has served the small farmer. In this respect the research results have been utilized by small farmers since the crops and technology relate to small farmer operations.

In Java the average land holding is 0.7 hectares; in the transmigration areas in the outer islands the farms are from 2 to 5 hectares in size (upland). Most farmers in Indonesia are classed as small farmers; tilling small areas, using little machinery or animal power, depending on family labor, reluctant to borrow money and willing to accept technologies which are economically sound for their conditions.

Research and field trials conducted by CRIA reflect the conditions experienced by small farmers. Many of these trials are conducted on village plots with full participation of surrounding farmers. CRIA's program addresses food crops and the small farmer in both the irrigated areas and the uplands.

The National Rice Research Program is aimed at providing new varieties and techniques for all rice farming situations. To meet the needs of the small farmers new varieties must possess high yield potential, resistance to diseases and insects, tolerance to deep water, drought or soil problems, and possess high milling quality and the eating qualities preferred by Indonesians.

The extent to which new CRIA/IRRI varieties are used by the small farmers can be illustrated by the fact that more than 50% of the rice now planted in the country is of the newly developed high

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yielding varieties. The extension service is used for seed multiplication, for disseminating varieties to the small farmers and as the feedback mechanism on problems from farmer to extension to research.

5. Project Background Description

In Indonesia, trained and experienced rice scientists are in short supply. Considering the complexity of a modern varietal development program, the diversity of the needed varietal types, and the limited scientific staff, it was determined to coordinate Indonesia's program at the national level to take advantage of the scale economies of research programs and complementarities among disciplines. Regional research facilities have been utilized to their best advantage, considering their staffs, their physical facilities and their proximities to areas with conditions under which breeding lines must be tested. This project has demonstrated that a nationally coordinated program gives a higher return, with a limited budget and staff, than would separate regional programs.

This project operates through the small farmers, who in the aggregate occupy most of the presently arable lands of the nation, and who produce most of the foodstuffs now consumed. Through this medium, Indonesia is pursuing two major goals: (1) to move strongly toward self sufficiency in food production to keep pace with population growth and the rising standards of living, while reducing food imports; and (2) to resettle excessive populations from the small islands of Java and Bali, to the vast unused or under-used uplands of other islands in the Indonesian archipelago. There are now more than 80 million people (60% of total population) on Java and Bali, which contain only a small percent (7.2%) of the total land area.

Research is viewed as the foundation and driving force for improved production efficiency on present farmlands and those to be occupied. The IRRI projects play a leading role in this many faceted research effort by developing new plant materials, by controlling dangerous pests, adjusting to the variables of soils and climate and finding ways to alleviate environmental constraints, devising practices and methods (farming systems) that greatly augment labor and materials in their productivity, and by contributing in progressive steps to increasing the store of knowledge on food production and development of agriculture, so that it may be disseminated to the producers on the land. CRIA is a willing partner in this effort, and is moving steadily in training and competence to ultimately assume the major responsibility in research, propagation and dissemination of these skills and knowledge.

Part III. Project Analyses

1. Purpose

To establish a coordinated National Rice Research Program with the competence and authority to plan and manage the use of

agricultural research resources to accelerate the production of improved technology; expand and improve the rice research capability of the principal action organizations; disseminate that technology to agricultural education and extension groups and test this commodity-oriented, multi-disciplinary research approach for relevance in other research programs.

2. Objectives

This project is concerned with research on food crop production in two major types of environments -- the irrigated lands, and the rainfed uplands. Rice is the predominant crop in both settings, but "secondary" food crops also are important, particularly in the rainfed farming systems that will have widespread significance in the major outer islands (Sumatra, Kalimantan, Sulawesi, Halmahera, Irian, Sunda Islands, etc.) where the government program of transmigration and settlement is actively underway. Technical guidance to effectively utilize land resources and climate, and to develop systems suitable to small farmers, is urgently needed; and this project has already begun to serve this requirement.

It should be recognized that the urgent need to identify land types not suited for cropping, and identify land types that will be suitable for economic development, is outside the scope of this project. Therefore, this research is definitely applicable only to land capability classes on which soil erosion may be avoided or controlled by suitable management. Soil erosion is serious on steeper lands of the central ridges on Java, and the research results of this project will not take the place of more rational land use. On the rain-fed uplands, that will dominate agricultural development on the major outer islands, these researches are pertinent to suitable land capability classes (classes I, II, and III with modification) that are appropriate for tilled agriculture. They will not be applicable to those lands that should be kept in permanent plant cover to control erosion (tree crops, or perennial grasslands for livestock), nor to lands where severe erosion hazards dictate that lands should be kept in native forest or in silviculture for timber production. The Government programs for land use mapping may be adequate for the island of Java, but are far less advanced for the other major islands. This research project is regarded by the Government agency, CRIA, as directly applicable to arable lands, with immediate use being made where resettlement colonies are being established.

Specific outputs of the project, under the proposed extension, is the continuance of:

Output A -- Irrigated Agriculture (Intensification)

Rice breeding, sequential cropping, pest control, secondary crops, grain quality, cultural practices, improved varieties, labor distribution, fertilization

Output B -- Upland Agriculture (Extensification)

Rice breeding, pest control, inter planting of secondary food crops, adaptation to kinds of soil, cultural practices, yield improvement, net returns, varietal testing, soil improvement, economic returns by systems

Output C -- Office of Information Services

Research information dissemination, visual aid preparation, graphics, editing and layout, equipment operation, bulletins, reports

Output D -- Networks, Linkages and Feedback

To assure small farmers are adequately served, geographic emphasis and appropriate technology, variety dissemination, extension, field trials

Output E -- Training for Staff Needs

MS and PhD training overseas, workshops, seminars, subject matter specialists, extension training, short courses

Output F -- Commodities and Equipment

Direct support to the project scientists or to supplement and modernize research equipment, equipment for the new Office of Information

3. Progress to Date

Output A -- Irrigated Agriculture (Intensification) -- through 1976

The IRRI research staff under this contract has made a massive transfer of research components from IRRI headquarters to Indonesia. These included high yielding rice breeding lines carrying genetic resistance to important insects (brown plant hopper, green leaf hopper, gall midge) and diseases (grassy stunt virus, tungro virus, bacterial leaf blight), lines with different length of growing season, kernel type and flavors, plant types as to height, tillering, strength of straw, etc. The IRRI research scientists also brought concepts such as "constraint" research methods, cropping system principles, techniques for screening plant materials for disease and insect resistance, effective use of fertilizer and pesticides, and design of field experiments to collect valid performance data with a minimum of time and labor. With these aids, the plant breeders have produced five improved varieties, each of which has increased yields more than 20% above presently grown rice types. Two varieties have increased cold tolerance (for higher altitudes), one is resistant

to tungro virus, one is strongly tolerant of brown plant hopper attacks, and one is short-season and high yielding. A fairly large volume of breeding material with superior attributes has been carried to advanced stages that could lead to release of new varieties for commercial production in the next three years.

The plant breeders are responsible for production of an initial stock of pure seed for each variety to be released to the Extension Service for its multiplication and distribution to small farmers. As of 1976, it is estimated that about $\frac{1}{2}$ of all irrigated rice is now planted in high yielding varieties, including both the varieties adopted directly from IRRI, and those created by hybridizing native varieties with IRRI strains.

Pest control has continued to be important, partly because heavier plant growth under fertilization favors pest multiplication. Each pest is under attack by the breeders, for development of genetic resistance which reduces the need for control by use of pesticides.

Shorter-season varieties introduce new cropping potentials. For regions with 10-months irrigation water supply, it is possible to grow two rice crops per year. For regions with water for only seven months it is now possible to grow two short-season rice crops, followed by a short-season secondary crop with natural rainfall (such as cowpeas, or rice bean). For regions with only 5-month irrigation, it is possible to grow one rice crop, followed by two subsequent secondary crops. The first year of full testing (1975-76) produced a doubled net return in rupiahs per hectare for the 7-month irrigation system, and about 10-fold increase (over a single rice crop) with 5-month irrigation followed by two secondary food crops. These tests will be continued. It is of great importance to Indonesia to determine if such results can be replicated widely.

There are great differences between varieties of other food crops, as well as rice. The best mung bean varieties produced twice the yield of others; and equal varietal differences were found in soybeans and cowpeas. Different cultural methods -- plant populations, placement of fertilizers, seed bed preparation, planting methods, use of pesticides, weeding, etc., all affected total yields and costs per unit of crop harvested. The timing of planting was important, to fully utilize the available growing season. The intensification of production is definitely underway, but it will require a continuing flow of information from field testing before promoting such systems by farmers.

Output B -- Upland Agriculture (Extensification)

Research Accomplishments by CRIA/IRRI -- Project through 1976

Production of food crops on upland, rain-fed lands involves systems that differ greatly from irrigated agriculture. Crops are typically grown in mixtures under current peasant practices, and a major change introduced by this research has been to plant each crop

In rows to facilitate all cultural practices, and to interplant different crops that are compatible in growth habits, but to apply improved technology for each crop. By selecting crop species suited to the rainfall expected in each growth period, the land is continuously in production, and the aggregate harvests may approach those on irrigated lands, even though the products differ. One example is an initial interplanting of strips of rice and corn, with the corn followed by grain sorghum, rice harvest some three-weeks later is followed by peanuts, cassava cuttings are planted in corn or sorghum to make growth after the grain crop is harvested, and rice beans or other food grain legume follows sorghum. On a single field:

<u>Crop</u>	<u>Planting date</u>	<u>Harvest date</u>
Corn	November 28	March 14
Upland Rice	November 28	April 5
Cassava	December 6	October 6
Sorghum	March 17	July 14
Peanut	April 10	July 17
Rice bean	July 27	October 4

Each crop strip is fertilized before planting, in accordance with the needs of the crop. The plant populations are adjusted to the capacity of the soil and rainfall, from 25 to 50% of full stands grown alone for large crops like corn and sorghum and cassava, to 80% for rice, and 70% for peanuts or rice bean.

Such a pattern of intercropping devised after two years of trials, proved highly productive, with great flexibility for adjustment to current rainfall patterns, so that total yields per hectare were high. The first full year in which productivity and costs were measured showed that the best system of intercropping produced a net return in rupiah per hectare, about three times as great as the peasant system of mixed planting. In this system, the best available improved varieties of each crop were used, fertilizer was applied as needed, cultural practices were timely and effective and pest control was practiced.

While there are innumerable variations in possible interplanting systems, the following side benefits were noted for the better systems.

Weed control was greatly improved; there was greater stability in early production by reducing effects of variable rainfall, and incidence of pests; total labor per hectare was more evenly distributed over the year; capital inputs were spread over the full year which reduced need for borrowing; harvest income and cash flow was nearly continuous; and moreover, the continuous plant cover largely controlled the soil erosion hazards while controlling the noxious imperata grass.

The benefits from better intercropping systems for upland agriculture (a) widen the range of food crops that may be grown even though rice is a major component; (b) total productivity per

hectare approaches that of irrigated agriculture, (c) the total input needs (fertilizer, seeds, pesticides) are no greater, (d) the total labor needs are within capability of the farm family, and (e) managerial skills bring economic rewards. In the transmigration (resettlement) schemes, each farmer is allocated two hectares of arable land, and this may be sufficient to supply family subsistence needs, and produce surpluses for sale where an improved interplanting system is used. (Some settlement areas located on less productive soils may require larger land allotments per family.)

The CRIA/IRRI research results on upland intercropping farming systems are already being used as guidelines by the Extension Service and transmigration agency, in assisting new settlers to move promptly into production. Admittedly, there are many aspects that appear susceptible to further marked improvement, and substantial modifications must be worked out on each major soil type and land capability class. The research to date has effectively demonstrated that potential productivity of rainfed agriculture is substantially greater than previously anticipated. The outlook for bringing unused lands into production throughout the nation is thereby enhanced.

Output C -- Office of Information Services (CRIA-Bogor)

This division is newly organized although some information services were available through most of the life of the contract. Services performed were the writing of reports and the preparation and publishing of scientific research bulletins. In late 1976 this division was given a real boost when a CRIA technician returned to head the service -- after obtaining his PhD at the University of the Philippines. CRIA maintains a six-man editorial board which is responsible for editing, production and publishing.

CRIA recognizes that there is a crucial, critical, immediate need for support services in information dissemination. An inordinately large percentage of the time of senior scientists has been used in this function at the expense of scientific research. Included in the budget for this project are funds for the purchase of a small amount of equipment for the Information Services and for a six-month TDY of an IRRI information specialist.

Output D -- Networks, Linkages and Feedback

While emphasis in CRIA is on research, they have developed increasing numbers of experiments on extension farms, transmigration farms and farmers' fields. The GOI has made comprehensive changes in its extension and information dissemination services, with the objectives of improving staff qualifications and strengthening the services provided to the farmers.

Agricultural extension is under the control of the Director General for Food Crops and Agency for Extension, Teaching and Education (Ministry of Agriculture). Farm level extension activities are conducted under provincial authority with funds provided by the Ministry of Agriculture. The ratio of extension worker to farm families is 1:2,000.

CRIA conducts field trials in conjunction with the extension service. These trials demonstrate practices and varieties relating to small farmers under conditions as experienced on typical farms. CRIA has field technicians located in the field trial areas to work with extension personnel. A feedback mechanism operates from farmer to extension to CRIA and has proved to be most successful. Illustrative of CRIA presence is the experimental fields at Lampung in Sumatra where CRIA has 25 technicians assisting extension and farmers in that upland cropping area. CRIA provides training for extension workers in the field, at work shops, seminars and special training courses on a continuing basis.

At the regional research level, in West Sumatra, CRIA has an active working relationship with the agriculture extension service, Andalas University and the provincial planning board (BAPPEDA). This consists of an Advisory Board which establishes policy and makes recommendations to a Technical Team for agricultural research programs. The chairman of the Board is the Province Governor; the vice-chairman is the Province Agriculture Inspector; and members are representatives of BAPPEDA, Andalas University, the extension service, and CRIA. The Technical Team is composed of a chairman represented by CRIA, with members representing the extension service and the university. Under the proposed Sumatra Agricultural Research Project (0263) a similar working relationship will be developed in the provinces of Aceh, North Sumatra, South Sumatra and Lampung.

Attachment E to this project paper is a report which is an excellent example of feedback from farming regions to CRIA. It illustrates prompt action in responding by mobilizing resources to alleviate the damage of a major pest with potential disastrous effects on yield.

Output E -- Training for Staff Needs

The purpose of training has been to increase the national staff's capability to conduct high priority research on rice and rice-based cropping systems.

Although the USAID training component previously was not directly included in the USAID-IRRI contract, many members of the CRIA staff have received training under provisions of the same ProAg which supports the technical assistance contract. All except two of the eleven completed or in-progress PhD trainees have been supported by USAID funds. Seven of the completed or in-progress MS trainees also have been supported by USAID funds. USAID funds have been used to support approximately one-third of

the trainees under specialized programs. Under the proposed project extension academic and short term training will be funded under the IRRI contract.

From the advanced degree programs, CRIA expects long-term improvements in research capabilities and planning. Specialized training is of a short-term nature and is primarily designed to give the senior scientists a competent staff of junior scientists and technicians who, by handling routine research activities can expand the research capabilities of the senior staff.

The IRRI program has assisted with the identification and placement of trainees. The present overall status is given in the table below.

<u>Specialized Training</u>						
	Advanced Degrees		<u>Rice Production</u>	<u>Cropping Systems</u>	<u>GEU*</u>	<u>Others</u>
	<u>PhD</u>	<u>MS</u>				
Completed	5	4	12	31	15	21
In-progress	6	7	-	10	-	-
Planned	<u>4</u>	<u>8</u>	<u>10</u>	<u>8</u>	<u>6</u>	<u>3</u>
Total	15	19	22	49	21	24

*GEU = Genetic Evaluation and Utilization

Output F -- Commodities and Equipment

Most of the expenditures for commodities were for direct support of the project scientists or the programs in which they were involved. Items purchased under the original five-year project were:

- Five project vehicles
- Three programmable calculators and accessories
- Power-tiller and accessories
- Grain threshing and drying equipment
- Protein analyzer
- Three electric typewriters
- Photocopier
- Mimeograph machine
- Four portable dictation units and two transcribers
- Standby generator
- Vacuum emasculator

The extension of this project has budgeted \$43,600 for commodities which will be required to supplement and modernize existing research equipment. These purchases will include but not be limited to sprayers, hand-tractors, harvesters, grain mills, dryers, agricultural chemicals and other new production and processing prototype machines to be used at the CRIA research station.

Flexibility in equipment purchases will be provided through a USAID waiver permitting local purchases of small farm machinery manufactured in Indonesia which will be used and tested in field situations.

4. General Appraisal

This project renewal is given exceptionally high priority by the GOI and USAID. The proposal is sound in design and cost estimates are appropriate to the level of effort intended.

The contractor (IRRI) has a strong staff with outstanding experience in rice breeding, rice-based cropping systems and conducting field trials. CRIA possesses a sizeable staff (600 technicians) and the field facilities and equipment for breeding nurseries, screening lines and conducting agronomic trials. Well-developed linkages have been established with universities, the Extension Service and other GOI agencies such as BIMAS. Cooperative efforts and field trials have been established with the Transmigration program in the outlying islands.

Five years of successful operation of the program under the original contract have established the base for the expectation that continued benefits will result.

5. Management Considerations

No unusual management problems are expected to arise in connection with the extension of this project. It is identical in concept and design to the present project which terminated February 8, 1977.

Noncontract funded inputs will be substantial. These inputs include activities of CRIA, BIMAS, the Extension Service, the Transmigration program and other GOI agencies. In addition IRDC (Canada) has contributed \$240,000 for the final two years of the original contract and it is anticipated that a like amount will be made available for the first two years of this extension. Also the World Bank financing of a three-man IRRI team at Sukamandi gives this project additional resources.

6. Environmental Considerations

No adverse environmental problems are anticipated from the proposed extension of this research project, nor from the adoption of the improved germplasm or cultural practices. The main thrust of this project is the breeding of superior rice varieties and the development of rice-based cropping systems for Indonesian small farmers.

USAID believes that this activity is not deemed a Major Federal Action (Section 1500.6, CEQ Guideline) since the project will have no significant effects which adversely affect such aspects of the human environment as air, water, land, flora, fauna and socio-economic conditions.

USAID further believes that the Threshold Decision should be negative, constituting a negative determination, because project activities are restricted to controlled experimentation and field application and as such are carefully monitored.

Part IV. Implementation Planning

Proposed research to develop increased production potentials: 1977 - 1980

1. Irrigated Agriculture

Breeding programs will be focused more sharply on the desired characteristics for each type of irrigation pattern -- as to length of growing season for maturation of high yielding varieties. The breeding program also is focused on combined resistance to the major insect pests and diseases, but this must proceed by successive steps to add resistance to individual pests, one at a time. Adaptation to temperature regimes, responsiveness to fertilizers, acceptable grain quality for eating are other traits to be incorporated or retained. A wealth of breeding material -- initial crosses, advanced segregating populations, and backcrosses to concentrate certain traits, is on hand for screening and recombinations in the ensuing three years.

Cultural practices under study that require field testing and trials on farmer's fields before promoting them as standard practices, include direct seeding vs. transplanting of the rice crops, effective placement of mineral fertilizers, methods and timing of nitrogen fertilization, effective use of pesticides, and methods of land preparation that will permit prompt planting of successive crops.

For "secondary" food crops, research has only begun. The great promise, indicated by preliminary varietal trials, should continue by extensive screening of available germ-plasm collections of soybeans, cowpeas, mung bean, and rice bean. There is merit in undertaking breeding programs to combine desirable traits of the more promising varieties. The length of growing season that must be met to permit including such "catch" crops in the yearly cropping pattern, is an important feature. Resistance to important pests will undoubtedly be a feasible goal. Plant types must be suitable -- probably the bush type with determinate growth will prove most useful, but this must be compatible with weed competition. Seed size, color, and cooking qualities are important characteristics to be evaluated.

The choice of secondary crops should recognize farm labor distribution to be feasible for small farmers. The addition of legumes in the rotation should greatly reduce the need for costly nitrogen fertilizer, if the legume crop is adequately inoculated with nodule bacteria. Such inoculation must not be taken for granted on irrigated soils. The need for mineral fertilizers (phosphate, potash) and lime must be tested for legumes since the mineral requirements are different from those for rice. Weed and pest control for the legumes may be

minimized when grown in rotations with irrigated rice but this remains to be proven. An important trait will be non-shattering of mature seed. Another problem, known to be serious, is the viability of legume seed produced in a humid climate, and stored for nine or ten months before planting.

Proposed research to develop increased production potentials:
1977 - 1980

2. Upland, Rain-Fed Agriculture

Research on rain-fed agriculture must of necessity be strongly site-specific; to deal with important soil classes, regional climatic patterns, present systems of land use and type of agriculture, and apparent market potentials. The complexity is reduced somewhat by focusing on food crop production, but there remains the necessity to select research sites that are reasonably representative of the region to be served.

The IRRI project undertakes to continue work on red-yellow podzolic soils and on other major land forms and soil classes on Sumatra. In each case, a survey of present farming patterns, as well as the characteristics of local rainfall patterns must be evaluated for every new location. These considerations will narrow the range of crop species chosen for intercropping, and to the extent that information is available on varietal adaptation, the most productive varieties will be selected. Soil improvement by application of lime, mineral fertilizers, nitrogen, and trace element needs may be predicted if field trials have been made elsewhere. Otherwise, exploratory field trials should be made with different fertilizers on test crops (guided by rapid soil tests in the laboratory) to identify major soil constraints and responses. Recorded rainfall patterns may be used to select the season when rice should be grown (having the greatest rainfall needs), and drought resistant crops (food grain legumes, and cassava) for seasons of lesser rainfall.

In addition to full testing of selected intercropping systems with component crop combinations, supplemental research will be needed for each crop species. This will include:

- (1) Performance testing of many varieties of each crop;
- (2) Identification of pest problems, and probable control measures;
- (3) Determining the unique fertilizer requirements on the soils under test, for each type of crop (rice, other cereals, food legumes, cassava, etc.);
- (4) Recording the length of crop growth period, which will dictate fitting particular varieties into a basic farming system;
- (5) Adjustments to distribute labor requirements over the entire year, and to reduce labor peaks to fall within the farm families capability;

- (6) Maximizing production of those food crops for which there are the greatest net returns;
- (7) Breeding programs to develop improved varieties -- more productive, suitable plant and seed type, pest resistance, etc.; and
- (8) Soil improvement research on nutrient supply, moisture supplying power, soil organic matter replenishment, etc., that are applicable to the predominant soil class for the region to be served.

Whenever an improvement is made in any of these components, it may be included in the appropriate farming system to determine its effect on net returns. The ultimate test is actual adoption by the small farmer on whose fields the trials are made. When proven profitable, the interplanting farming system is referred to the Extension Service for transmittal to farmers in the region.

3. Research project design and methods for secondary crops, in farming systems where rice predominates: (Farming Systems Design in Development of Interplanted Cropping Systems)

Initially, field surveys of farmers' production materials and practices are used to select those that appear to contribute most to favorable net returns. When the requirements for rice culture have been met, preliminary judgments may be made as to the secondary crops that can be fitted into the system. First consideration is given to an appropriate food grain legume (soybeans, cowpeas, mung beans or peanuts) since these are high-protein foods with high acceptability. Moreover, they are capable of making good yields without nitrogen fertilizer when seed is effectively inoculated with root nodule bacteria, they make significant contributions of residual soil nitrogen that enhances yields of subsequent crops, they have high market value, and they are comparatively tolerant to limited moisture supplies.

Other crop choices may be corn, grain sorghum, or cassava, all of which are valuable food stuffs. Cassava is the most drought tolerant and has the widest soil adaptation, but also requires the longest growth period (seven to ten months to produce a crop of roots). Preliminary screening of varieties for each species, and growth behavior when planted at various seasons, together with observations on incidence of diseases and insect pests, are made in special test fields under farm conditions. Total yields of the edible crop portions are the most significant indicators in these screening tests.

Following the initial screening and selection of the most promising crop types and varieties, these may be assembled into candidate farming systems. Each system is usually tested on at

least three farmers fields, in each of three or more localities. More than one system may be included in these tests to provide direct comparisons. The farmer is expected to permit detailed evaluation of his own system for comparison with the candidate system. Normally, the farmer also is encouraged to use any plant materials, fertilizers or pesticides, on a separate field, without specific guidance on their use. This permits a separate evaluation on the importance of management practices that are integral to the candidate farming system intended to maximize net returns.

To properly interpret yields and net returns, there must be fairly comprehensive field notes during the growing season for each crop to note any constraints (pests, weeds, nutrient deficiency symptoms, etc.) that may influence yields and crop quality.

The interpretation of results by the researcher is a necessary function, prior to the next round of experimentation.

4. Plans to Develop Linkages and to Facilitate Use of Research Results:

This subject has been discussed under --"Networks, Linkages and Feedback" earlier in this project paper. Additional information which will apply to the three-year project continuation is:

Under the improved Extension Service, as supported by the World Bank loan, subject matter specialists (SMS) in food crops will be trained to work with extension workers and farmers in provinces, districts and smaller areas. To date some 200 SMS have been trained by CRIA and the goal is to have, country-wide, 2,000 to supervise and guide the extension field workers. These specialists also will be trained in extension methodology.

In each region the local government has a board which supervises the direction research is to take, applies the research and conducts the field experiments. The existing number of locations for experimental fields will be greatly increased during the extended life of this project. Presently CRIA has seven experimental field areas in West Java, two in Central Java, six in East Java, one in Lampung, three in West Sumatra, three in South Kalimantan and three in South Sulawesi. Many of the plots are in farmers' fields and each experimental field consists of from 16 to 30 cropping pattern trials, 20 to 25 component technology plots and 18 to 35 farm recording families.

The transmigration resettlements are now utilizing research results and CRIA furnishes technical staffs in these areas. More technicians will be supplied in the future to assure proper land use and adequate, well supervised field plots on farmers' fields.

In addition, modern technology is made available through BIMAS -- Mass Guidance Program for Self Sufficiency in Rice and Secondary Crops. This program was established to assure that fertilizers, insecticides, seeds and credit are available. However,

there is some evidence that inputs are not being utilized by farmers to their fullest efficiencies. Under the extended project, efforts will be made to more fully include these inputs in experimental trials and on small farms.

Another research center exists at Maros in South Sulawesi in which the Dutch Government funds a contract with IIRI. This is part of the national policy of regional research station development, to more narrowly focus on specific problems found within natural agricultural areas possessing similar climatic, soil and socio-economic features. Over the past three years substantial progress has been made toward creating a modern field and laboratory facility, strengthening the research staff and developing well focused regional research programs. Effective linkages have been established with the Extension Service and the University of South Sulawesi. The major portion of present research activities concentrates on rice production problems.

Justification for this research center is that it represents a completely different climatic and soil environment; the area where field trials are being conducted is a savanna area. CRIA and the AID-supported IIRI team work closely with this station and its experimental programs.

5. Time Phase Work Plan and Evaluation:

Under the terms of the three-year project extension, IIRI will continue to provide technical assistance to CRIA with emphasis on Research Project Design and Methods as discussed under items 1, 2, and 3 of this section. To provide this assistance USAID will sign a contract with IIRI to provide the following experts:

<u>Technician</u>	<u>Work Months for 3-year period</u>
Rice Breeder	36 wm
Multiple Cropping Agronomist	36 wm
Statistician-Economist	36 wm
Information Services Specialist	6 wm (first yr.)

Over the past five years CRIA has demonstrated financial and administrative responsibility and competence in implementing the project. CRIA budgetary support for 76/77 is Rp. 1,913,400,000 (\$4.6 million). Each year the CRIA central administration and each department develops detailed research programs, staff expansion programs and building programs. This has provided the justification for the substantial budgets allocated to CRIA.

Each year the CRIA staff is augmented by returning trainees with advanced degrees and also each year the staff becomes more experienced and expert in budgeting, management and implementation.

The present contract expired February 8, 1977. However, activities are being continued on the assumption that funds are available for two months operations. The contract, which will continue to be a USAID contract with IRRI, should be signed as soon as possible and made retroactive to February 9, 1977.

The project will be evaluated on a regular schedule of reviews as well as by continuing review by the USAID project officer. For the life of the project full-scale reviews and evaluations will be scheduled for November, 1977, for September, 1978 and for July, 1979. Responsibility for scheduling these evaluations will be shared jointly by USAID, CRIA and IRRI. Addition of outside review team members will be at the option of the sponsoring organizations.

Attachments:

- A. Page 1 - Project Budget in U.S. Dollars
Page 2 - Project Budget in thousands of Rupiahs
- B. Logical Framework
- C. Non-Capital Project Paper (PROP),
dated 4/28/71
- D. Project Appraisal Report (PAR)
- E. Example of feedback from farmer to research center
- F. Letter from CRIA (Dr. Setari) requesting extension of contract

3/8/77

Project Budget *
(U.S. Dollars)

U.S. Dollars	<u>1st Year</u>	<u>2nd Year</u>	<u>3rd Year</u>	<u>Total</u>
1. Direct Salaries (114 WPI)	73,000	76,700	80,500	230,200
2. Fringe Benefits (Retirement & Insurance)	16,400	17,300	18,100	51,800
3. Allow (Post diff, cost of living, school)	20,500	21,575	22,675	64,750
4. Travel, Transportation & Per Diem including travel of counterparts to conferences in Asia)	30,000	23,000	47,400	101,300
5. Equipment & Supplies	35,500	4,100	4,000	43,600
6. Consultant salaries	25,000	12,500	12,500	50,000
7. Training (18 man-year academic)	40,000	81,000	41,000	
5 short-term overseas	17,500	17,500	17,500	
Incountry stipends & travel	9,200	6,100	3,000	
English language training	3,000	2,000	1,000	
	<u>69,700</u>	<u>106,600</u>	<u>62,500</u>	<u>238,800</u>
8. Other Direct	62,400**	2,400	2,400	67,200
9. Indirect Costs (9.5%)	<u>25,900</u>	<u>25,200</u>	<u>23,800</u>	<u>74,900</u>
Total	358,400	290,275	273,875	922,550

* Project year begins 9 February 1977.

** Includes \$ 60,000 for local currency costs during first year of extension (2.9.77 - 2.10.78) for which no Trust Fund rupiah are available.

Project Budget
(Punjab, 1969)

Punjab	<u>1st year</u>	<u>2nd year</u>	<u>3rd year</u>	<u>Total</u>
1. Salaries & wage (local employees)	7,410	8,151	8,966	24,527
2. Vehicle operation, insurance, repairs & maintenance	3,555	3,910	4,302	11,767
3. Supplies	378	416	457	1,251
4. Repairs & maintenance, including exterior and interior painting	990	1,089	1,198	3,277
5. Utilities	2,880	3,178	3,496	9,563
6. Travel (air)	4,830	5,321	5,854	16,013
7. Per diem	4,578	3,475	3,829	11,842
8. Miscellaneous	95	104	114	313
	<u>24,733</u>	<u>25,604</u>	<u>28,216</u>	<u>78,553</u>

(\$ 50,670)*

* Included on previous page under item 8 "other direct costs", first year column.

Project only
Nothing of
salaries of research (600)
workers lets in
beds, travel
maintenance
etc

78,553
2,880
2,880

Need PP corrected

NON CAPITAL PROJECT PAPER (PROP)

XXX ✓
1

Country Indonesia Project No. 497-11-110-~~207~~

Submission Date _____ No. ⁻¹⁹⁸ 497-207-PROP-9

Project Title: Agriculture Research

U.S. Obligation Span: FY 1971 through FY 1975

Physical Implementation Span: FY 1972 through FY 1976

Gross life-of-project financial requirements:

U.S. dollars ----- \$ 1,750,000

U.S. -owned local currency ----- -

Cooperating country cash contribution --- \$ 4,525,000

Regular Budget \$4,205,000

Trust Funds \$ 320,000

Other Donors: Ford Foundation, Japan,
Netherlands \$ 3,700,000

TOTAL \$ 9,975,000

SMS
Drafted: MSmith: AGR/REASON: PRO: 4/28/71

Cleared:
EDU *2806/71*
CONT *4/28*
TRG *4/28*
PRO *4/28*
SMD *4/28, 1971*
JAS *4/28*
AGR *4/28/71*
DIR *[Signature]*

I SUMMARY

This project supports the Indonesian National Five Year Plan's highest priority: increased agricultural production. The Government has recognized the importance of each of the five agriculture functions of production and has begun or is planning major programs in each area: research, dissemination of the new technology, distribution of inputs, provision of adequate credit on reasonable terms, and development of effective systems to market the products.

This project addresses the research function. Its goal is to develop and supply the improved technology required to support the other four functions. At a more specific level, the purpose is to establish a coordinated national program to plan and manage the use of agriculture research resources for the production of improved technology of high economic priority and to distribute that technology to agriculture education and extension institutions.

The importance of agricultural research is derived from the economic benefits of increased production which can result from applying improved technology to the vast, currently under-productive rural land and population resources. If the technology can be developed and applied, other potential benefits include reduction in the substantial foreign exchange expenditures for food and fiber imports, decreased costs of agricultural products, expansion of both domestic and foreign markets, increased employment of the rural population, and generation of capital necessary for continued economic expansion.

Substantial research capability exists in Indonesia which, if well managed, could quickly adapt and develop new technology. The most important contribution of this project will be training in management both at the senior administrative and the senior research discipline levels.

The targets specified in Part IV are, in summary: to coordinate and consolidate the activities of the multiple research organizations on research projects of high economic priority; to establish one specific project to develop improved varieties and techniques for rice and related crops as a model for other coordinated research projects; to institute professional development programs for research administrators and staff; and to establish the effective linkages with extension and education necessary for dissemination of the new technology to farmer producers.

*OK except
for specific
targets*

AS
The United States, along with the Ford Foundation, the Netherlands and Japan, will support the first national crop development project established under the aegis of the newly formed Board for Food Commodity Research. The first three donors will to a large extent work through contracts with the International Rice Research Institute. All assistance is summarized in Appendices A, B, and C.

11. SETTING

A. SIGNIFICANCE OF THE AGRICULTURE SECTOR TO THE NATIONAL ECONOMY

About 50 percent of the GNP in Indonesia currently is derived from agriculture. About 66 percent of the nation's labor force is involved in agriculture directly and the total proportion involved directly and indirectly in agriculture, agri-business and agri-industry is estimated at about 80 percent. Additionally, about two-thirds of the critical foreign exchange required for continued import of modern production technology, industrial raw materials and consumer goods was generated from agricultural exports in 1970.

However, agricultural production is at present inadequate to meet current effective demands for either staple foods or fibers. Imports of supplemental supplies of these products represent about 25 percent of the value of all imports.

The value of just that portion of these imports to be financed by foreign aid in 1971/72 according to Bappenas totals \$210 million. The economic effects of substituting local production for products now being imported would be increased national income, decreased budget allocations for subsidies and reduction in the national debt accumulation.

The retarded stage of Indonesian agriculture is illustrated by the index of per capita food production which in 1969 was 98 compared to the base period of 1957-59.

Thus, a major challenge to economic development in Indonesia emerges from the agricultural sector. The problem of increasing the level of farm productivity, expanding employment of the rural population and increasing capital formation for this major sector of the nation has been the most crucial issue in national development planning and program formulation outside of the stabilization issue. It is recognized that the serious limitations for increasing farm productivity are due to inadequate institutional capabilities in the five major production functions -- research, extension, distribution of inputs, credit and development of markets.

B. IMPORTANCE OF AGRICULTURAL RESEARCH

The Government of Indonesia has recognized the importance of each of the five production functions and has begun or is planning major programs in each area. Of these, the research function requires the longest lead time to affect production. Research programs must be initiated now to develop the yield potential and alternative profitable crops which will be required three to five years from now for both the domestic and export markets. The lead time extends to ten years for crops which have had little or no improved breeding recently.

The economic issues related to this project extend beyond the GOI's goal of self-sufficiency in rice. The need for rice imports is expected to decline steadily and, barring natural disaster or major epidemics of disease or insects, cease completely in three to four years. Therefore, self-sufficiency is not an economic justification in itself.

Not So.

The rationale supporting this project considers: (1) the factors involved in determining at which comparative price level it is economically more rational to import than produce indigenously, (2) the potential for increased agricultural production in Indonesia, and (3) the potential for decreasing the relative cost of food and fiber crops by increasing production efficiency and intercropping.

Import substitution for agricultural products that can be produced in Indonesia is not now in the nation's interest as long as the current under-utilization of rural labor and natural resources exists so extensively. Production can be increased substantially if high yield varieties and input-intensive technology replace traditional culture dependent upon varieties bred particularly with tolerance to low fertility. Increased production and its associated efficiency are the keys to potential reduction in the "relative" retail price of food and fiber to consumers, which in turn increases their purchasing power. Increased purchasing power is required to increase the domestic demand for agricultural products, as agricultural production potential is expected to exceed effective demand for certain products -- particularly rice -- in the near future. Crop diversification is required to provide alternative enterprises for land and labor displaced from rice production as the supply of rice begins to exceed the demand. Improved varieties and efficient production techniques must be developed for other crops to utilize this displaced labor and land for expanded domestic and export markets.

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Agriculture is the largest single enterprise in the nation currently and for the foreseeable future. Increased productivity and efficiency of this sector are objectives which must be achieved if the low national per capita income is to be improved both substantively and equitably. Increase in per capita income in this broad sector increases opportunity, directly or indirectly, for increasing capital generation required to self-finance further economic development.

A program to increase the productivity and efficiency of Indonesia's agriculture requires both an economic and technical approach. Assumed is a public policy committed to free markets and to improving the effectiveness of these markets to assure reasonable economic incentive. The technical factors required to increase agriculture production include the five major production functions, among which research is fundamental.

Genetic potential and efficient production techniques establish the outer limits to which the most efficient farmer producer can go in the use of inputs and credits to increase his yield and to establish the lowest cost of production to which the most efficient marketing system adds distribution costs to construct retail prices. Conversely, availability of genetic potential and efficient production techniques of themselves do not contribute to low cost production unless farmers know of their existence, can procure the inputs, have credit for their purchase and can sell their products through an efficient marketing system. Research information is essential to the interplay of all five major production functions. More than the other four, research requires time to effect improved production. A program to increase the research capability is therefore required as the first of the several agricultural programs.

Prior to proceeding with specific plans for development of an indigenous agricultural research system, the GOI made a survey of improved agricultural techniques as well as the sources of technical assistance, in order to determine which were superior to those available locally and the extent to which these could be procured. Importation of these goods, techniques or services would help bridge the gap until Indonesian agriculturalists could develop both the professional skills and institutions capable of providing them in country.

An example of this imported technology is the high yielding PB varieties of rice which were developed at IRRI and are now being used in Indonesia. These have been more productive than native varieties; however, they each have deficiencies which require improvement before optimum yields can be obtained. Indonesia's average yields of PB 8 and 5 (IR 8 and 5) are considerably below those obtained in Vietnam where the varieties were better suited to the prevailing insect and disease conditions. Similar to Indonesia, however, Thailand, Pakistan and India encountered serious adaptability problems, but these are being overcome by developing crosses with native varieties having resistance or high tolerance to indigenous insect and disease conditions.

Improved rice varieties are expected to be produced regularly by IRRI, and these could be an improvement over existing varieties, including other previously released IRRI varieties in Indonesia. However, either re-selection from this basic seed stock, or cross breeding is required to produce optimum yields and to satisfy Indonesian preferences as to taste and consistency.

For crops other than rice, the availability from foreign sources of improved genetic potential that is suitable for direct production is very limited. For many crops, however, considerable time could be gained in developing improved local varieties by increasing the use of selected foreign source germ plasm in plant breeding programs in Indonesia.

Therefore, while the recently developed international research centers such as IRRI and CIMMYT are important institutions accelerating improved agricultural technology for countries such as Indonesia, their roles are distinct and limited. Dr. N. E. Bouloug, the Nobel Prize winner for wheat breeding has appropriately defined the roles of these institutes:

"The international centers are not substitutes for sound, aggressive national programs. The international centers can and should be involved primarily in long-time research projects and as 'clearing house' and catalysts for the national programs".

A. H. Roseman adds in his recent book, Building Agricultural Research Systems in Developing Nations:

"Although the international institutes will be most important vehicles for developing new basic concepts or principles for improvement of agriculture in tropical regions, the increasingly critical adaptive and protective research will require competent attention to localized agricultural conditions in the individual countries."

The GOI recognizes, however, that more transferable for direct utility than varieties or production techniques and of greater long range importance is technical assistance. Besides those experts from foundations such as Rockefeller and IRRI, the East Asia area has many well trained breeders and agronomists in rice. Indonesia plans to continue to utilize the technology available from IRRI and, even more fully than previously, that which is available from neighboring countries in its future research programs. These sources of technology will be integrated as additional resources in the national agricultural research program.

C. THE INDONESIAN PROGRAM TO INCREASE AND IMPROVE AGRICULTURAL RESEARCH

To improve the agricultural research capability, in 1969 the GOI organized and USAID assisted in a Joint Research Study Group to inventory the resources available, identify the problems inhibiting their use and recommend principles and programs to establish a research capability commensurate with the needs of an industry as vast as agriculture. ~~AAA~~

The study group pointed out that there are two main channels for agricultural research in Indonesia: research institutes and universities, and both channels have deteriorated gradually since independence. The 32 institutes are administratively responsible to five Director Generals in the Department of Agriculture. On the other hand, the 24 universities, which have faculties in agriculture, animal husbandry and fisheries, are responsible to the Department of Education. Research activities of the two groups are conducted separately and have been uncoordinated except on an informal case by case basis. Furthermore, the institutes have operated with little coordination both between and within the Directorates General. 7 out

Each of these two groups has particular assets as well as handicaps for carrying out agriculture research. The institutes generally have ample land -- more than they can use -- but have only limited, untrained and underpaid staff. out

DIR./CIA 15
ASO REC./IPB

The universities have a larger number of technical agriculture personnel, but these people are occupied principally with the usual teaching and administrative responsibilities. Further, they have very little land at their disposal. Neither of the groups has adequate laboratory equipment and supplies or operating funds to maintain a regular research program.

The current weaknesses of the Indonesian agricultural research system were reported by the 1969 Joint Study group to be:

"(a) inadequate guidance and coordination at the national level ...; (b) extreme fragmentation of the national research institutions...; (c) absence of nationally coordinated, production oriented, problem solving research programs...; (d) isolation from the fruitful research programs underway currently in sister countries...; (e) a great paucity of scientific manpower trained for high levels of scientific and technical competence...; (f) non-utilization of the valuable research potentials existing in the agricultural facilities of the universities...; (g) a dearth of field, laboratory and library facilities...; (h) extremely low levels of salary and other compensation...; (i) an almost total absence of research at the province level...; (j) inadequate and ineffective links and coordination between research and extension, and (k) inadequate central facilities in land, buildings and equipment..."

To rectify the major administrative and organizational limitations of the research being conducted currently and to best utilize and economize on the particular assets of both the universities and institutes, the study team recommended:

a. The setting up of an Indonesian Agricultural Research Organization at the national level, (IARO)

b. The grouping together of the various central research institutes into one strong national agricultural research center, and placing it under the administrative control and technical guidance of the IARO.

**For further details on the current weaknesses of the Indonesian research system, see "Report of Survey and Recommendations on Organizations, Systems and Requirements for Research in Agriculture and Related Industries in Indonesia" by the Joint Agricultural Research Survey Team, July 18, 1969.

- c. The launching of a number of national coordinated research projects that are oriented towards production and problem solving and which involve teams of specialists from the universities and research institutes.
- d. The building of a national cadre of well trained, well paid and fully supported scientists through systematic and selective programs of recruitment and advanced training.
- e. The decentralization of agricultural research in the country by establishing and energizing a chain of experiment stations in the provinces to cover adequately the provincial needs for agricultural research.
- f. The forging of strong links between research, education and extension at the central as well as the provincial levels to ensure that the research effort is relevant to present as well as the future needs of Indonesian agriculture.
- g. The achievement of balance and coordination among programs and projects of foreign assistance so that they fit well into the national programs of research and training.
- h. The development of a master plan for a new National Agricultural Research Center with disciplines in agriculture, animal husbandry, social economics, forestry and fisheries.

In summary, the recommendations focus on management and the need for administrative leadership. The current research manpower and facility resources need to be coordinated and then to be concentrated on problem-oriented research programs backed with adequate financial and administrative support.

After consideration of the internal and external resources available and of the problems inherent in any major reorganizational change, the Department of Agriculture (DOA) has developed a phased program incorporating principles from the joint study recommendations.

In January, 1971, the Minister of Agriculture issued a decree establishing an advisory Board for Food Commodity Research. Its jurisdiction extends to the research operations of the Directorates General for Agriculture, Animal Husbandry and Fisheries. This board is authorized (1) to advise the Minister concerning the organization, administration and priorities to be followed in food commodity research; (2) to study and

evaluate research reports and proposals, the research program, manpower and the funds; (2) to coordinate cooperative efforts among government agencies as well as private organizations in carrying out food security research and (3) to conduct meetings with research scientists and to form technical groups at the central or provincial levels.

The Board consists of the Directors General concerned, the secretary of Bimas and representatives of the Departments of Education, Public Works and Trade as well as EULOG, Bappenas, LIPI and others as assigned by the Minister of Agriculture. The Chairman and Vice Chairman are appointed by and serve the Minister.

out

The Board as constituted is empowered to advise and coordinate. Influence over the budget is currently limited to review of requests. Administration of personnel, programs and budget continues to be the responsibility of the three Directors General concerned.

out

The Board, however, is empowered to advise the Minister concerning organization and administration of research programs with the clearly implied intent that effective coordination of available resources is its responsibility. This decree provides flexibility to evolve gradually an effective system based on experience rather than a prescribed program transplanting a system from another country.

out

Inherent in this flexible approach is the possibility that the board will perfunctorily approve gestures of coordination by the concerned Directorates. While this possibility exists, the representation on the board of concerned agencies other than agriculture introduces an element to support the broad national interests. Further, the continued GOI administrative interest to improve the research system has indicated that it is prepared to make additional modifications to strengthen the coordination structure, if necessary.

As to the second administrative change to improve the research program, the DOA has accepted the principle proposed by the joint study group that "national coordinated research projects are perhaps the most potent vehicles for making wide-ranged thrusts in research for the expeditious development of new agricultural technology that would create an immediate and substantial impact on production per unit area and per unit of time".

At the request of the CGI, Ford Foundation provided the consultant services of Dr. Shastri, Coordinator of the India Rice Project, to outline the procedures for the formation of the National Rice Research Program (NRRP), which would focus principally on rice, but would include other crops grown in multi- and inter-cropping systems with rice. Shastri recognized that the "task may appear formidable, but can ... be accomplished so long as the NRRP is not seen as yet another research institute - but only as a program, ... which plans and coordinates the work of the institutes and universities.

Following Shastri's plan, an NRRP Coordinator (and a Joint Coordinator as an advisor from IRRI) has been appointed to provide research leadership. He will coordinate and administrate the work of three task forces: production (biologic sciences), education, and economics. out

Most countries utilizing the project approach have limited the coordination effort to the biologic sciences, which includes the work in production and protection by plant breeders, entomologists, pathologists, physiologists, agronomists, soil scientists, and others. However, the task forces for education (covering formal education and the extension program) and for economics (dealing with credit, inputs and produce marketing) are included in the NRRP in order to strengthen the linkages that are so essential to a unified national crop production program.

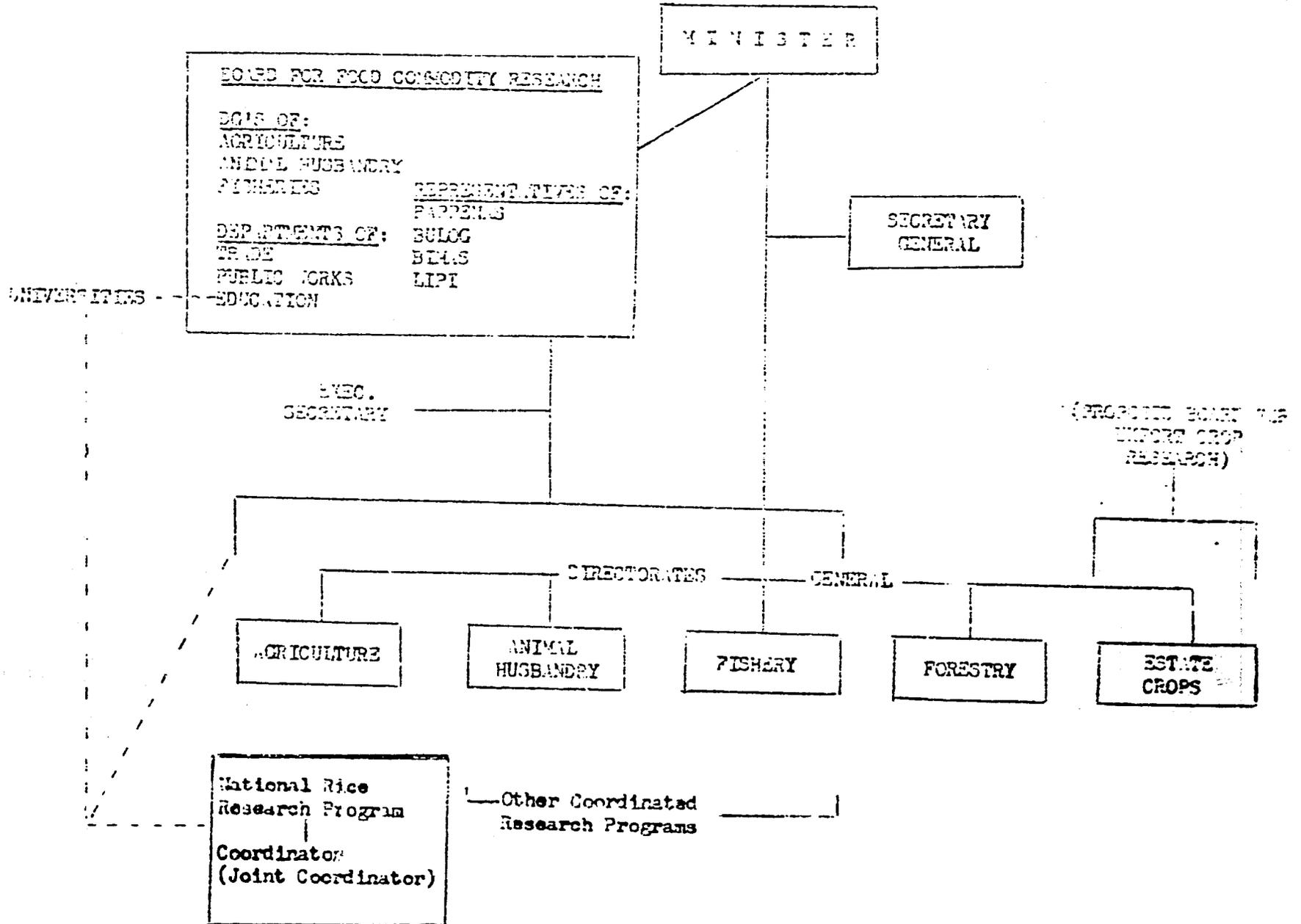
The leaders and members of the working groups in each task force were organized and first brought together in July, 1970. In April, 1971 they reported the results of the past year's work in another plenary session which was immediately followed by a working session of all the group leaders to develop a detailed research plan for the NRRP. They are currently working on this plan with the assistance of the joint coordinator from IRRI.

Of the eighteen research institutes in the three Directorates General represented on the Board for Food Commodity Research, only three are involved with rice or crops multi-cropped with rice, and only these three will be included in the NRRP. They are the Central Research Institute Bogor (CRIA), Soil Research Institute (SRI) and the Horticultural Research Institute (HRI). These three institutes have seventy-five field stations on Java, Sumatra, Sulawesi, and Kalimantan.

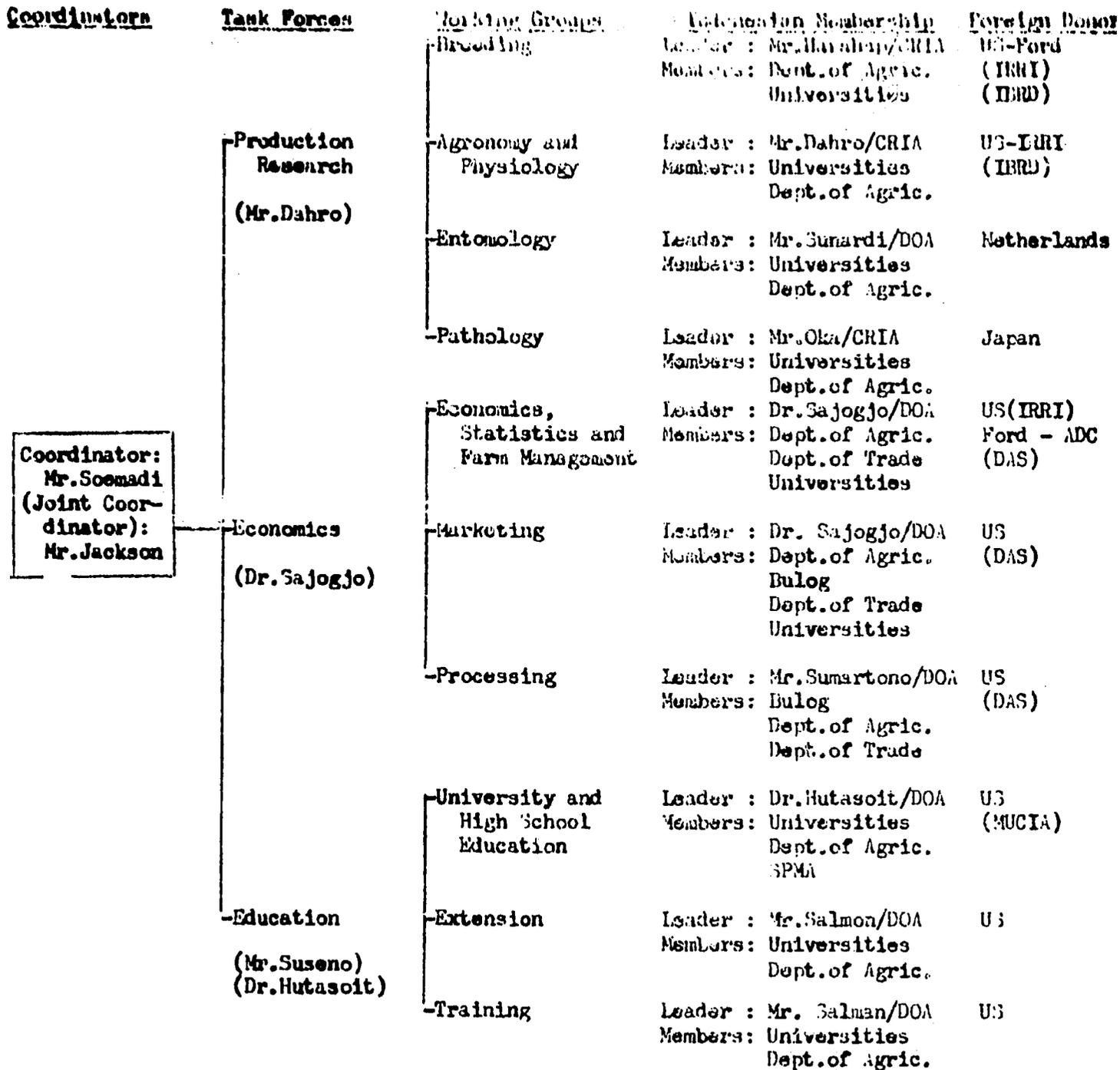
Of the twenty-four universities, two have been teaching agriculture much longer than the others and have been assigned a leadership role to assist the others. These two "leader" universities, also known locally as Pambina universities, are themselves being upgraded through the USAID Higher Agriculture Education Project. Staff members of these two and of the other universities are also members of each of the three task groups in the NRRP.

A diagram of the Department of Agriculture organization incorporating the new Board for Food Commodity Research and one detailing the NRRP structure follows:

DEPARTMENT OF AGRICULTURE
FIRST PHASE RESEARCH ORGANIZATION



ORGANIZATION OF THE NATIONAL RICE RESEARCH PROGRAM
(NRRP)



III. Strategy

The National Five Year Plan gives top priority to increasing agricultural production in Indonesia. The goal of this project is to develop the new technology required in the "production mix" of the five basic functions of agricultural production. The purpose is to establish a coordinated national program to plan and manage the use of agriculture research resources for the production of improved technology of high economic priority and to distribute that technology to agriculture education and extension institutions.

The project strategy is closely aligned with the recommendations of the 1969 Joint Research Study Group and is being implemented at two levels. First, at the department level, the Board for Food Commodity Research has been established to formulate national policy and coordinate research operations for food commodities. (Another Board will be established subsequently to determine and govern policy for research and production of export crops.) Secondly, a coordinated production project, the National Rice Research Program, has been initiated to establish priorities and to concentrate the research resources of the institutes and the universities on improving technology, principally for rice. The assumption is that once the problems of planning and coordination have been solved for this high priority crop, national production programs can and will follow for other crops as well as for livestock and fish, etc.

The most important USAID contribution to this project will be training and management support both at the senior administrative and the senior research discipline levels. Therefore, while research techniques must and will be improved under the direction of the IRRI advisors, the main focus will be on improving the management and administration of research.

For carrying out this strategy, two of the key advisors will be the Joint Coordinator of the NAKP (already in Indonesia under Ford Foundation sponsorship) and the proposed senior research administrator (to be contracted by USAID) who will be the counterpart of the Executive Secretary of the Board for Food Commodity Research. An important task of these two advisors will be to help train at least three Indonesian project administrators so that the almost total lack of this kind of management talent in Indonesia will be partially remedied when USAID assistance has been completed.

These two IRRI advisors will also assume many of the responsibilities for overall project management, thereby keeping to a minimum the workload of USAID's small direct hire agriculture staff.

*No
work*

A crucial part of the purpose of this project is improved distribution of the technology -- new varieties and farming methods -- to the extension and education institutions which are, in turn, responsible for delivering the information to the final beneficiaries -- farmers, teachers, and students. Therefore, an important assumption for the ultimate success of this project is that those institutions can or will be able to carry out their part of the task. //

There are several programs being assisted through USAID or other donors which should help make this a reliable assumption, and those programs are formally and informally linked with this project. As mentioned in Part II, the USAID-supported Higher Agriculture Education project is helping to upgrade the two Fambina universities. Several of their staff also hold positions in the three institutes in this project and are members of the working groups of the NERP.

The World Bank is in the final stages of approving a loan to develop the National Seeds Corporation which will mass produce and distribute seed for new varieties developed under this project.

During the past three years, the extension service has been improving the training of its agents and of farmers with the help of a USAID technician, and other improvements are being made or planned (see Part IV).

Finally, operational and policy level officials responsible for government programs for each of the five agricultural production functions are represented on the Task Forces of the NERP and the Board for Commodity Crops Research.^{4P} To supplement Indonesian efforts in this project to modernize the agricultural research capability, the GOI has requested that the governments of Japan, Netherlands and the United States and the Ford Foundation to provide technical assistance, commodities and participant training.

The Ford Foundation and USAID have agreed to channel their support through contract arrangements with IRRI. IRRI was selected as it is the most qualified research institution in the South and East Asia tropic region in both rice and the multi-inter-crop techniques.

The Netherlands plans to furnish part of its assistance directly and part through IRRI. Japan plans to furnish all of its assistance directly but has agreed, as have all donors, to coordinate its assistance with the NERP. IRRI has agreed to provide technical leadership, personnel and services

in accordance with funds and terms provided by any of the donors.

Ford Foundation, Japan and the Netherlands have already made their support commitments to the NRRP project. Appendix A provides a summary of all the donors' contributions.

IV. Targets and Action Steps

By the time the project is terminated in FY 1976,^{1/} the following targets will have been attained through the course of action summarized for each target. A project budget is contained in Appendix B.

A. The Research Program

1. Target:

The Central Research Institute for Agriculture (CRIA), the Soil Research Institute (SRI), the Horticulture Research Institute (HRI) and the university faculties involved in NRRP and subsequent coordinated agricultural commodity programs will orient developmental research to national priorities as determined by the Department of Agriculture and Trade and by the economic planners of Bangladesh on the basis of effective market demand and market potential.

Action:

- a. In FY 1972 the above cited economic planners will, through the NRRP working group on economics, determine market demands and potential for rice and related rotation crops for both domestic and export markets.
- b. In FY 1972 the economic Task Force in cooperation with the research Task Force will jointly determine priorities for biologic research programs considering both market demand and the biologic opportunities to increase both yield and economy of production to meet these demands.
- c. In CY 1972 economic working group will assist the production research task group to develop the GOI FY 73/74 budget requests for all agricultural

1/ All U.S. fiscal years (FY) unless otherwise indicated.

research to be presented to the national economic planners. Subsequently, steps a, b, and c will be regular annual functions.

2. Target:

The three institutes and the university faculties concerned will develop improved varieties and techniques for rice and other related crops adapted to the major rice cropping areas. 2

Action:

a. The rice and general crop breeder experts under the contract will review the current variety development program with GOI counterparts in US FY 72 and by the fourth quarter will have developed the particular plan for each research institute and faculty to introduce those improved research techniques required to develop a progressive crop breeding program.

b. The rice and general crop agronomists under the contract will review the current fertilizer, insect, disease, weed and other cultural research programs with their GOI counterparts in US FY 1972 and by the fourth quarter will have developed the particular plan for each research institute and faculty to develop a progressive crop cultural program.

3. Target:

The three institutes and the university faculties concerned will expand or initiate breeding and production techniques research for crop diversification including cereals, pulses, vegetables and fodder crops for areas other than the major rice cropping areas. 3

Action:

a. In FY 1973, the contractor's breeders and agronomists with their GOI research counterparts and NRRIP economic working group will assess the market potential for these types of crops and determine priority subject matter and geographic areas for developmental research.

b. In the last half of FY 73 limited adaptability trials will be initiated to screen existing varieties and techniques for their agronomic and economic response.

c. In FY 1974, contractor's breeders and agronomists and the GOI research counterparts will outline and initiate priority selected breeding and technique research programs to improve deficiencies in existing programs.

B. Coordination and Consolidation

1. Target:

The Board for Food Commodity Research will coordinate the allocation of agricultural resources between the Directorates, Institutes and Universities to reduce avoidable duplication of research programs.

Action:

a. The Board will require all agencies receiving budgetary support for agricultural research to submit GOI FY 1972/73 proposals and budgets for review. The Board will negotiate adjustments in proposals to eliminate duplication. It is assumed that all Department of Agriculture requests will be negotiated finally by this Board.

b. Final budget recommendations will be made to the Minister of Agriculture and any unresolved differences between these and the requests by the universities will be resolved by the two Ministers or the Cabinet through the Department of Education

2. Target:

The Board for Food Commodity Research will concentrate research activities in the minimum quantity of physical facilities and manpower required to support national agricultural production targets.

Action:

a. After economic priorities are established in the last half of FY 1972, researchers and statisticians will develop the most economical layout required to conduct the developmental research.

b. Specific consideration will be given to allocating available land for use by the universities who already have administrative buildings, some laboratories and considerable trained technical staff available to do research in addition to their academic duties.

c. Any resource in excess of requirements in a given area will be made available for other uses such as extension training centers, other official agencies or for commercial use.

d. Advanced laboratory work will be confined increasingly to a limited number of well equipped central institutes or regionally selected university laboratories. A plan for this consolidation will be presented to the BFCR by the end of CY 1972.

C. Training

1. Target:

The Central Research Institute for Agriculture (CRIA), the Soil Research Institute (SRI) and the Horticulture Research Institute (HRI) will have staff with recent advanced training in the most critical senior subject matter positions, and 12 research staff will receive advanced degrees.

Action:

a. In September, 1971, 4 participants selected from senior research positions of the above institutes will be sent to the U. S. for two years of academic training. They will return to Indonesia or the Philippines for their field research work and PhD dissertation. They will be on board again starting in FY 1975.

b. 2 participants will be sent for similar training during each of the next four years beginning in FY 1973.

2. Target:

The above three institutes and the university faculties concerned with the NRRP and subsequent coordinated agriculture commodity programs will have developed organized training programs to continuously provide professional development for all their first and second echelon staffs.

Action:

a. During FY 1972, an IRRI specialist in training will be assigned to assist the NRRP coordinator and the training sub-committee of the NRRP research task force to develop training policy and programs. A training work plan will be submitted to the NRRP coordinator by the end of CY 1972. The Extension Training Working Group will assist the sub-committee in developing visual aids, including photography.

b. Consultants and contract staff will assist the GOI staff in conducting subject matter seminars for the research staff of the institutes and university faculties. Five seminars will be held each year for four years beginning in FY 1973.

3. Target:

Central Research Institute for Agriculture, Soil Research Institute and the Horticulture Research Institute will have routine technical seminars for keeping all sub-professional staff informed on concerned subject matter and technical progress.

Action:

a. One half of the CRIA province station staff will be provided two months' training in the first half of FY 1972 at the Central Institute. CRIA staff and several of the 9 participants recently trained at IRRI in biometrics will conduct this training.

b. The second half of the provincial staff will be trained in the last half of FY 1972.

c. Semi-annual training will be continued thereafter for CRIA staff.

d. SRI and HRI will institute similar training for sub-professionals in FY 1973.

4. Target:

The Board of Food Commodity Research will have developed not less than three administrators who have the capability to organize, operate

and evaluate national research and staff development programs.

Action:

a. In FY 1973 the contract Senior Research Administrator and Food Commodity Research Board's Executive Secretary will identify and select researchers with demonstrated management potential for advanced management training. They will develop in-service training to provide a variety of assignments within the department, in-country academic training and, if applicable, participant training in other South and East Asian countries. This training will be completed for not less than three administrators by the end of FY 1975.

D. Management

1. Target:

The Board for Food Commodity Research will promote reorganization of the three institutes to provide a pyramid of collective responsibility in officers of increasing rank thereby increasing a chain of command of both supervision and responsibility.

Action:

a. By FY 1973, the contractor's Senior Research Administrator and the Food Commodity Research Board's Executive Secretary will assist the three Director Generals to identify the organizational modifications necessary and develop a plan by the last quarter FY 73 to implement these modifications.

E. Utilization of Research

1. Target:

The Board for Food Commodity Research will strengthen linkages with extension particularly through the NKRIP to increase the flow of technology to the farmer and the flow of producer problems back to the research institutions.

- a. The Central Research Institute for Agriculture for the first time will include on its staff at the National Rice Training Center at Muara, Bogor in FY 1972, four extension subject matter specialists who will have been trained in rice and multi-crop production at IRRI. Also during FY 1972, these four specialists who will work under the supervision of the CRIA Training Center Director, will train 80 other extension subject matter specialists. These will, also for the first time, be added to the extension staff and assigned four to each residency in Java. Each training period will accommodate 30 trainees, and by the end of FY 1972 all the local specialists for Java will either have been trained or be in training. Extension crop specialists are under consideration for the outer islands in later years.**
- b. Improved linkage can be developed most quickly and extensively at the province level. The research results from the provincial experiment stations will determine which varieties or techniques are best adapted to individual localities. The new extension service, crop subject matter specialists referred to in (a.) above will maintain routine contact with the experiment stations in the province of their assignment, thereby providing a communication link to inform the extension field agents promptly of new research developments. These field agents will in turn conduct farmer education and demonstration programs to promote the new varieties and production techniques.**
- c. The farm management section of the economic Task Force starting in the last half of FY 1972, will routinely analyze the production techniques developed by research. In cooperation with the research and education Task Forces... they will select the production techniques with the greatest economic advantage to the farmer producer and to the nation for promotion by the extension service.**
- d. Research personnel both at the provincial stations and at the central institutes and universities will assist the Extension Service develop visual aids for both in-service training for extension field agents and farmer education programs. This activity will start in FY 1973 and be continuous thereafter.**
- e. The provincial and university research stations will be used for field days for selected innovative farmers starting in FY 1973. Here they will observe developmental research and can discuss varieties and production techniques about to be released for general farmer use.**

f. National extension, research and economic leaders will jointly plan annual production programs under the leadership of the NRRP coordinator starting in the last half of FY 1972.

g. Subject matter specialists of the national extension staff will attend any of the appropriate five annual training seminars conducted principally for professional development of researchers (see C. 2 above).

V. Implementation Details

Rewrite

1. Technicians

USAID will provide research specialists in plant breeding, agronomy and ~~statistics~~ ^{economies and special consultants as needed} to complement the entomologists, plant pathologists, nutritionists and seed production technicians provided by other donors. These technicians will balance the specialist component required to assist senior GOI researchers plan and conduct coordinated research operations and to plan and conduct in-service training programs. ~~These programs will be under the leadership of the NRRP coordinator and Ford financed IRRI joint coordinator.~~

A contract, to be negotiated with IRRI, will include staff, ~~that portion of the training which will be conducted by IRRI,~~ and all commodities, except possibly those residence commodities which may be furnished by the U. S. Joint Administrative Office (JAO) and chargeable to Trust Funds (See Part 2. b below).

W.M.M.
In the last half of FY 1972, USAID will provide a senior research administrative advisor also under contract through IRRI. This support is contingent upon continued satisfactory GOI support to the NRRP and acceptable progress of the program.

2. Commodities

a. Research facilities

Commodities will be required to supplement or modernize existing research equipment, ~~at primarily the three institutes.~~ These will include, but not be limited to, ~~laboratory glassware, ganninating equipment, drying ovens, centrifuges, microscopes, reagents, balances, refrigerators, sprayers, roto-tillers, harvesters, grain mills, dryers,~~ agricultural chemicals and other new ~~grain~~ production and processing prototype machines, and *equipment for the new Office of Information.*

b. **Technician Support**

1. ~~Three~~ The Department of Agriculture will provide a house for each of the full time contract employees and their families. These houses will meet comparable standards for Government of Indonesia housing provided to other foreign specialists. The cost of renovation, furniture, and equipment will be borne by the GOI.

2. One vehicle for each technician will be provided through the contract in accordance with AID approved procurement procedures.

3. **Participant Training**

Twelve research staff of senior rank will be provided advanced degree training in the United States. Insofar as possible, these trainees will do their research work and dissertation in Indonesia or the Philippines. This has particular benefit not only to close the considerable relevance gap between U.S. academic training which is oriented to temperate conditions and sophisticated techniques and facilities, but also to establish further support for this practice which has just recently been initiated in the Higher Agricultural Education Project.

Fifteen rice research staff and fourteen multi-crop research staff are scheduled for third country training. This training will be largely at IRRR or the University of Philippines College of Agriculture (UPCA) although some training is conceivable in other South East Asian countries where special tropical production technology is well developed.

Candidates selected for training will be utilized in in-service training programs in addition to their research operations upon return. Selection of candidates will be coordinated with the Konsortium and MUCIA and other Donors to the extent practical to create balance in the various specialty fields for which training is provided.

By 1975, degree candidates will be available in some subject matter fields from the two Pembina universities. The proposed training in this project is planned largely to bridge the gap until qualified Indonesian scientists are available from local universities.

Details of the timing and cost of technical assistance, commodities and participant training are provided in the summary table attached at the end of this section.

Appendix A

MULTI-LATERAL SUPPORT FOR NRRP
FY 1971 - 1977

(In \$1000's)

DONOR	TECHNICAL ASSISTANCE		Value	COMMODITIES	PARTICIPANT TRAINING	TOTAL GRANT SUPPORT
	Professional Specialty	Number				
Ford Foundation (THRU IRRI)	Senior Agriculturist (counterpart to NRRP Coordinator)	1	450	75	225	750
JAPAN (Direct)	Plant Pathologists Rice Nutrition Seed Production	3 1 2	750	500	200	1,450
Netherlands (Direct (THRU IPRI)	Entomologists Agro-Ecologist Research Station, South Sulawesi (Short time consultants)	1 1 1	50	100 400	150 50	1,500
SUB TOTAL		12	2,000	1,075	625	3,700
U.S. (THRU IRRI)	Breeder Rice Breeder-other Crops Agronomist-Rice Agronomist-Other Crops Statistician Research Admin. Adv. (counterpart. Exec. Secretary Food Commodity Research Board and Export Crops Research Board)	1 1 1 1 1 1	1,200	252	298	1,750
TOTAL		18	3,200	1,327	923	5,500

Appendix B: Project Budget

B 1. Summary

(Costs and Funding in \$ 000)

Item	Description	FY 1971	1972	1973	1974	1975	1976	1977	Man Months	Total
Technical Services	Advisors	--	6	6	6	6	3	--	285	
	Consultants	--	6	6	6	6	--	--	12	
	Cost		250	300	300	300	50	--		1,200
	FY Funding	150	400	300	300	50	--	--		(1,200)
Commodities	Cost		74	75	82	24				252
	FY Funding	20	125	82	24	--				(252)
Participant Training	Number		11	13	13	13	9	4		
	Cost		53	65	56	52	44	23		298
	FY Funding	34	29	56	52	67				(298)
Total Cost			379	440	438	376	94	23		1,750
Total Funding		204	615	438	376	117	--			1,750

B. 2. Project Budget Details
Agriculture Research (497-11-110-207)
 (Costs and Funding in \$ 000)

A. Technical Services		FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	People	Man Months	Total
Agr. Research Adm. Advisor	Number Quarters (Duty)	0	1	1	1	1	1	1	48	
	Cost		25	50	50	50	25			200
Rice Breeder Agronomist Consultants (from IRRI)	Number Quarters (Duty)	0	2	2	2	2		1	48	
	(No.-Total Man Months)		(4-2 Man Mo)	(4-2 Man Mo)	(4-2 Man Mo)	(4-2 Man Mo)		16	8	
	Cost		103	103	103	103				412
Statistician	Number Quarters (Duty)		1	1	1	1		1	48	
	Cost		47	47	47	47				188
Other Crops Breeder Agronomist Consultants (from IRRI)	Number Quarters (Duty)		2	2	2	2	2	1	48	
	(No.-Total Man Months)		(2-1 Man Mo)	(2-1 Man Mo)	(2-1 Man Mo)	(2-1 Man Mo)		8	8	
	Cost		75	100	100	100	25			400
Technical Services										
TOTAL COST			250	300	300	300	50	6	208	1,000
(BY FUNDING)		150	400	300	300	50		24	12	1,100

B.2: Project Budget Details (Cont'd.)
(Costs and funding in \$000)

Commodities		FY 1971	1972	1973	1974	1975	1976	1977	1978	No.	Man Mos.	Total
Cost FY Funding		20	71 126	75 82	82 24	24						252
Training		a b c ⁽¹⁾	a b c	a b c	a b c	a b c	a b c	a b c	a b c			
Long Term (Rice and other food crops)	<u>U.S.</u> Group A Group B Group C Group D Group E		4-12-36	4-12-29	2-12-15	2-12-15	2-12-15	2-12-15	2-12-15	12	276	197
	<u>Non-US Portion</u> <u>Academic Trg. (d)</u> Group A Group B Group C Group D Group E				2-12-8 2-12-0	1-12-4 1-12-0	1-12-4 1-12-0	1-12-4 1-12-0	1-12-4 1-12-0	12	144	24
Short Term	<u>3rd Country</u> Multi-Crop Rice		4-6-10 5-6-12	4-5-10 3-6-8	3-6-8 3-6-7	3-6-8 3-6-7	3-6-7			14 15	84 90	36 41
Total Train. Cost FY Funding		34	58 89	65 56	56 52	52 67	44	19	4	53	594	298 298

Note: (1) a = Number participants
b = Months of Funding
c = Cost

d = Assumes 1/2 of the participants program at UPCA or IREI and 1/2 programmed at an Indonesian University for Ph.D. Philippine costs \$4,000/yr - Indonesian students will be supported by funding.

APPENDIX C.1: OBLIGATIONS TABLE - USAID

	<u>Ap</u>	<u>L/G</u>	<u>Total</u>	<u>Cont</u> non add	<u>Personnel Serv.</u>		<u>Participant</u>		<u>Commodities</u>		<u>Other</u>	
					<u>AID</u>	<u>PASA</u>	<u>CONT</u>	<u>DIR.</u>	<u>CONT</u>	<u>DIR.</u>	<u>CONT</u>	<u>DIR.</u>
FY 1971	TC	G	204	204		150		34		20		
FY 1972	TC	G	615	615		400		89		126		
FY 1973	TC	G	438	438		300		56		82		
FY 1974	TC	G	376	376		300		52		24		
FY 1975	TC	G	117	117		50		67		-		
All Sub.			-	-		-		-		-		
Total Life	TC	G	1750	1750		1200		298		252		

Appendix C.2: Obligations Table - Host Country and Other Donor
(in \$'000 equivalent 1/)

GOI FY	AID Controlled Local Currency		Other Cash Contribution Cooperating Country 3/	Other Donor Funds 4/
	U.S. Owned	Country Owned <u>2/</u>		
FY 1971/72		95	530	
FY 1972/73		53	600	
FY 1973/74		53	675	
FY 1974/75		53	750	
FY 1975/76		53	800	
FY 1976/77		13	850	
All Subs.		-	-	
Total Life		320	4,205	3,700

1/ Exchange rate US\$1.00/Rp. 378.

2/ Trust funds provided by GOI and administered by USAID.

3/ Department of Agriculture budget funds for the three institutes in the project.

4/ See Appendix A for a breakdown by donor. A breakdown by year is not available.

already abstract

PROJECT APPRAISAL REPORT (PAR)

Attachment No. D

PAGE 1 of 8

1. PROJECT NO. 497-11-110-198	2. PAR FOR PERIOD: 2/74 TO 11/76	3. COUNTRY Indonesia	4. PAR SERIAL NO. 77-4
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5. PROJECT TITLE

Agricultural Research

6. PROJECT DURATION: Began FY <u>72</u> Ends FY <u>77</u>	7. DATE LATEST PRIP 4/28/71	8. DATE LATEST RIF -	9. DATE LATEST PAR 4/11/74
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10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: \$ 1262	b. Current FY Estimated Budget: \$ 100	c. Estimated Budget to completion After Current FY: \$ 770
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11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME	b. CONTRACT, PAR OR IRL, AB, NO.
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International Rice Research Institute (IRRI)

AID/ead - 185

I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X)			B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
USAID	AID/W	HOST		
			<p>CRIA, with the concurrence of the Agency for Agricultural Research and Development, has made a formal request to USAID to continue funding the IRRI contract until such time as the facilities are completed and staff assigned to implement the IBRD loan (1179) for rice and secondary crops research at the new National Research Center.</p>	
*	*	*	<p><u>Action:</u> Prepare a revised Project Paper to continue the contract for an estimated 3 year period.</p> <p>Project 497-0-0263, Sumatra Agricultural Research Project, is a logical extension of the concept of assistance to CRIA and in the same manner will provide technical assistance, training, and the development of physical facilities for a network of research stations on the island of Sumatra. A PRP for this new project was sent to Washington in October 1976.</p>	December 1976

D. REPLANNING REQUIRES	E. DATE OF MISSION REVIEW
REVISED OR NEW: <input checked="" type="checkbox"/> PROP <input type="checkbox"/> PIP <input type="checkbox"/> PRO AG <input type="checkbox"/> PIO/T <input type="checkbox"/> PIO/C <input type="checkbox"/> PIO/P	

PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE Walter C. Tappan <i>WCT</i> 18 NOV. 76	MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE Thomas C. Niblock <i>TN</i>
Robert F. Zimmerman <i>RZ</i> PRO/Evaluation	

II. PERFORMANCE OF KEY INPUTS AND ACTION AGENTS

A. INPUT OR ACTION AGENT CONTRACTOR, PARTICIPATING AGENCY OR VOLUNTARY AGENCY	B. PERFORMANCE AGAINST PLAN							C. IMPORTANCE FOR ACHIEVING PROJECT PURPOSE (X)					
	UNSATISFACTORY		SATISFACTORY			OUT-STANDING		LOW		MEDIUM		HIGH	
	1	2	3	4	5	6	7	1	2	3	4	5	
1. International Rice Research Institute						X							X
2.													
3.													

Comment on key factors determining rating: Over the past 2.5 years contract performance has been outstanding. Early ground work has provided a firm base for developmental research. As confidence and credibility has developed between the CRIA and IRRI staffs, and as trainees began to return from specialized short courses in research methods, cooperative research programs in varietal improvement, cropping systems, and agricultural economics have focused on priority problems. Important results, which should have bearing on future national development activities, have been generated by these research programs. Perhaps more importantly, CRIA scientists are fully conversant with the program's objectives and research methods and, as a result, the programs should continue to address priority issues and produce useful results for many years. (Continued page 5)

4. PARTICIPANT TRAINING	1	2	3	4	5	6	7	1	2	3	4	5
					X							X

Comment on key factors determining rating: A CRIA Assistant Director for Manpower and Training has been appointed and who is responsible to develop and keep current a training program for participants. As individuals become eligible, they are processed through GOI agencies for clearance. When necessary, trainees are placed in an English language training course to bring them up to the standards required for the proposed training program. (Continued page 5)

5. COMMODITIES	1	2	3	4	5	6	7	1	2	3	4	5
				X						X		

Comment on key factors determining rating: Since 1974 commodities have been ordered as needed, to be used in the research programs; these are being used effectively. Many items have since been turned over to CRIA in accordance with the Project Agreement, i.e. one motor vehicle, all calculating equipment, and most of the equipment used directly in research programs. Adequate inventory records are maintained. (Continued page 5)

6. COOPERATING COUNTRY	a. PERSONNEL											
	1	2	3	4	5	6	7	1	2	3	4	5
					X							X
	b. OTHER											
						X						X

Comment on key factors determining rating: Although in the past the lack of personnel immediately qualified for training was a constraint, this situation has been measurably improved. Also, new additions to the CRIA staff, many of whom are recent university graduates, serve as a pool of future trainees. The CRIA administration is highly aware of the importance of scientific manpower development towards the achievement of national research goals over the long-run, and is making every effort to take advantage of training opportunities -- even at some expense to current program activities. Furthermore, funds for travel have never been lacking once a participant has completed processing. All returned participants are properly employed, and IRRI staff are adequately counterparted.

Total CRIA budgetary support for IFY 75/76 and IFY 76/77 is Rp. 1,708,000,000 and

(Continued pages 6 & 7)

7. OTHER DONORS	1	2	3	4	5	6	7	1	2	3	4	5
				X								X

(See Next Page for Comments on Other Donors)

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11. 7. Continued: Comment on key factors determining rating of Other Donors. Other donors have specific portions of the rice and secondary crops research program for which they provide assistance. The Netherlands provide assistance in entomology and physiology, and a grant to IRRI for the Maros station for research on rice and secondary crops. The Japanese provide assistance in plant pathology and nutrition. IBRD Credit # 246-IND provides four IRRI staff and research equipment for the National Research Center. In December 1975 a loan agreement was signed with the World Bank (1179) for rice and secondary crops research at a National Research Center for such crops. While the numbers of scientists from other donors, and their technical competence, is not questioned there have been some problems of mutual concepts and understanding of institutional development.

III. KEY OUTPUT INDICATORS AND TARGETS

A. QUANTITATIVE INDICATORS FOR MAJOR OUTPUTS		TARGETS (Percentage/Rate/Amount)					END OF PROJECT
		CUMULATIVE PRIOR FY	CURRENT FY		FY 76	FY 77	
			TO DATE	TO END			
1. NRRP reorganized within Agency for Agricultural Research and Development and Chairman appointed (who is also Project Leader Nat'l. Research Ct.)	PLANNED	1	1	1	1	1	1
	ACTUAL PERFORMANCE	1	1				
	REPLANNED			-	-	-	-
2. National Food Commodity Research Board Functional	PLANNED	1	1	1	1	1	1
	ACTUAL PERFORMANCE	1	1				
	REPLANNED			-	-	-	-
3. Sufficient Rupiah budget support (million Rp/Year) by IFY	PLANNED	743	1708	1708	1913	-	-
	ACTUAL PERFORMANCE	743	1708				
	REPLANNED			-	-	-	-
	PLANNED						
	ACTUAL PERFORMANCE						
	REPLANNED						
B. QUALITATIVE INDICATORS FOR MAJOR OUTPUTS		COMMENT:					
1. GOI budgetary support		CRIA budgetary support for IFY 75/76 is Rp. 1,708,000,000 and for IFY 76/77, Rp. 1,913,400,000.					
2. Planning		COMMENT: The quality of the Planning and Organization indicators can be discussed under the same heading: The NRRP has been reorganized under the ARD, as of 1975. The chairman is a senior scientist in CRIA, and CRIA is the executive body for NRRP. Each year the central administration and					
3. Organization		COMMENT: each department develop detailed research programs, staff expansion programs, and building programs. These programs have provided the justification for the substantial budgets allocated to CRIA in recent years.					

AID 1020-25 (10-70) PAGE 4 PAR 8	PROJECT NO. 198	PAR FOR PERIOD: 2/74 to 11/76	COUNTRY Indonesia	PAR SERIAL NO. 77-4
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IV. PROJECT PURPOSE

A. 1. Statement of purpose as currently envisaged. Establish a coordinated national program to plan and manage the use of agricultural research resources for the production of improved technology of high economic priority food crops and to distribute that technology to agriculture education and extension institutions.

2. Same as in PROP? YES NO

1. Conditions which will exist when above purpose is achieved.	2. Evidence to date of progress toward these conditions.
1. Jointly planned and implemented agricultural research program among Indonesia's agricultural institutes and universities.	1. The reorganized NRRP, under the ARD and through the CRIA administration, incorporates joint institutional planning and implementation.
2. Food-commodity approach to research by the NRRP and other research programs through coordination efforts of National Board for Food-commodity Research.	2. Both rice and multiple cropping research activities are food-commodity approaches.
3. Research priorities determined by economic studies and analyses.	3. The NRRP/CRIA activities have been the result of economic studies and analyses to develop priority research areas.
4. Research results adopted by end-users through extension services.	4. While emphasis in CRIA is on research, there are increasing numbers of experiments on extension farms and in farmers' fields. The IBRD has 3 current loans in the extension area: a) Information Centers, b) Training Centers, c) Extension Education. (Continued page 6)

V. PROGRAMMING GOAL

A. Statement of Programming Goal

Increased agricultural production through the development of improved technological research.

B. Will the achievement of the project purpose make a significant contribution to the programming goal, given the magnitude of the national problem? Cite evidence. Although there may be alternatives, the research approach to increasing food production is logical and has proved successful in the developed countries. In Indonesia it has been demonstrated that milled rice equivalent yields can be increased by the typical farmer from the present 1.8 mt/ha to 3.5 mt/ha, and that the potential is as much as 6 mt/ha. Yields of over 3 mt/ha are being produced by some farmers. Inasmuch as Indonesia has been in a position of annually importing approximately one million mt of food grain for the past two decades, increased yields through research, and the dissemination and adoption of new plant varieties and agricultural techniques, offers a reasonable means of attaining self sufficiency in food grains.

Continuation of II A 1:

As new problems and issues arise, these programs should also serve as models for future well-focused and soundly developed research. Reference should be made to Attachment I, pp 5-10, for a description of activities.

Continuation of II A 4:

CRIA has placed prospective trainees at LIA, IPB, and a local high school for English language training, using CRIA funds to cover costs. Overall training to date, which is on schedule, and funded from all sources available to the contractor, is as follows:

	PhD	MS	Specialized Training			
			Rice Production	Cropping Systems	GEU	Others
Completed	5	4	12	31	15	21
In progress	6	7	-	10	-	-
Planned	4	8	10	8	6	3
Total	15	19	22	49	21	24

Continuation of II A 5:

Commodity funding through the IRRJ contract, to date, has amounted to \$ 75,500.

Continuation of II A 6:

Rp. 1,913,400,000 respectively. Each year the central administration and each department develop detailed research programs, staff expansion programs, and building programs. These programs have provided the justification for the substantial budgets allocated to CRIA in recent years. In January 1976, the CRIA staff, together with scientists from the universities and other government agencies, reviewed the CRIA research administration process with reference to 1) problem identification, 2) research strategies, 3) program direction, and 4) organizational development. The proceedings from this review have been published by CRIA as "Strategi dan Pengembangan Penelitian Tanaman Pangan" pp 63 (The Strategy and Development of Food Crops Research).

CRIA scientists play significant roles in cooperative international research. Of major importance is the cooperative role CRIA staff play in the IRRJ Cropping Systems Network, the International Rice Testing Program, and the International Agro-Economics Network. Their roles are not only as scientists implementing

in-country research projects, but also in advisory capacities on committees which guide the general thrust of these cooperative projects in South and Southeast Asia.

The IRRI Annual Report for 1975, "Research Highlights", notes:

*An early maturing line from a cross made by Indonesian scientists, Kn-1b-361-1-8, performed best under the unusually cold conditions of Banaue (Philippines). It matures early, so farmers can grow two crops there, where they have traditionally grown only one because local varieties mature late. The Philippine Seed Board has named the Kn line as the Variety RPKn-2 and is multiplying and distributing seeds to farmers in mountainous regions of the Philippines."

Overall cooperation on the part of CRIA has been outstanding. As a result of the cooperation between scientists, new rice and legume varieties have been screened and released and/or proposed for release. Research from other programs is expected to have an impact on national food crop production projects.

Continuation of IV, B, 4

In September 1976, two upland and three high elevation rice varieties, tolerant to cool temperatures, were released. New varieties of corn (resistant to downy mildew), mungbean, peanut, cassava and sweet potato will be proposed to the National Seed Board for consideration to be released in 1976.

Continued Relevance of Project Purpose

1. Alternative approaches to achieve purpose or goal

Both purpose and goal aim at increased agricultural production, implying self-sufficiency, through improved research planning, organization and new technology.

An alternative approach might be to follow the production-oriented thinking of some planners who suggest the direct adoption of HYVs and agronomic techniques developed by the International Research Centers, and thus avoid the time-lag occasioned by national research efforts. While such an approach may have been successful in a few isolated cases, the risks involved are very great, as varieties break down under different agro-climatic conditions and new types of pests and diseases, and agronomic practices vary traditionally amongst the world's peoples. In practice, then there appears no immediate substitute to national research; it follows that the better the organization and the planning, and the greater the involvement of new technology, the greater the probability of developing varieties and techniques suitable to the conditions peculiar to the various geographic areas of the country.

2. Current priority of project with the GOI

The priority given the project is high on the evidence given by support to the project, the increased budgetary allocation to CRIA (Rp. 596 million FY 72/73 to Rp. 1,913 million FY 76/77), the positive attitude and approach to training and increasing staff numbers, the credibility and participation of CRIA scientists in international research, the recent interest in expanding the research network to the outer-islands, and the strong request that the IRRI contract be extended for another 2 - 3 years.

3. GOI view of USAID role

The keenness with which CRIA staff, at all levels, participate in discussing research activities and traveling to experimental sites to exhibit the experiments; the willing participation in project planning, and project reviews; and the consistent requests for assistance all aptly demonstrate a confidence in USAID support. Both parties share common perception of the project purpose.

4. Adverse side effects to project

There can probably be found those prophets of doom who will maintain that the use of the new HYVs, mechanical threshing machines, and batch driers exert an adverse social (and implied political) effect in that they destroy social traditions. Such is often the result of a new technology, and those concerned must weigh self-sufficiency in food production against the preservation of traditional methods and values and consequent low production levels. Many scientists are fully aware of these effects and strive to maintain as much tradition, in change, as possible. Other than this consideration there are no adverse side effects to the project.

5. Do benefits justify costs?

The answer must be affirmative. Varietal testing and breeding has developed new lines of grains which yield two and three-fold increases in yield, mature much earlier, and are tolerant or resistant to certain pests and diseases, and adverse soil and climatic conditions. Using such plant materials the farmer can attain a higher yield from a single crop; can crop areas not previously cultivated; and, if he has the initiative (and markets), he can follow the cropping system patterns now being developed and harvest two or even three crops a year, using short maturity varieties in sequential plantings, or by intercropping.

6. Unexpected benefits

The increased credibility and participation of CRIA scientists in international agricultural research activities, over such short span of time, might be considered as an unexpected benefit.

7. Overall summary assessment of project

Performance

<u>Unsatis-</u>		<u>Satisfactory</u>			<u>Out-</u>	
<u>factory</u>					<u>Standing</u>	
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>

X

Arithmetically, in rating the performance of the six categories, a simple numerical index would appear at "5" -- highly satisfactory; however, it should be pointed out that contractor and host country performance are clearly outstanding.

Response to Action Outlined in Previous PARAction #1

The National Rice Research Program (NRRP) has been superceded by the development of the National Rice Research Project (effective from 1975), which falls within the structure of the Agency for Agricultural Research and Development (ARD). The ARD was created in April 1975. By putting the National Rice Research Project within one agency, the budgetary problems which confounded the NRR Program were resolved. The extension education, marketing and post-harves, technology components included in the NRR Program were not included since CRIA's expertise lay within crop improvement, production, protection, farm management and production economics. Where expertise within the NRR Project does not exist, the Project administration has endeavored to cooperate, and even contract with, university staff and other units which do have the expertise necessary to undertake priority investigations.

The GOI has made comprehensive changes in its extension and information dissimination services, with the objective of improving staff qualifications and strengthening the services provided to the agricultural community. Increasing the number of staff is an important component of this program, and World Bank funding is being provided to establish training programs for new extension and information service personnel.

Although substancial gains have been made in strengthening research programs and in improving staff qualifications, the planned development of a National Research Center for Rice and Secondary Crops, at Sukamandi, is behind schedule, and program planning for present and proposed regional stations in the outer islands will absorb more of CRIA's scientific and administrative resources. In view of these factors it is reasonable to consider the requested extension of support for the IRRI contract. The present contract staff (three) have an excellent working knowledge of research problems and CRIA's program objectives, and can ably provide needed assistance as the CRIA programs expand into new areas.

Action #2 & 3

Want of timely preparation of USAID-required documentation and formal reviews is a reflection on the lack of USAID initiative, as witness the last PAR was conducted in February 1974. Since December 1975, linkage between USAID and IRRI and CRIA staff has been maintained on a regular weekly basis. Quarterly Reports, Trip Reports, and reports of on-going research have been regularly presented, circulated within the Mission, and are on file. A formal review of the project activities was presented by a joint CRIA/IRRI team on 28 September 1976.

Action #4

Although formal planning and review of participant training has not been routinely conducted, a master list of potential trainees was developed shortly after the last PAR. Additionally, one of the senior CRIA scientists was designated Assistant Director for Manpower and Training, and given the responsibility of reviewing CRIA training needs and processing documents for training programs, in liaison with the various departments within CRIA. The responsibilities have been discharged in a professional manner to the general satisfaction of CRIA, IRRI and USAID.

Action #5

Commodities ordered since the last PAR have been minimal. The major portion of expenditures in that time being for statistical processing equipment, which has been placed in the statistics unit and is routinely used. Commodity needs are planned ahead and serve as a basis for annual budget development.

Action #7

As of 30 June 1976, the number of IRRI staff were reduced to three:

- 1 - Statistician/Economist/Team Leader
- 1 - Plant Breeder
- 1 - Agronomist

Action #8

The project Statistician/Economist has been appointed Team Leader by the Director General of IRRI.

Attachment B. Example of feed-back. From farming regions to the research center, and prompt action to mobilize resources to alleviate the threat of a major pest with disastrous effects on yields.

BPH Meeting (Siwi, Harahap, Subiyanto, Beachell (breeders); Soehardjan, Oka, Mochida, Dandi (entomologists); Tantera (pathologist); and Soetjipto (agronomist). February 19, 1977.

At the February GEU meeting it was suggested that a GEU* team be sent to N. Sumatra to investigate the reported BPH attacks on IR26. On February 10 to 14 a team did go to N. Sumatra for this purpose. The team consisted of Oka and Mochida (entomologists); Harahap and Beachell (breeders); and Soetjipto (agronomist). A detailed report of the trip is nearing completion and Dr. Mochida is taking the lead in its compilation.

* BPH - Brown Plant Hopper

Present BPH situation in N. Sumatra

As the report will show, a biotype of BPH has developed in N. Sumatra to which IR26, IR28, IR30 and IR34 are susceptible. IR32 and IR36 were resistant when adjoining fields of IR26, IR30, and IR34 were showing susceptible reactions.

The purpose of this meeting was to discuss the present CRIA research program relating to BPH control and to review the possibility of starting new studies that might conceivably lead to more efficient and effective control measures. Some of the ideas discussed are presented in the report of the meeting.

Varietal resistance, chemical control, and integrated control measures including cropping patterns designed to break the life cycle of the hoppers were discussed. The importance of GSV* control was also mentioned.

The group agreed that the present recommendations as published in Berita Nos. 4, 5 and 6, do give reasonably effective control if applied on schedule and before massive outbreaks occur.

Too often high insect populations develop before strong control measures are put into operation and then it is virtually impossible to prevent wide scale damage. Even air spraying as now practiced has questionable value. It may reduce adult populations but has little or no effect in reducing the emerging nymphs. It was generally agreed that more effective control measures are needed if heavy losses are to be prevented.

Varietal Resistance

A major effort of the varietal improvement program (through the GEU approach) is devoted to the development of resistant varieties. Promising BPH resistant breeding lines developed at Bogor are now being evaluated in advanced and multi-location yield trials. Some of them appear to be worthy of consideration for release as new varieties. Based on parents used in their development some of them should have biotype-2 resistance to BPH.

Many crosses have been made which carry biotype-2 resistance, a few of which are in the advanced generation stage of development. Many are in the F₂ to F₅ generation stages and include both bulk hybrid populations and pedigree lines. These populations and lines are now ready for biotype-2 screening which has been delayed because a biotype-2 colony has not been available in Indonesia.

Biotype-2 colonies from N. Sumatra are now being increased under isolated conditions at both Bogor and Sukamandi. Within 30 to 45 days populations of insects should be sufficient to start limited screening of a few varieties and lines.

Before large scale mass screening can be started additional facilities and budget will be required.

IRRI, Los Banos has been requested to screen some of the most promising lines for biotype-2 reaction but at best the number of lines that IRRI can screen will be only a small fraction of the total number that will be required.

As soon as the biotype reaction and yield trial evaluations are completed (by May-June 1977) we should be able to decide which of the lines should be advanced to wide scale yield tests in dry season and to seed purification and seed increase program.

We are also looking at promising lines developed at IRRI and elsewhere but at the moment do not have any outstanding prospects. There are several rather promising selections from IRRI lines, made at Sukamandi^(on Java) which may have promise.

The search for other gene sources of resistance should be pursued vigorously. We will have to rely heavily on IRRI for identification of biotypes and whether local varieties found to be resistant represent new gene sources. Maros station^(So. Sulawesi) has found several local varieties that show resistance but reaction to biotype-2 is not known.

Another approach is to follow up on the reported tolerance to hopperburn reported on B541 in the Kuningan area and on Kencana which has not appeared on hopperburn in seedling tests as readily as susceptible varieties. B2350- showed much slower rate of hopperburn in the field at Genteng than adjacent lines. In all of the above cases seedling tests show susceptible reactions, except that Kencana sometimes shows a degree of resistance.

If varieties can be found which tolerate the hoppers and at the same time prevent the massive build-ups now experienced in the HYV's it might prove to be an effective control measure, particularly if pressure on biotypes is not involved.

A method of detecting such a reaction on many lines will be difficult. Studies such as reported by IRRI in the 1968 annual report page 218 might be used. Only a limited number of varieties could be tested using such procedures but it would determine whether the suspected varieties retard insect reproductivity compared with known susceptible varieties such as Pelita, etc.

Stem diameter and thickness of stem walls might be factors that influence rate of population build up.

Field screening

Field screening in N. Sumatra should be considered as well as greenhouse screening in cooperation with universities there. Field screening has been used effectively but plantings of test materials must be made when hoppers are abundant in the fields and the plants in the fields are still in the vegetative or early reproductive stages. Close monitoring of areas under consideration for field screening is essential as well as availability of experienced technicians for carrying out the tests.

Chemical control

^{publications}
Berita/Nos. 4, 5 and 6 give the latest information on control of BPH and recommend varieties to use; list recommended insecticides and methods of applications; describe integrated control measures; and suggest cropping patterns to consider.

It was brought out that the above mentioned control measures are effective and if early monitoring of BPH build-up is followed, satisfactory control is possible. If spraying is delayed until after massive build-ups occur, the control measures are not effective as only live hoppers and predators are killed but not the eggs and the nymphs that emerge after spraying. An effective monitoring program might be one of the most effective programs for the immediate future. Similarly airplane spraying under these conditions is also ineffective for the same reasons.

An improvement in insecticide availability at critical times is needed.

The use of granular and ground application methods should be explored. The use of the liquid applicator developed at IRRI may be useful in some areas. The insecticide used would have to be carefully selected so as not to be injurious to human as well as to fish. The continued search for new chemicals is important.

Cropping Patterns (Agronomy)

A lot has been said about cropping patterns in control of BPH but little if any research has been done. Also, there is questionable information from the field as reported by farmers and others. In the Banyuwangi area BPH was brought under control by 1) prohibiting rice planting at certain periods of the year and 2) by the wide scale planting of IR26 / ^{variety.} It is difficult to say whether the control of BPH was due entirely to the use of IR26, or in part by the planting schedule followed. It is

important that cropping pattern research be considered but this will be complex. This does not imply that it should be neglected as it is entirely possible that cropping patterns may be the only practical way of controlling BPH.

Wide spread and massive BPH population build-ups are occurring in many countries on the HYV varieties. It is generally thought that this is due to the high N fertilizer rates used. But, there may be other factors involved. Do different plant spacings have an effect on hopper development? What about degree of tillering and plant height; erect or drooping leaves? The above mentioned factors should be considered in the overall program. Consultations with IRRI scientists and other leading authorities should be made.

Grassy Stunt Virus

Grassy stunt virus (GSV) which is vectored by BPH, can cause severe field losses and it is important that GSV resistance be bred into recommended varieties. A strong source of resistance ^{in rice} is available (from O.nivara) and this resistance has been transferred to a number of varieties/lines by IRRI and is a relatively stable resistance even though simply inherited. The difficulty is that only small numbers of lines can be screened per season by the IRRI method. So far we have been using field screening which is not reliable. The development of improved methods of screening large numbers was discussed, and Drs. Oka and Tantera felt that it might be possible to develop a satisfactory method. They propose to start work to develop such a method.

The team found essentially no GSV in BPH affected fields in N. Sumatra at the time of their visit (February 1977). Last year the virus was wide spread and caused considerable yield loss. The reason for the absence of GSV should be investigated. As a first step it should be determined whether biotype-2 BPH resistance will transmit GSV as readily as biotype-1 insects.

Varietal recommendations

At this time it appears logical to recommend the use of varieties IR32 and IR36 in those areas of N. Sumatra where IR26 has broken down. The group felt that the indiscriminate shift to IR32 and IR36 throughout Indonesia would be very unwise. These varieties are resistant to biotype-2 of BPH and at the present time appear to be resistant to BPH in N. Sumatra. Not enough information on their overall performance is known. In the seed increase fields of Extension Service near Medan considerable panicle blight (brown panicle) was observed in IR32 and considerable sheath blight in IR36.

The wide scale planting of new lines resistant to biotype-2 in N. Sumatra or elsewhere before they are fully evaluated in Indonesia was considered unwise. Approximately 23 ha. of IR38 are growing at Perum Sang Hyang Seri, Sukamandi. This seed should be distributed with caution. The same would apply to IR40 and IR42 (if and when they are made available in the Philippines) as well as any other lines (from Indonesia or elsewhere) that have not been fully evaluated.

Efforts should be expanded to speed up field evaluation through increasing the number of lines evaluated each season.

There were strong feelings against the emergency release of any new line until reasonably reliable information on its overall behavior is obtained. The Seedboard should be reminded of the dangers involved.

N. Sumatra wants 100 tons of IR32 now. It was suggested that if this amount of seed could be supplied to N. Sumatra it should be distributed to areas hardest hit. If farmers plant susceptible varieties, fields should be carefully monitored throughout the growing period and chemical control measures employed before hoppers reach epidemic proportions.

Conclusions

The group decided that a concise plan of work should be prepared at the earliest possible date and be presented to the Director of LP3 for consideration. Dr. Harahap was asked to head up the group calling on other scientists as required in the formulation of the proposals.



DEPARTMENT OF AGRICULTURE
CENTRAL RESEARCH INSTITUTE FOR AGRICULTURE

Jalan Merdeka 99, Bogor, Indonesia

Attachment No. F

Our Ref : 2065/Dir-08/76

USAID ROUTING		
to	Act	Info
D/R		
D/D		
LA		
MGY		
PHO		
RD	✓	✓
PH		
E&HR		
VHP		
P. T&E		
JAO/AUM		
PER		
GSO		
M.Pool		
MGY/C&R		

August 26, 1976

Mr. Walter C. Tappan
Agriculture Officer
USAID
American Embassy
Jakarta

Dear Mr. Tappan :

As you know the present USAID-GOI cooperative project, which started in August 1972, will be terminated in February 1977. We feel that this project is a successful one in terms of manpower development and research capability improvement of CRIA.

While awaiting for physical development at Sukamandi which later on will become the "National Centers" for rice as well as palawija crops, we feel that it is desirable to extend the present project for another two years * beyond February 1977. We prefer to extend the services of the existing experts.

We will submit the request through proper channels but in the meantime we will appreciate it very much if USAID can make necessary arrangements before the official request. In general, we would like the project to continue in its current form but with some slight modifications which CRIA scientists believe will greatly strengthen the project over the proposed two-year extension.

The modifications are suggested to strengthen the overall project where it is weak and to increase flexibility in funding of training programs and equipment procurement. The suggestions are presented below:

* USAID estimates that a further 3 - 5 years will be required before facilities are completed and staff assigned to implement the IBRD loan funding the national research center for rice and food crops at Sukamandi.

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Our Ref 2065/Dir-08/76

- 2 -

1. Support for an office of information services.

CRIA plans to strengthen its publication services and training activities for such agencies as BIMAS and Directorate of Production Development, and for its own net-work of regional stations and sub-stations. A USAID/IRRI trained CRIA staff member is expected to returned late in 1976 to develop a section which will have research information dessionimation and training responsibility. It is believed that a short-term consultancy of 6-9 months duration would enable the section to strengthen itself in such matters as visual aid preparation, graphics, publication layout and editing, and equipment operation. It is also suggested that the future program include funds for the purchase of critically needed equipment for an information services section. More details for such a proposal can be obtained from a report written by Dr. J.C. Torio, Editor, IRRI following a brief consultancy under the current IRRI/USAID program.

2. Short-term in-service and formal training.

There are many instances when a need for short-term training at IRRI or elsewhere for key CRIA staff is critical to overroome a bottleneck in a research program. Sometimes the training needs are for specific research techniques or procedures. Other times, the training requirement is more general, covering several aspects of a subject matter area. By putting training funds directly into the IRRI program, greater flexibility and shorter lead time requirement in the development of training programs should result. It is suggested that funds for 30 man-months of short-term training should be placed directly in the program budget for disbursement through IRRI.

3. Flexibility in equipment purchase.

In recent years, the manufacturing capabilities in Indonesia have increased rapidly. This is especially true in the sector producing small farm machinery.

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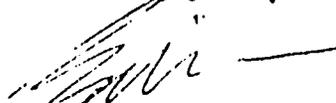
Our Ref : 2065/Dir-08/76

- 3 -

Advances in manufacturing capability in recent years have been so rapid that equipment which should be used and tested in field situations, chiefly in the outer islands, becomes available before the CRIA budget can be modified or adjusted to include funds for it in current research programs. Although it is expected that flexibility will be built into the CRIA budgeting procedures in the future, current regulations do not provide for rapid increases or modifications in the disbursement of budgeted funds. In light of this it is suggested funds be made available, either in dollars through the contract or in rupiah through the trust fund, to enable IRRI program scientists to purchase locally manufactured equipment critical to program needs. Moreover, it is suggested that funds for the purchase of equipment for similar purpose, manufactured in other developing countries such as the Philippines, Taiwan, Columbia, Sri Langka, Nigeria or India, be made available through the contract without resorting to waiver procedures, provided the purchase value is below US\$ 500 per order.

The above three suggestions are presented at this time so that they can be fully discussed before being included in the detailed agreement in a proper in suitable form.

Sincerely yours,



A. M. Satari
Director, CRIA

Concurrence:


Sadikin Sumintawikarta
Head, Litbang

March 8, 1977

FINDINGS AND RECOMMENDATIONS RELATING TO
PROPOSED EXTENSION OF INDONESIAN AGRICULTURAL RESEARCH
PROJECT 497-0198

REH. *H.B.S.*
(Reviewers: Ralph E. Hansen and Howard B. Sprague)
(6 copies to USAID, as specified in contract)

A. Findings

1. The team arrived at the mission on February 22, 1977 and completed its review on March 8, 1977. The procedure was: to consult with appropriate AID Mission personnel; review available reports by the contracting personnel on activities and progress during the 5-year period ending February 8, 1977; make visits to the research center at Bogor to view research facilities and to confer with IRRI and CRIA staffs who are conducting the project research; and to draft a project paper for a 3-year period. In addition, the reviewers held four conferences with the IRRI staff scientists at the AID Mission in Jakarta. All contacts with personnel have been friendly, and full cooperation has been provided.
2. The IRRI staff members were found to be competent in their respective professional assignments; they have exhibited initiative, diligence in performance, excellent judgment in evaluating research findings, and in planning to exploit fruitful lines of action. The counterpart senior CRIA staff is well trained, and progress has been made in advanced education and training of Junior staff for responsible duties.

3. The five improved rice varieties that have recently been released for commercial production combine higher yielding ability with shorter growth periods and resistance to certain diseases and insect pests, and tolerance to lower temperatures. There is a large collection of other breeding stocks on hand that will be used to develop additional improved varieties for uplands as well as for irrigated lands, and for combined resistance to serious pests. Considerable progress has been made in screening germplasm collections of secondary food crops to identify superior varieties and multiply seed stocks. Notable progress has been made in developing inter-planted cropping systems for upland rain-fed agriculture, that gives much higher total yields per hectare per year, with a marked increase in net returns to the grower. The research results to date indicate the potential for even greater benefits for a wider range of environments, if apparent opportunities are exploited. New methodology and experience gained in devising more productive farming systems should have wide significance. Positive progress has been made toward national self-sufficiency in food production, and in developing a practical and economically sound basis for resettlement of farmers on new land that can promptly be brought into production.

4. The prompt dissemination of recent research findings is indicative of acceptance by the Extension Service and by farmers, of the improved technology created to date. The prospects are excellent that the flow

of improved technology will grow in volume and in profitability as this research project advances. Such advances will be the product of the widening scope of available plant materials and of new insights, combined with the growing body of young scientists who are returning to CRIA from advanced training in other countries. The challenges of pioneering resettlement programs in the major islands will easily absorb the new capabilities, and serve as the stimulus for further innovative research and adaptation to specific environments.

5. The general atmosphere for progress appears excellent. There are good personal relations and mutual respect between the AID Mission, the IRRI research team, and the CRIA counterparts. There is frankness on technical matters, freedom in exchange of information, cooperation in use of support facilities and manpower, and acceptable compliance by GOI in meeting its programmed support. The essential construction at Sukamandi (new research center) is notably behind schedule, but adjustments at Bogor will permit continued progress with the project because of the present favorable good will. During the next three years, field testing may expand at Sukamandi, even though at some disadvantage because of the distance from laboratories and offices at Bogor.

6. The reviewers have prepared a draft revision of the proposed project extension (project 497-0198) (complete with attachments) which

provides for a three-year extension of the AID contract with IRRI. Six copies were delivered on March 8, 1977 to the USAID Mission, as specified in instruction to the reviewers. In preparation of the revision, a preliminary draft was submitted to six officers of the Mission and the Director/CRIA for comments, and the final draft was modified to reflect decisions on proposed changes.

B. Recommendations

1. On the basis of five years of satisfactory performance, it is recommended that this project be continued for three years, with total AID grant funding in the amount of \$922,550. (see project paper).
2. It is recommended that the following staff scientists be provided as part of this IRRI contract:

		<u>Work months</u>
Plant Breeder	- 3 years	36
Agronomist	- 3 years	36
Statistician/Economist	- 3 years	36
Information specialist	- 6 months (1977)	6
	T o t a l	114 W.M.

3. It is recommended that periodic Project Appraisal Reports continue jointly by USAID-IRRI-CRIA, plus one outside specialist nominated

by AID-Washington, in following sequence:

November 1977

September 1978

July 1979

4. Determine the future of any AID support for this project at least six months prior to the completion of the proposed contract extension.

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Department of State

ATTACHMENT NO. H
OUTGOING
TELEGRAM

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TAGS:

SUBJECT: EXTENSION OF AGRICULTURAL RESEARCH PROJECT (497-196)

REF: (A) JAKARTA 15996 (B) STATE 295326 (C) JAKARTA 14965

1. AID-W SUPPORTS PROPOSED PROJECT EXTENSION HOWEVER PP REVISION NEEDS ADDITIONAL DETAIL INFORMATION AND ANALYSIS TO SUBSTANTIATE RECOMMENDATION FOR APPROVAL. BECAUSE OF LENGTH OF DESIRED EXTENSION AND MAGNITUDE OF FUNDING INCREASE, PP REVISION SHOULD DEMONSTRATE CONTINUING VALIDITY OF ORIGINAL PROJECT PURPOSES AND (2) ADDRESS MANY OF NEW PROJECT DESIGN CONSIDERATIONS IDENTIFIED IN HANDBOOK.
3. REQUEST USAID POUCH NEW PP REVISION WHICH ADDRESSES FOLLOWING POINTS:

2. IT SHOULD DESCRIBE NATIONAL STRATEGY FOR DEVELOPMENT OF AGRICULTURAL RESEARCH INCLUDING RELATIONSHIP BETWEEN SUBJECT PROJECT EXTENSION, IBRD-FINANCED SUMATRA PROJECT, AND PROPOSED AID-FINANCED AGRICULTURAL RESEARCH PROJECT IN SUMATRA (REF STATE 1552). DISCUSSION SHOULD CLARIFY WHY IBRD LOAN IS BEING DEFERRED AND NEW SUBJECT PROJECT IS EXPECTED TO PHASE INTO IBRD-FINANCED PROJECT.

3. INCLUDE SUMMARY FINDINGS/RECOMMENDATIONS OF RECENT PROJECT EVALUATION AND USAID REVIEW AND CLARIFY FOLLOWING RELATED SUBJECTS: PLANNED END-OF-PROJECT STATUS (EOPS), ACHIEVEMENTS TOWARD EOPS TO DATE, AND WAYS IN WHICH PAR RECOMMENDATIONS WILL INFLUENCE PROJECT DESIGN FOR THREE-YEAR EXTENSION. REQUEST USAID POUCH COPIES OF PAR ALONG WITH PP REVISION.

4. IN LAYING OUT PROJECT DESIGN FOR EXTENDED PERIOD, PROVIDE MORE PRECISE DEFINITION OF PROJECT PURPOSE AND DESIRED SET OF CONDITIONS TO EXIST AT END OF THREE-YEAR PERIOD. CURRENT STATEMENT OF PURPOSE (EOPS) (PER LOG-FRAME) IS OPEN-ENDED AND WOULD NOT PROVIDE SATISFACTORY BASIS FOR CONCLUDING PROJECT IN TIMELY FASHION AND EVALUATING RESULTS.

5. BENEFICIARY LINKAGES: AS WITH SUMATRA AG RESEARCH PRP, PP PERMISSION SUBJECT PROJECT SHOULD IDENTIFY INTENDED BENEFICIARIES AND DISCUSS LINKAGES TO ASSURE THAT SMALL FARMERS WILL BE ADEQUATELY SERVED BY PROJECT. DISCUSSION

SHOULD ADDRESS FOLLOWING FACTORS: (A) CROP SELECTION GEOGRAPHIC EMPHASIS, AND APPROPRIATE TECHNOLOGY AND PRACTICES THAT RELATE TO SMALL FARMER. (B) MEANS OF CONDUCTING RESEARCH AND FIELD TRIALS THAT REFLECT CONDITIONS EXPERIENCED BY SMALL FARMER AND (C) FEEDBACK MECHANISMS FROM SMALL FARMERS TO RESEARCH AGENCY. TO WHAT EXTENT ARE NEW CROP VARIETIES RECENTLY RELEASED BY CIA USABLE BY SMALL FARMERS? HOW ARE THESE NEW VARIETIES BEING DISSEMINATED TO SMALL FARMERS? IN GENERAL, HOW EFFECTIVE IS THE NATIONAL EXTENSION PROGRAM IN CONVEYING IMPROVED TECHNOLOGY AND PRACTICES TO SMALL FARMERS?

6. FINANCIAL AND ADMINISTRATIVE FEASIBILITY: CURRENT PP REVISION AND REF (C) ALLUDE TO BUDGETARY AND ADMINISTRATIVE PROBLEMS THAT HAVE AFFECTED PROJECT TO DATE AND APPARENTLY HAVE CONTRIBUTED TO DELAY IN DEVELOPING NATIONAL RESEARCH CENTER AT SUKAMANDI. PP REVISION SHOULD PROVIDE ANALYSIS OF CIA'S FINANCIAL AND ADMINISTRATIVE CAPABILITY TO CARRY OUT NATIONAL AGRICULTURAL RESEARCH PROGRAM AND TO IMPLEMENT SUBJECT PROJECT EFFECTIVELY. (II) WHAT WAYS WILL SUBJECT PROJECT IMPROVE PROSPECTS FOR EARLY AND EFFECTIVE DEVELOPMENT OF IBRD/SUKAMANDI AND AID/SUMATRA AG RESEARCH PROJECTS?

7. SATARI LETTER DATED AUGUST 26, 1976 REQUESTS APPROVAL OF MORE FLEXIBLE PURCHASING ARRANGEMENTS FOR EQUIPMENT. PP REVISION SHOULD DISCUSS ISSUE AND POSSIBLE SOLUTIONS, PERHAPS INCLUDING NEED FOR USAID WAIVER AUTHORITY FOR SMALL LOCAL COMMODITY PURCHASES.

8. FACE SHEET FOR PP REVISION SHOULD BE REVISED TO REFLECT CONTINUING NATURE OF PROJECT.

9. RECOGNIZE THAT ANALYSIS REQUESTED HERE REQUIRES CONSIDERABLE STAFF TIME AND USAID TEMPORARILY SHORT-HANDED. BELIEVE WE CAN PLACE TOY TEAM IN FIELD QUICKLY TO ASSIST IN DEVELOPING PP REVISION. ALTERNATIVELY, MISSION MAY WISH TO UTILIZE RALPH GLEASON AND/OR XOPH AND FPOLICK SCHEDULED TO ARRIVE IN MID JANUARY AND EARLY FEBRUARY, RESPECTIVELY. PLEASE ADVISE.
KISSINGER

Handwritten notes and checkboxes in a rectangular box, including a large arrow pointing to the right.

